IT Infrastructure Proposal

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Summary

In order to increase our company's profit and work efficiency, our infrastructure must be modern and meet current standards. Currently, our infrastructure does not meet current standards and uses technology that is out of date. We have no network connecting our computers and cash registers. Local databases at our seven locations are running DBASE V, an old application that has newer versions, on DOS, an operating system that no longer receives support and has not had much use in more than two decades. The internet is a great place to market to customers and expand the business. By implementing web features and marketing via social media, we can bring more customers. The goals of this proposal are to:
- [ ] Create network structure
- [ ] Update database software
- [ ] Update database operating systems
- [ ] Improve communication between stores
- [ ] Upgrade applications
- [ ] Add web presence
- [ ] Add online shopping

Network

We will implement the legacy token star network. WIFI technologies with the 802.11a/b/g/n wireless standard will help us have a wireless network capable of covering the entire office. To achieve this standard however, we chose a network provider capable of it. AT&T's network solution for the price of $45 per month, is capable of reaching about 500mbps. This guarantees fast and consistent internet speed across the office.
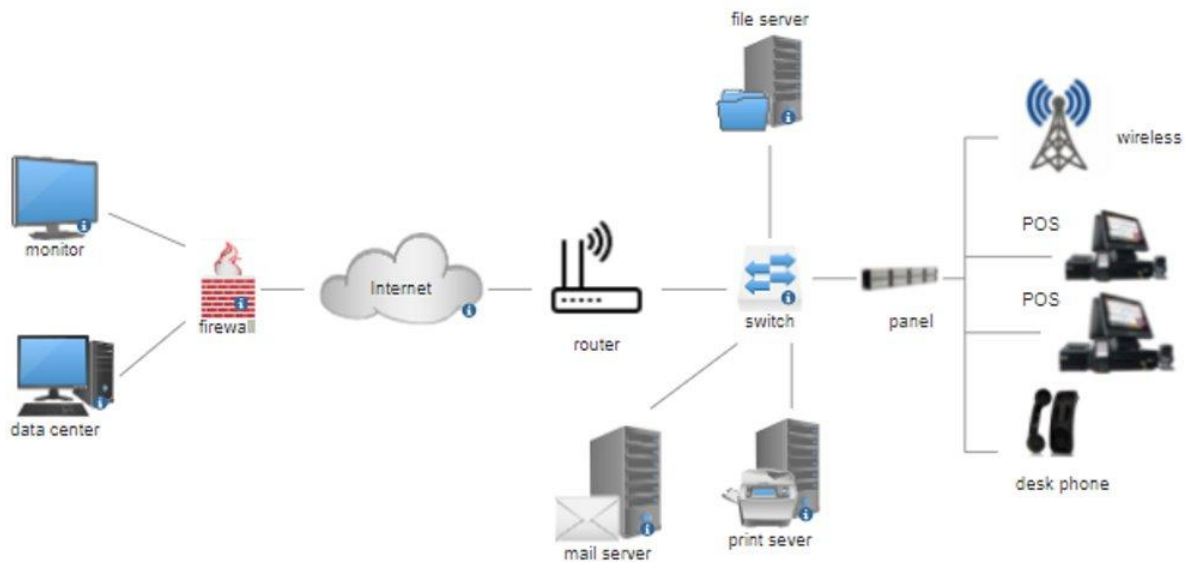
Database

Every organization has information that it must store and manage to meet its requirements. For example, a corporation must collect and maintain human resources records for its employees. This information must be available to those who need it. An information system is a formal system for storing and processing information. An information system could be a set of cardboard boxes containing manila folders along with rules for how to store and retrieve the folders. However, most companies today use a database to automate their information systems. A database is an organized collection of information treated as a unit. The purpose of a database is to collect, store, and retrieve related information for use by database applications.

A database management system (DBMS) is software that controls the storage, organization, and retrieval of data. Oracle database could be one of the best Database Management systems that can be used to manage data from all locations of your company. This database system will replace the outdated Dbase V system, and allow employees and management to access customer and company data from any location with real-time updates. All orders that go to the main warehouse can be easily communicated to any other branch location.

An Oracle database is a collection of data treated as a unit. The purpose of a database is to store and retrieve related information. A database server is the key to solving the problems of information management. In general, a server reliably manages a large amount of data in a multiuser environment so that many users can concurrently access the same data. All this is accomplished while delivering high performance. A database server also prevents unauthorized access and provides efficient solutions for failure recovery.

Oracle Database is the first database designed for enterprise grid computing, the most flexible and cost effective way to manage information and applications. Enterprise grid computing creates large pools of industry-standard, modular storage, and servers. With this architecture, each new system can be rapidly provisioned from the pool of components. There is no need for peak workloads because capacity can be easily added or reallocated from the resource pools as needed.

The database has logical structures and physical structures. Because the physical and logical structures are separate, the physical storage of data can be managed without affecting the access to logical storage structures.

For using an oracle database, we need the oracle server that software manages a database, and a client is an application that requests information from a server. Each computer in a network is a node that can host one or more databases. Each node in a distributed database system can act as a client, a server, or both, depending on the situation.

Website Presence

The website system that the Prairie Wind Auto Parts is going to use is WordPress service where the website is going to be deployed and maintained using WordPress for $45 / month which is going to be the eCommerce plan where it also could maintain the online store that this store had. The reason why we chose the eCommerce plan is because the WordPress system for this plan has integration with a shipping company, where it could be beneficial for the online store to have a trusted shipping company when some client purchases something from our online store. The system that the website had is going to be a website that a client / customer could access by looking around the website as a guest. The customer is also able to register or log in with their email, where they could use the account to do some online shopping on the website. The customer is also able to send an email using the website section without opening another email tab to email to the store itself. The customer is also able to modify or cancel the order that they made from online order after registering an account for the website. On the other hand, the employee or the owner of Prairie Wind Auto Parts should already have an admin account where they could use the account to access the database that was already created before using Oracle Database where they could access it to maintain their website or the online order such as what items are in stock at that time or the checking what kind of order that not been fulfilled yet. The admin of the website should also be able to maintain the email that their customer uses to register for their account.

Online Ordering

Multiple payment methods can be used when a customer makes a purchase in the online store. Some payment methods that we could use are ApplePay, SamsungPay, GooglePay, Visa, Master Card, etc. The payment system can be controlled using Shopify where all of the purchases can be made through their system before connecting to our database where the item stock is stored. Shopify would be useful for shipping our products to customers as it can make shipping products easier with its shipping labels and discounts.

Applications

Shopify POS can be used to manage the data from customer sales both online and in physical stores. This point of sale system will manage the financial transactions of the store. Shopify manages the online store; having it manage data for physical stores as well makes it easier to merge the total data. As such, Shopify can be used to manage the warehouse inventory and ensure data remains secure. The application holds data in a cloud and can connect to our local database that synchronizes when connected to the internet. There are various other features that may be useful later.

Currently, our company is using Lotus 1-2-3 to track customer sales. This application is outdated and had its final release 19 years ago. Using Microsoft Excel to hold the data for our sale data on our local database. Excel is a more up-to-date spreadsheet software that performs better than Lotus 1-2-3.

Email

Google Workspace has several services to offer. The primary feature we would need is the custom emails for the company. However, Workspace comes with 30 GB of cloud storage for each employee and other services.

Personnel

To add web presence to our company, positions for social media manager would be required. This position will handle several social media platforms including Facebook, Twitter, and Linkedin. This is necessary in order to reach more customers and direct them to our online and physical stores. The average salary for this position is $ 68,616 with a minimum of $ 46,000. There should be two people appointed for this position.

Our online store needs a person to create and design the front-end and back-end of the website. An independent contractor can be hired to build the website for our online store. Outsourcing to build the website would cost about 40,000 dollars.

Hardware

For our plan each location would house a tower server that would run the secondary database and virtual machines for the thin clients, eliminating the need for configuring and maintaining full desktop computers at each location. All Dell servers for both the store and main warehouse will have Windows Server 2019 pre-installed. They would also include a UPS system for each location in case of power loss to allow the systems to shut down safely. The POS system would be connected to both the Shopify cloud server and the local database server as a redundancy so the POS would still function even when the internet connection goes down or Shopify's servers.

The main warehouse also features a rack server with a UPS rack that syncs its database with the Shopify cloud server allowing for the warehouse to take orders as they are received by the POS. The server systems also were chosen with expandability in mind as each server has the ability to have components like RAM be expanded for bigger databases or additional thin clients down the road.
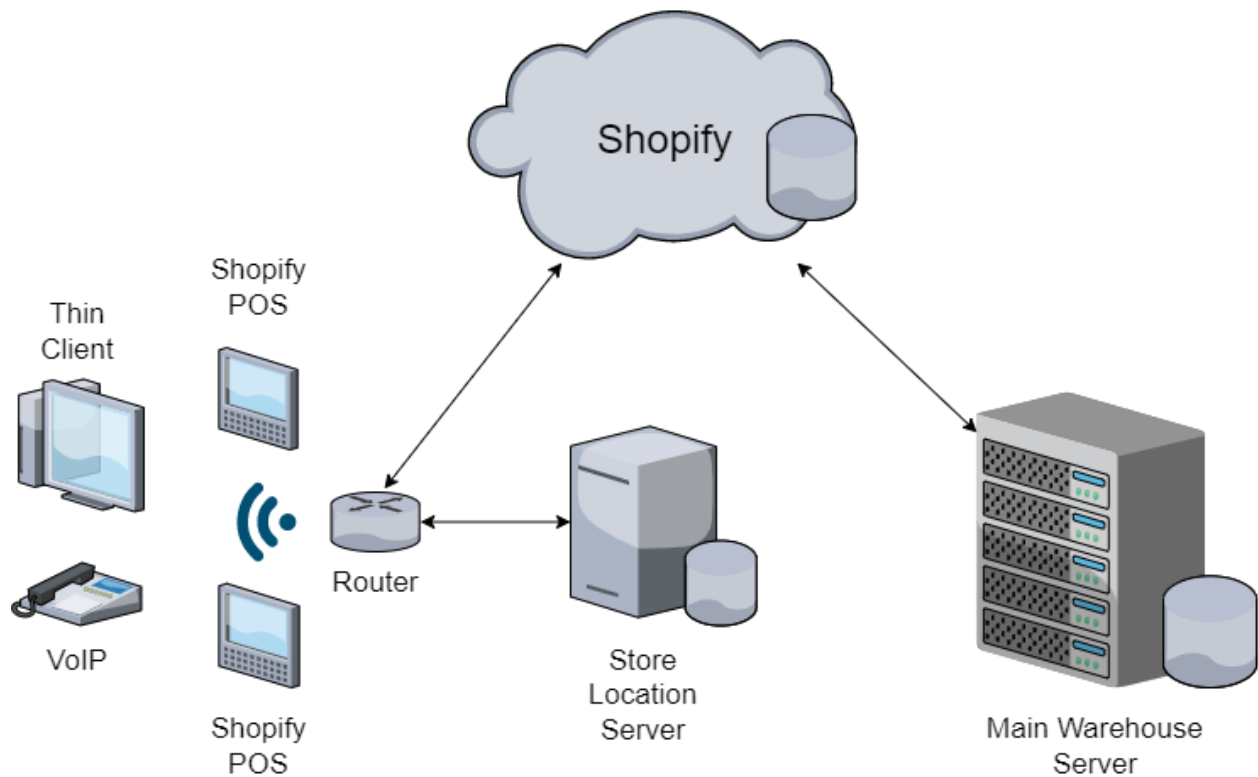

Figure of Server Layout

Communication

For communication, a modern alternative to phone/fax lines is a Voice over IP system which is an internet-based phone service. The benefit is that it is cheaper due to paying a monthly service instead of per minute, more scalable, and includes additional features like video and instant messaging. Cloud-based VoIP systems also reduce costs due to their ease of setup and installation. We selected the VoIP service from Nextiva which offers unlimited voice calling and useful features such as internet fax and a mobile app. Each location will receive a desk internet phone system from Nextiva, including the main warehouse.

Redundancy

It's important for a business to have a backup solution that is offsite in case of disasters like data loss from cyber attacks. Each store location has two plans for accessing data in case one method fails. Plan A's primary connection is with the Shopify cloud server which will continue to sync with the store's local database. Plan B switches to the local database if the connection between Shopify and the store is unavailable and continues to use the local database as its primary database allowing for the store to still function until a connection can be made with Shopify cloud service. Our plan also includes a third backup of the database at the main warehouse that syncs with Shopify's database. The main warehouse rack server hard drives are also configured in RAID so even if a hard disk fails the database won't lose any data.
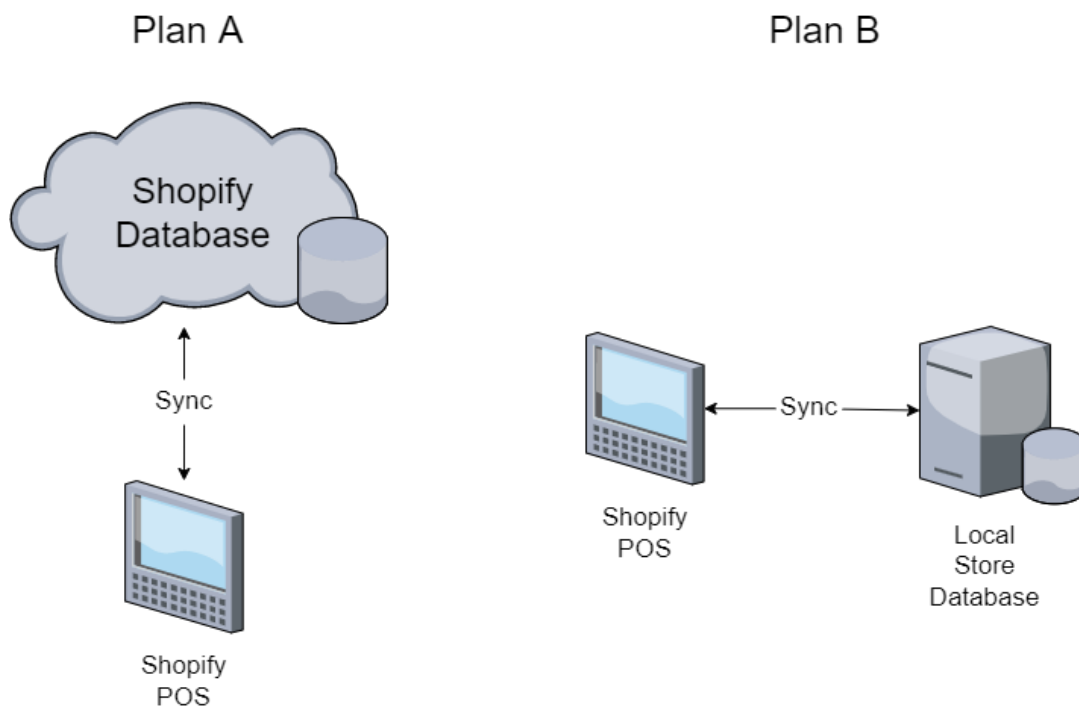

Figure of Database Redundancy Plan

Category Expenses

Flat Cost

	Cost
Database Hardware	$28,992.11
Database Equipment	$6,936.00
Computers Equipment	$5,921.91
Communication	$1,592.00
Oracle Database License EE	$285,000.00

Yearly Cost

Communication	$359.40 per year
Network	$540.00 per year
Web Presence	$2,655.00 per year
Email	$72.00 per year

Personnel

2 x Social Media Managers	$9,2000.00 per year
Contracted Web Developer	$40,00.00 per year

Total Cost	$464,068.42

**Costs are estimates and are subject to change

Full Expenses List

Q	Item	Total Cost
1	Dell PowerEdge R740 Rack Server	$3,899.00
1	APC Rack Smart-UPS	$1,600.00
1	Dell EMC Netshelter SX 24U Rack	$1,050.00
1	Mini-Split Air Conditioner	$786.00
7	Dell PowerEdge T440 Tower Server	$25,093.11
7	APC Smart-UPS	$3,500.00
9	Dell Wyse 5070 thin client	$4,482.00
9	Dell 19 Monitor	$1,439.91
1	Oracle Database License EE	$285,000.00
8	Nextiva Yealink T46U Desk Phone	$1,592.00
1	Nextiva VoIP Service	$359.40 per year
1	Internet	$540.00 per year
1	Web Server	$540.00 per year
1	Shopify	$948.00 per year
1	Shopify POS	$1,068.00 per year
1	Microsoft Excel	$99.00 per year
1	Google Workspace	$72.00 per year
2	Social Media Manager	$92,000.00 per year
1	Contracted Web Developer	$40,000.00 per year

Total Cost	$464,068.42

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References

Social Media manager salary in Chicago. BuiltIn. (n.d.). Retrieved December 2, 2021, from https://www.builtinchicago.org/salaries/marketing/social-media-manager/chicago.

Pos features and pricing: POS software, hardware, inventory, and more. Shopify. (n.d.). Retrieved December 2, 2021, from https://www.shopify.com/pos/features.

Buy Microsoft 365 family (formerly office 365). Microsoft Store. (n.d.). Retrieved December 2, 2021, from https://www.microsoft.com/en-us/microsoft-365/p/microsoft-365-family/cfq7ttc0k5dm?activetab=pivot%3Aoverviewtab.

Encyclopædia Britannica, inc. (n.d.). Information system. Encyclopædia Britannica. Retrieved December 2, 2021, from https://www.britannica.com/topic/information-system.

Database concepts. Introduction to the Oracle Database. (2005, October 10). Retrieved December 2, 2021, from https://docs.oracle.com/cd/B19306_01/server.102/b14220/intro.htm.

What is a database? Oracle. (n.d.). Retrieved December 2, 2021, from https://www.oracle.com/database/what-is-database/.

Nextiva pricing: VoIP and CRM starting at $18.95 per month. Nextiva. (n.d.). Retrieved December 2, 2021, from https://www.nextiva.com/nextiva-pricing.html.

Servers, storage & networking : Data infrastructure: Dell United States. Dell. (n.d.). Retrieved December 2, 2021, from https://www.dell.com/en-us/work/lp/servers-storage-networking.

Why use a thin client for MY BUSINESS: HP® Tech takes. Why Use a Thin Client for My Business | HP® Tech Takes. (n.d.). Retrieved December 2, 2021, from https://www.hp.com/us-en/shop/tech-takes/why-use-thin-client-business.

Sheldon, R. (2020, June 4). How to purchase the best server hardware for small business. SearchDataCenter. Retrieved December 2, 2021, from https://searchdatacenter.techtarget.com/feature/How-to-purchase-the-best-server-hardware-for-small-business.

Best servers hardware in 2021 | G2. (n.d.). Retrieved December 2, 2021, from https://www.g2.com/categories/servers.