Addressing Small Business Needs:   
Technological Consultation for MilleniAds

Katelyn K. Stapleton

Southern New Hampshire University

Abstract

MilleniAds is a newly founded small publishing company that hired an IT consultant to address their technological needs. The consultation provides an overall summary of the company’s technological situation. The following sections address technology in detail in the categories of hardware, software, networking, and maintenance and security. The consultation closes with information regarding future technological considerations.

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An entrepreneur is launching a small advertising company, known as MilleniAds. At this time, the company has a limited IT budget of $25,000 with 10 employees who work in administration, sales, and graphic design. The sales team works remotely from regional firms and customer sites. The estimated client total is 12 accounts with increased grow over time. MilleniAds requests a simple, user-friendly system for file and information exchange.

# Overall Assessment

MilleniAds should have 2-in-1 laptops. Many employees claim that desktops slow down their performance. By removing the keyboard, the laptop screen acts like tablet with the laptop features still included (Madeley, 2018). The employees can to select their preference. At minimum, a graphic design laptop needs a 512 GB solid state drive (SSD), an integrated graphics card, a 1 gigahertz (GHz) quad core processor, and a 8 GB random access memory (RAM) (Micron Technology, 2018). The screen should be at least 13 inches with high resolution (Dean, 2019). The laptops need wireless network capabilities with wired networking options recommended (Mah, 2016). MilleniAds can buy the same laptop for all employees, which is more convenient for repair and replacement. MilleniAds should consider purchasing a desktop for large operations. Other peripherals to purchase include one to two printers, for administrative and production usage. Otherwise, they may need to outsource the production. Administration would be best suited with a printer also.

MilleniAds needs office and graphic design software. For general office software, Microsoft Office is usually the standard choice due to its many features at a low cost (Microsoft, 2019a). Adding a cloud financial application would allow the sales team to process transactions, the administrative team to do accounting, and the CEO to have access to all financial information (Gewirtz, 2018). Many options are available for graphics software, from open source software to high-end software. Graphic software is obtainable for free, one-time purchase, or monthly subscriptions (Crump, 2018; Pickavance, 2019). With a low budget, the consultant and CEO should consider finding graphic software that is a balance between sophistication and cost. They should purchase an anti-virus software or services to prevent possible security issues.

MilleniAds desired to operate digitally and has a remote sales team. The company should use clouding software for business operations. The cloud-based software provides a built-in data recovery system, free to low-cost services, accessible from any location, and offers tools to streamline workflow (Creative Bloq, 2013). Modern software usually has built-in cloud-friendly tools (Microsoft, 2019; Pickavance, 2018). MilleniAds should consider purchasing cloud software that offers virtual communication features. Employees can use their laptops for voice communications and video conferencing (Clarke, 2018). The company will not need to buy smartphones for everyone. The cloud and communications software should have administrative control and security features.

MilleniAds needs a secured network designed for businesses. The company needs a private wireless network with secure remote access capabilities. Note that multiple types of networks are available and not necessarily fully exclusive to each other (Bourgeois, 2016). Based on the company’s size, MilleniAds needs a local area network (LAN). A LAN covers a small geographical area, suitable for small businesses and personal connections (Mitchell, 2019). For the type of LAN, MilleniAds should setup a fiber-optic LAN with an Ethernet-based LAN is an alternative. A fiber optic network provides high-speed connections with symmetrical and large data transfer (Otelco, 2019). The network design, wireless optics, and necessary devices vary based the network type (fiber optics or Ethernet) and the office structure (Otelco, 2019; H, 2019). MilleniAds may also consider setting up a wired network for peripherals or large products to help prevent slow-downs on laptops or tablets (Mah, 2016). The secure network should at least have a firewall(s), secure login, and features to control access and security.

# Hardware Analysis

A graphic designer’s laptop or computer needs at least a 512 GB solid state drive (SSD) with a 7,200 revolutions per minute (RPM) (Micron, 2019). An alternative to the SSD is a 750 GB hard disk drive (HDD) (Micron, 2019). The HDD offers more storage and costs less to purchase (Bryant, 2019). However, it has a lower performance and speed, which affects how fast the computer can operate (Bryant, 2019). An SSD has excellent performance and operates at faster speed than HDD, which is important for graphic design. Based on the importance of speed and longevity, the SSD is a better choice than HDD for MilleniAds despite its extra cost.

With graphic design, the two most important specifications are the number of cores and speed of the processor (Micron, 2019). With more cores and a higher speed, the system can run additional processes without slowing down performance, which is vital for graphic design (Hoffman, 2018). The minimum number of cores recommended is 4 cores. CPUs with 6+ cores are better for higher performance (Micron, 2019; CGDirector, 2019). The recommended processing speed is 4 gigahertz (GHz) with 1 GHz as the minimum (Micron, 2019; CGDirector, 2019). On the side, Intel i5 or Intel i7 is the suggested manufacturer and minimum versions, followed by AMD Ryzen 2700x (Blake, 2016). Due to the expensive price of CPUs, a 1 Ghz quad core processor with Intel i7 is the ideal balance between price and performance.

The ideal RAM is 16 to 32 GB, with the absolute minimum of 8 GB of RAM (CGDirector, 2019). For each new file or software opened, more RAM is needed. Graphics software requires large amounts of RAM (and increasing per software version) (Micron, 2017). Another factor is the RAM’s form. Due to speed and size, the best form for desktops is DDR4 and SODIMM for laptops or mobile devices (CGDirector, 2019). The 16 to 32 GB of RAM is more expensive, but leads to an extended long-term usage and higher performance (CGDirector, 2019). With MilleniAd’s small budget, MilleniAds should use 8 or 16 GB RAM. The laptops can function with 8 GB of RAM if the OS is not overloaded with numerous open applications.

A video card is also known as graphics processing unit (GPU). A dedicated graphics card is highly recommended, but not required. A dedicated graphics card allows for higher graphic display and often has dedicated memory built in, known as VRAM (Micron, 2019). However, a dedicated GPU is usually expensive and large, so it is hard to fit into smaller device, such as laptops or tablets (CGDirector, 2019). A recommended dedicated GPU is NVIDIA GTX 1050 or higher (CGDirector, 2019). Modern integrated GPUs have increased in their graphic capabilities, but still not as high dedicated GPUs (Micron, 2019). According to CGDirector, an integrated GPU will not decrease performance, assuming that MilleniAds does not do video editing and 3D animation (CGDirector, 2019). An integrated graphics card is a better selection for MilleniAds based on its lower cost and past improvements.

Because the computers are not fully custom-made devices, the manufacturer will select the proper motherboard and RAM form. Creating high-functioning custom-made devices is expensive, may require assembly charges, and issues with customer support and warranty policies (Koble, 2016). Pre-made computer models are best for MilleniAd’s smaller budget.

Many modern computers have built-in sound cards, known as on-board sound cards (Fisher, 2019). Dedicated sound cards are available, but only necessary for a full-time audio professional (Fisher, 2019). On-board sound cards “…allows for a less expensive device with only a slightly less powerful audio system” including playing music (Fisher, 2019). MilleniAds should use the on-board sound card because a dedicated sound card is not necessary.  
 The company should purchase 2-in-1 laptops. A 2-in-1 lap is a hybrid laptop that is convertible into a tablet at any time. The keyboard is removable or has up to 360-degree hinge (Bryant, 2019). The laptop becomes a tablet with a bonus of a full computer operating system (Brant, 2019). The ideal screen size is 15 inches, with 13 inches to provide room for graphic design (Micron, 2019). Each employee can select what generates better productivity, a laptop or tablet. The hardware recommendations are as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Hardware | Recommended | Alternative | Reason |
| Type | 2-in-1 laptop | Laptop | Versatility |
| Operating system | Windows 10 Pro | Windows 10 Home | Practicality |
| Storage drive | 512 SSD | 750 HDD | Higher speed |
| RAM | 8 GB | 16 GB or 32 GB | Price |
| CPU - type | Intel i7 | Intel i5 | Performance |
| CPU - # of cores | 4 cores | 6+ cores | Price |
| CPU - speed | 1 Ghz (or higher) | 4 Ghz | Price |
| Video card/GPU | Integrated | Nvidia GTX 1050 | Price |
| Motherboard | Manufacturer/Default | n/a | Pre-determined |
| Sound card | Manufacturer/Default | n/a | Non-essential |
| Screen size | 15" | 13" | Design area |

Laptops already have wireless network capabilities (Mah, 2016). If possible, the laptops should wired networking capabilities (Mah, 2016). The wired capability allows employees to continue working, even if when issues arise regarding the wireless network. To reduce cost, MilleniAds should consider using lesser-known, but still respectable computer manufacturers (Allan, 2018).

Most new 2-in-1 laptops come with Windows 10, the newest version of Windows. Businesses should use Windows 10 Professional (Pro), not Windows 10 Home (Microsoft, 2019b). The Macintosh operating system (OS) is not yet available in actual 2-in-1 laptops (Bryant, 2019). MilleniAds should use Windows 10 Pro due to the additional business functions it has.

Since a desktop is more powerful, the company should consider purchasing one to two desktops for IT management/security, large designs, and product processing (Micron Technology, 2018). The hardware requirements do not change, with the exception of adding monitor recommendations (CGDirector, 2019). However, it is important for the desktop to have the ideal requirements, not the minimum. A keyboard and mouse are necessary. For employee convenience, MilleniAds should consider providing a professional stylus and, if possible, a wireless mouse. MilleniAds will also need at least one high-quality printer for production.

# Software Applications

For office software, Google G Suite Business would be the best choice due to its ease of usage, collaboration, and unlimited storage, offered at reasonable price of $12/user per month (Aten, 2019; Google, 2019). G Suite is a user-friendly cloud-based suite, offering applications for documents, spreadsheets, emails, presentations, storage, communication, administrative control, and security (Aten, 2019). Due to personal usage, employees will likely have some familiarity with it, which helps minimize training (ComputerWorldUK, 2019). A strong highlight is that G Suite allows users to create and edit documents in real-time, allowing for higher productivity and better team collaboration (ComputerWorldUK, 2019). It also offers excellent video conferencing and voice communications (Clarke, 2018). The administrative controls provide features such as data retention, activity reporting, and security but can be tricky to learn (Gruman & Hassell, 2019). G Suite provides 24/7 customer support in multiple languages with libraries and community forums (Aten, 2019). G Suite is compatible with Microsoft Office and offers numerous integrations between other applications (Google, 2019; Aten, 2019) through its G Suite Marketspace. MilleniAds should consider selecting the Accounting application from the G Suite Marketplace (Google, 2019).

Microsoft Office 365 Business Premium is a strong alternative to G Suite, offering similar software, at $12.50/user per month (Microsoft, 2019a). However, Office 365 offers more advanced features than G Suite (ComputerWorldUK, 2019). It is also the only suite with dedicated desktop software along with its browser or mobile applications (ComputerWorldUK, 2019). In contrast to G Suite, real-time collaboration comes with an issue: only one user can edit/add to the document at a time due to the software’s design (Aten, 2019). With over 30 years in the market, most people use and understand how to operate the primary applications of Word, Excel, and Outlook, even more so than Google apps (Aten, 2019). Office 365 provides 50 GBs of email storage and 1 TB of cloud storage per user, making G Suite a better option for large storage needs. (Microsoft, 2019; Aten, 2019). It offers 24/7 live customer support, libraries, and forum, plus extensive training materials (Aten, 2019). The administrative/security control is somewhat easier to handle in Office 365 than G Suite (Gruman & Hassell, 2019). For MilleniAds, Microsoft’s advanced features are unneeded at this time. G Suite offers better collaboration and storage, which is important for MilleniAds.

Zoho Workplace is an alternative to Office 365 and G Suite (Clarke, 2018). It provides a similar collection of applications and storage to Office 365 and G Suite (Aten, 2019). Zoho has less advanced features than Office 365, but about equal to G Suite. Workforce Professional is the least expensive at $6/user per month (Aten, 2019; Zoho, 2019). Zoho has been operating for over 20 years with a growing vendor credibility (Zoho, 2019). However, according to an overall summary of reviews, customers frequently complained about additional purchases and poor technical support (Orencia, 2018).

For graphics software, MilleniAds should purchase CorelDraw Graphics Suite due to its perpetual license, reasonable features, and 5 design applications with additional administrative applications (Corel, 2019). The Enterprise perpetual license is a one-time payment of $499 for a volume license and up to two free Program version updates (Corel, 2019). Additional version updates are available at a much lower cost after the initial purchase (Corel, 2019). A monthly subscription is possible, but the perpetual license is a better choice for MilleniAds. Once a company purchases the software, the company owns the software and can use it for as long as they desire without additional fees (Corel, 2019). Users said the applications provide reasonable features for graphic design, including pixel and vector, but not advanced as Adobe CreativeCloud (Tupert, 2018). Corel offers content exchange and a large library of images, templates, fonts, and more (Tuppert, 2018). CorelDraw functions on tablets, cloud/web-based, and downloaded on computers (Corel, 2019). Integration is available including Adobe Illustrator, MS Powerpoint, and other software/files (Tupper, 2019). CorelDraw offers maintenance software, tutorials, patches/updates, but customers have mixed to negative impressions about the quality of its technical support (Corel, 2019; Capterra, 2019).

Adobe Creative Cloud is considered a top-line graphics software with license reassigning, but it comes at a very high price (Tupper, 2018). If MilleniAds is willing to push their budget to the limit, Create Cloud is available for $80.00 per user per month. The annual cost is $960 per user, totaling to $4800 for 5 users without taxes (Adobe, 2019). A one-time purchase is not available, but the newest version is offered with the subscription. It allows access to all 20+ advanced design applications including Illustrator and Photoshop, much more than CorelDraw (Adobe, 2019; Tupper, 2018). Adobe provides 100 GB of cloud storage, collaborative editing, shared stock places and libraries. It offers integration with Microsoft’s Teams software and with CC applications (Adobe, 2019; Tupper, 2018). Creative Cloud offers positive 24/7 technical support, sessions with design experts and onboarding assistance (Crump, 2018; Adobe, 2019).

Overall, MilleniAds should select Google G Suite Professional as their office software with its low-cost, easy-of-usage, and excellent collaboration tools. For graphics, MilleniAids should select CorelDraw Graphic Suite due its renewability, administrative controls, and advanced features and applications at a much lower cost than Adobe Creative Cloud. If the company is not satisfied with either option, MilleniAds should look into GIMP, a commonly recommended freelance software for graphic design (Crump, 2018).

# Networking Options

MilleniAds needs a secure network for their office with remote access and wireless capabilities. MilleniAds needs a wireless (Wi-Fi) connection because employees will have and prefer mobile devices. W-Fi also allows for a guest connection if desired. The sales team needs remote access to the business’s cloud services and files to display portfolios to clients, catalog sales and travel, and perform general business duties.

MilleniAds needs a local area network (LAN). Generally, a LAN is a network that covers a relatively small geographical area, from the size of one office to multiple buildings on a campus (Mitchell, 2019). Larger networks are available, but cost more to setup, operate, and repair (Mitchell, 2019). Instead of a full wireless LAN (WLAN), two networking types to consider are passive optics LAN (PON) with wireless capabilities or a traditional LAN with wireless capabilities (LeFebvre, 2016, H, 2019). A PON uses fiber optics to establish connection to the internet (LeFebvre, 2016). A traditional LAN uses active Ethernet (AE) (LeFebvre, 2016). The networking design, wireless optics, and necessary devices vary based on the office’s physical structure and network type (PON or AE) (Otelco, 2019; H, 2019).

When comparing PON and AE, MilleniAds should use fiber optic networking and consider Ethernet at an alternative. A fiber optics network provides high-speed data transfer at large capacities with symmetrical speeds for both incoming (downloading) and outgoing (uploading) data (Otelco, 2019). The average transmission speed is up to 10 gigabytes (Gbps) per second, with higher frequencies available (Otelco, 2019). Fiber optic cables are more expensive and fragile than copper cables, but fiber cables have a lower signal-loss rate and longer life span (Woodford, 2018; Anderson, 2019). Due its design, fiber optic networking is highly resistant to electric/ electromagnetic interference (Anderson, 2019). Unlike Ethernet, fiber optics is nearly impossible for outsiders to tap into (Anderson, 2019; Multicom, 2019). However, fiber optic networks are not available in many locations due to cost, but are steadily growing and replacing Ethernet (Anderson, 2019; Otelco, 2019). Ethernet networking is much more common than fiber optic networking, available in most locations (Otelco, 2019). Unlike fiber optics, Ethernet data transmission is asymmetrically; the speed for downloads is 10 to 500 Mbps and uploads at 5 to 50 Mbps (Admin, 2018). Ethernet networks are less secure and susceptible to electric/ electromagnetic interference (Multicom, 2019). Ethernet cables are more flexible, but have a much shorter life span (Otelco, 2019). Fiber optics networking is a better choice for MilleniAds because of the higher data transfer capacities, symmetrical speed, and is replacing Ethernet.

Types of networks are not necessarily exclusive to each other. For remote access, MilleniAds should consider adding a Virtual Private Network (VPN) as an extra security measure. VPNs are setup through a network access server, client software and a subscription to the VPN provider, usually offering technical support (Verizon, 2018). A VPN provider creates a virtual encrypted “tunnel” between the remote user and the facility’s remote network, encrypting the device’s network traffic (Eddy, 2018). A VPN provides security through encrypted data, hiding the device’s location, masking the user’s identity and more (Eddy, 2018). See Figure 1:

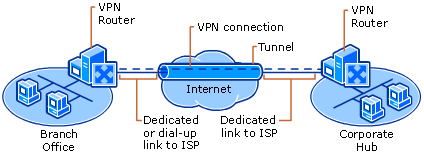


Figure 1. Remote access VPN connection (Stark, 2017)

A VPN works on any network including public connections (Eddy, 2018). Administration can limit data access, implement usernames and passwords, and grant/revoke access at any time (Verizon, 2018). In addition, MilleniAds can add firewall(s) and AAA servers. Employees will be able to use their mobile devices securely from almost any location, which will greatly benefit the remote sales team and if the designers desire to work outside the office.

MilleniAds needs to examine which VPN vendors they would prefer and alternative vender. In the modern day, many companies offer VPN, with different levels of security, connection speed, encryption levels, ease of use, and pricing (Finances Online, 2019). Some well-known VPNs include Cisco AnyConnect and Norton WiFi Privacy (Finances Online, 2019). Norton WiFi Privacy offers bank-level encryption, no provider logging, ad blocking, and content-locking rules (Finances Online, 2019). Cisco AnyConnect offers user/endpoint behavior monitoring, single agent management, and multiple integrations (Finances Online, 2019). Both providers offer monthly and annual subscription plans. Cisco bases their plans on individual quotes, so the price comparison between Cisco and Norton is not obtainable (Finances Online, 2019). Norton and Cisco provide support through the phone, live, and tickets (Finances Online, 2019). Only Cisco provides email support (Finances Online, 2019). Based on an overall summary of customer ratings and reviews, customers had better experiences with Norton than Cisco (Finances Online, 2019). Based on its control features and customer experience, Norton WiFi Privacy is a better choice for MilleniAds than Cisco AnyConnect.

For security, MilleniAds needs a firewall(s), AAA protocol, a secure login and authorization, and the abilities to limit information access. Firewalls create a wall between the internet/outside networks and the office’s private network (Cisco, 2019). AAA protocol is a system for tracking and controlling of the network and its users through authentication, authorization, and accounting (Techopedia, n.d.). Secure logins could include multi-factor authentication, such as a usernames with USB and pin as key, biometrics, text/email code, or security questions (Lee, 2014). All employees need access to the network, but most do not need administrative privileges. As the owner of the company, the CEO should have full administrative privileges. The office administrator and creative directors should have limited administrative access based on their management and maintenance duties. Employees should only have access to the information and files needed to perform their duties (Mah, 2016).

# Information Maintenance and Security

MilleniAds needs to keep technology and sensitive data secure. With a wireless network, MilleniAds needs to hide and encrypt the network from the public (Federal Communications Commission (FCC), 2018). To hide the network, the company needs to disable broadcasting the network and its name (FCC, 2018). The company should set up authorized access only to the network and its administrative controls (FCC, 2018). With 2-on-1 laptops, MilleniAds needs a mobile device action plan to reduce the risk of breaches or compromises (FCC, 2018). A mobile device plan should include the regulations related to device login (such as passwords, questions, and fingerprints), limited user access, the employee’s device accountability, and the missing device procedures (Microsoft, 2018). Employees should not be able into install software without authorization (FCC, 2018). MilleniAds needs a firewall and anti-virus software. A firewall prevents malicious software from entering system (Aukta, 2017). The anti-virus system scans and removes the infected files and software (Aukta, 2017). MilleniAds should install certified key software updates upon released because updates often provide protection from newly discovered security risks (Elmblad, 2019).

All information and data needs to be restricted to employee access only, with limitations based on their role in the company (FCC, 2019). Security and administrative controls must be limited to selected personnel, such as the administrator, lead creative director, and CEO to ensure for proper safety, security, and maintenance. MilleniAds needs to designate access to personally identifiable information (PII) and financial information through a need-to-know basis only (FCC, 2018). Only the accountant and CEO need full access to the financial information for duties such as payroll/benefits, accounting, taxes, budgeting, and transactions. The sales team, administrator, and creative directors need limited access that only allows for processing sales and operating within the budget. All employees should be able to review regulations without access to editing the regulations.

MilleniAds should create user accounts for each employee (FCC, 2018). Individual user accounts allow the system administrator to restricted access to only certain groups or individuals (). When an employee leaves the company, the administrator only needs to disable or remove the former employee’s account instead resetting passwords for every employee. With the use of restricted access, password protection is unnecessary for individual files. With frequent password changes or high usage of passwords, employees are more prone to create simple passwords, reuse other passwords, or write down their passwords (Bergsman, 2016). To maintain an organized workflow, MilleniAds needs to implement file/folder naming and organization system. The company should create folders to group files based on categories, such as departments, clients, or the project/product (Lord, 2019). Keep the names concise, understandable, and descriptive of the information, such as the project’s name and finish date (Lord, 2019). If numbers are used, use sequential numbering (01, 02, 03 instead of 1, 2, 3) (Lord, 2019). If dates are used, the naming convention needs to account that dates should stay in chronological order, such as YYYY-MM-DD (EzComputer, 2019).

MilleniAds should back up all sensitive data, designs/stock, templates, and design-related material on a regular schedule (Ward, 2018). Sensitive data includes any data with financial relations, personally identifiable information (PII) for employees and customers, all security and administrative control, company documents, regulations, and designs/products (FCC, 2018). Google Drive is one of the cloud storage features offered with the use of G Suite. Google Drive has the capability to remotely backup data on an automated basis (Google, 2019). It encrypts the transferring data with no additional purchase required (Google, 2019). The administration can control the backups and the information can be access from any location (Google, 2019). The disadvantage is internet access is required to perform remote backups and held by the third party (Google) (Ward, 2018). Backing data locally is an alternative option. Local backups require an on-site device to backup and store the data (Ward, 2018). The device needs enough storage for the data, good remote service, user access control, and software that will do the backups (instead of copy-and-paste) (Ward, 2018). MilleniAds will have the data available on-site if the internet goes down (Ward, 2018). However, the company will have to purchase a new device when the current device runs out of memory (Ward, 2018). Some other issues are someone can steal the device, a natural disaster can ruin the device, and the device may malfunction without the company being alerted (Ward, 2018).

Access to backups should be limited to the office administrator and the creative directors. The creative directors supervise the graphics team. If a designer messes up a project, the director can recover the file in the backup data storage. The administrator works with the sales team and other administration staff. If a business document is deleted or accidently saved over, the administrator can retrieve the document. If the administrator is absent, the directors can manage the backups instead. It also allows for employee monitoring for backups. Having more than one person assigned is beneficial, but MilleniAd’s should not grant all employee access. By denying all employee access, the company reduces the chances of sabotage, personal usage (non-MilleniAds), schedule interferences, and unauthorized information access.

The company should have backups performed daily after the office closes for the night. Data is MilleniAd’s primary asset. However, backups can temporarily deny access to opening or saving files and can slow down a computer’s speed (Ward, 2019). Backing up every 24 hours allows for frequent storage that does not interference with an employee’s duties. By backing up at night, all data is ready for transfer (Ward, 2019). If a company only backs up data on a weekly basis, the company would suffer a higher financial loss for lost data. For example, a data disaster takes place on Thursday, but the company only does backups on Friday nights. If backups were daily, the company would only lose a few hours instead of a full week’s worth of labor (Ward, 2019).

# Future Considerations

MilleniAds expects to gain a higher load of customers within the few years and possibly increase the size of the company. MilleniAds needs to consider how business and technological growth will affect their needs.

As technology rapidly advances, the requirements to handle the technology increase also (CGDirector, 2019). With a larger business, MilleniAds will have more projects or larger projects to complete at the same time. Instead of purchasing hardware based on price, performance may need to be considered more important. The original purchase cost is more expensive, but the hardware does not need to be replaced as frequently because it has a longer compatibility with technological upgrades (CGDirector, 2019). Certain alternative options in hardware become the recommended options. In the table below, the red-colored hardware indicates the switch between the recommended and alternative hardware:

|  |  |  |  |
| --- | --- | --- | --- |
| Hardware | Recommended | Alternative | Reason |
| Type | 2-in-1 laptop | Laptop | Versatility |
| Operating system | Windows 10 Pro | Windows 10 Home | Practicality |
| Storage drive | 512 SSD | 750 HDD | Higher speed |
| RAM | 16 GB or 32 GB | 8 GB | Performance |
| CPU - type | Intel i7 | Intel i5 | Performance |
| CPU - # of cores | 6+ cores | 4 cores | Performance |
| CPU - speed | 4 Ghz (or higher) | 1 Ghz (or higher) | Performance |
| Video card/GPU | Integrated | Nvidia GTX 1050 | Price |
| Sound card | Manufacturer/Default | n/a | Non-essential |
| Motherboard | Manufacturer/Default | n/a | Predetermined |
| Screen size | 15" | 13" | Design area |

MilleniAds needs to invest in a professional accounting software. As a company increases in size, the company’s financial complexity and volume enlarges also (Fairbanks, 2019). Intuit QuickBooks is business accounting software available for any company size and accounts for business scalability. It offers built-in reports, automatic backups, electronic invoicing, customer information/contacting, mobile apps, integration, and customer service (Fairbanks, 2019). Mobile apps allow for straightforward functionality on the 2-in-1 laptops (Fairbanks, 2019). Electronic invoicing, reports, and customer information assist the sales and financial team with reconciliation, processing payments, budgeting, and providing proper customer service (Fairbanks, 2019).

MilleniAds should continue to use G Suite and CorelDraw. G Suite is a highly scalable software used by any business size from personal to enterprise (Google, 2019). The cloud storage space is unlimited and teams can perform real-time editing. G Suite provides communication, collaboration, administrative and security features right from the start. CorelDraw is also highly scalable and offers many advanced applications used in graphic design (Corel, 2019). With the perpetual license, the license does not limit how many employees can use CorelDraw and MilleniAds permanently owns rights to use the software (Corel, 2019).

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