[Proposal]

Database Initialization and Management: Inventory Tracking, Sales and Reports – For Equinox Distributors

Produced For:

Scott Colegrove, Owner

Equinox Distributors LLC

Composed by:

Daniel Cucinotta

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Administrative Synopsis

The business model that has been established is lacking organization (physically and digitally). There are no forms/records and very little information tracking is performed. There are several hundred customers nationally, but how many are active? Which products need reordering? What is the overall monthly profit? Such questions cannot be answered easily without tracking data from orders, sales, customer information and product inventory.

There is always an opportunity to gather more valuable information from every sale. The majority of initial revenue is generated through point of sale at gem and mineral shows – fortunately, much contact information has already been acquired to keep many customers active. Data can be collected from customer contact information, recent orders as well as inventory to generate many beneficial reports such as sales trends, demographics, active customers, items/products, etc. Such reports can be utilized to send promo codes to inactive customers, determine which product(s) have the greatest profit margin, inventory tracking for automatic inventory reorder reminders, the possibilities are endless.

Introduction

There are several problems with the current configuration that renders the company less efficient to be able to self-sustain and/or maintain steady growth. A large portion of income is originated from transactions with “random” customers and contact information is generally not collected as normal convention. Coupons/promo codes and newsletters are a great way to retrieve relevant contact information for repeat business, but also to identify sales trends. Much of the raw material is stored in bins and the quality faceted pieces are kept in cases; all items are stored without weighing the inventory. Being unaware of the availability and/or amount of an item in stock can affect the possibility of a purchase. An all fronts approach is needed to make improvements with data collecting; physical practices, database design and website/network synchronization.

An Entity Relationship Diagram will be completed to visually display the associations between orders, products, customers and suppliers. This framework will be the foundation to build the database and collect more information and create various reports such as:

- *Identify active and inactive customers*
- *Sales/product trends*
- *Profit variance*
- *Demographics (regional, age, sex, date, etc.)*
- *Inventory*
- *Promo code/coupon usage*
- *Specifics (orders, sort by price, customers, procurement sources, products, etc.)*

Simple solutions can be effortlessly achieved with potential business growth.

Entity Relationship Diagram

(BRIEF EXAMPLE: Page 6)

Orders Table:

- ItemID
- Description
- Quantity
- Price
- Date
- CustomerID

Customers table:

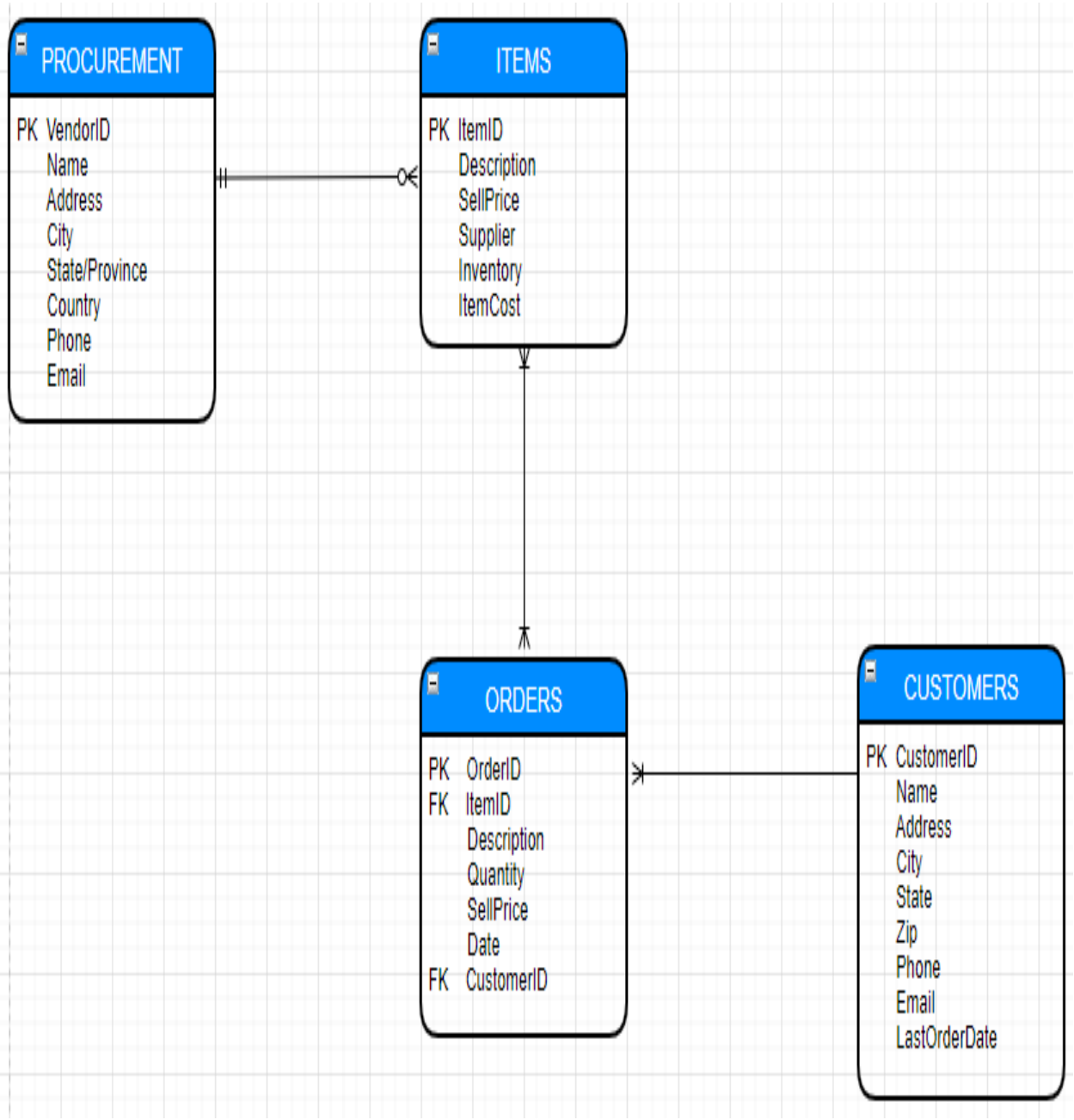
- CustomerID
- Name
- Address
- City
- State
- Zip
- Phone
- Email
- LastOrderDate

Items table:

- itemID
- Description
- SellPrice
- Supplier
- Inventory
- ItemCost

Procurement table:

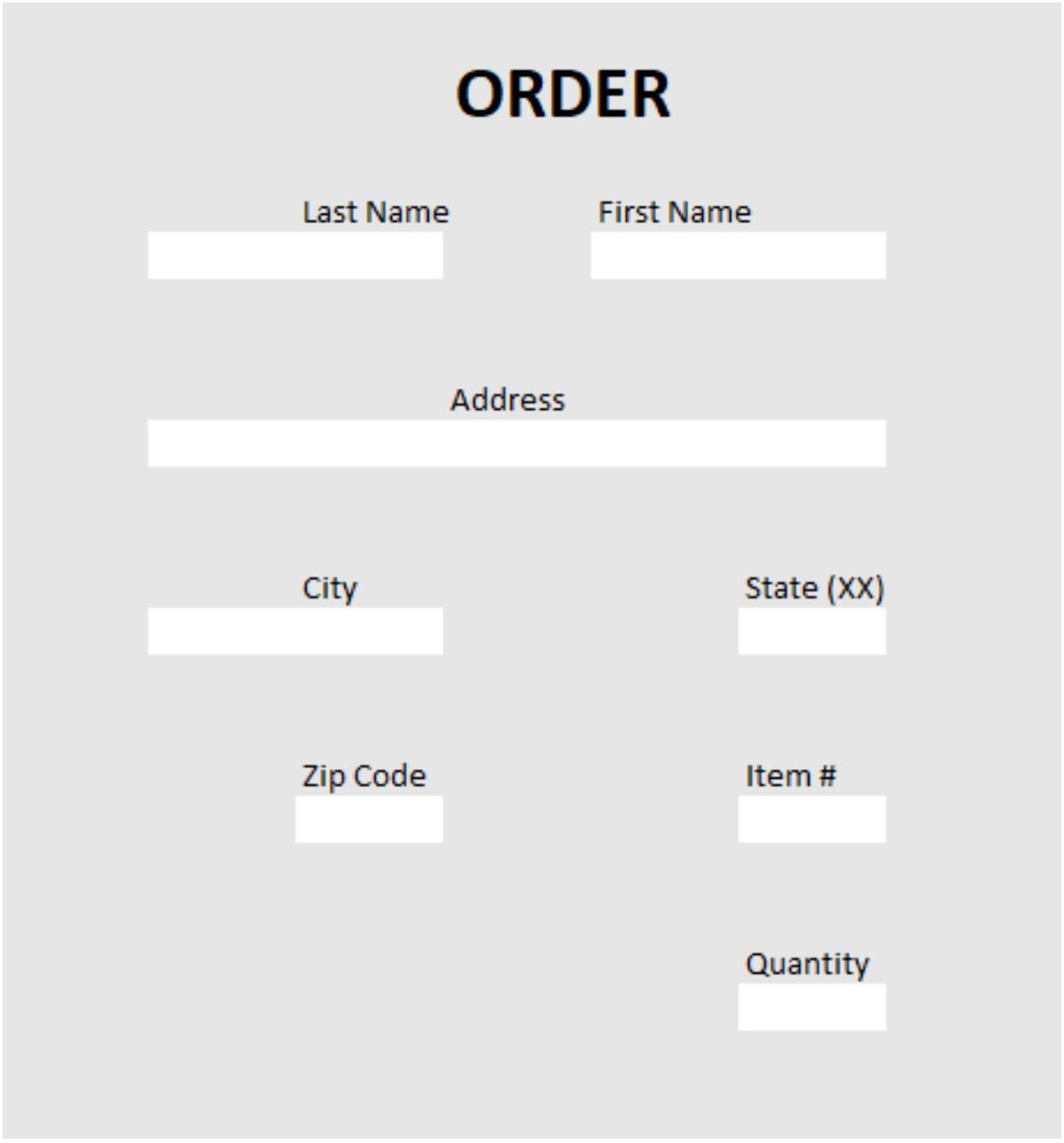
- Name
- Address
- City
- State/Province
- Country
- Phone
- Email



Disclaimer: A general overview – many corrections/improvements will be implemented.

Many visual screens will need to be created to instruct customers as well as anyone trying to access the database in the future - order form, menu, login, list of reports, etc.).

Example of an order form



Example of a REPORTS menu screen.

Conclusion

Implementing the proposed design will manifest a multitude of opportunities; create various reports for analyzing to increase sales and/or profit margin, identify any issues and/or improvements that may need to be undertaken along the supply chain (supplier to customer), keep customers active with promo codes/birthday coupons and possibly a simple digital newsletter as well to target narrowed demographics (items – locations), such as focusing more on promoting specific items in a particular geographic region at the gem shows. Moments after each transaction is executed, all pertinent data will be updated in the system. The more information that is gathered exponentiates the possibilities of what the data can be utilized for. “Knowledge is power…” (Sir Francis Bacon)

UML Class Diagram,
Data Flow Diagram
& Back-Up Plan

By:

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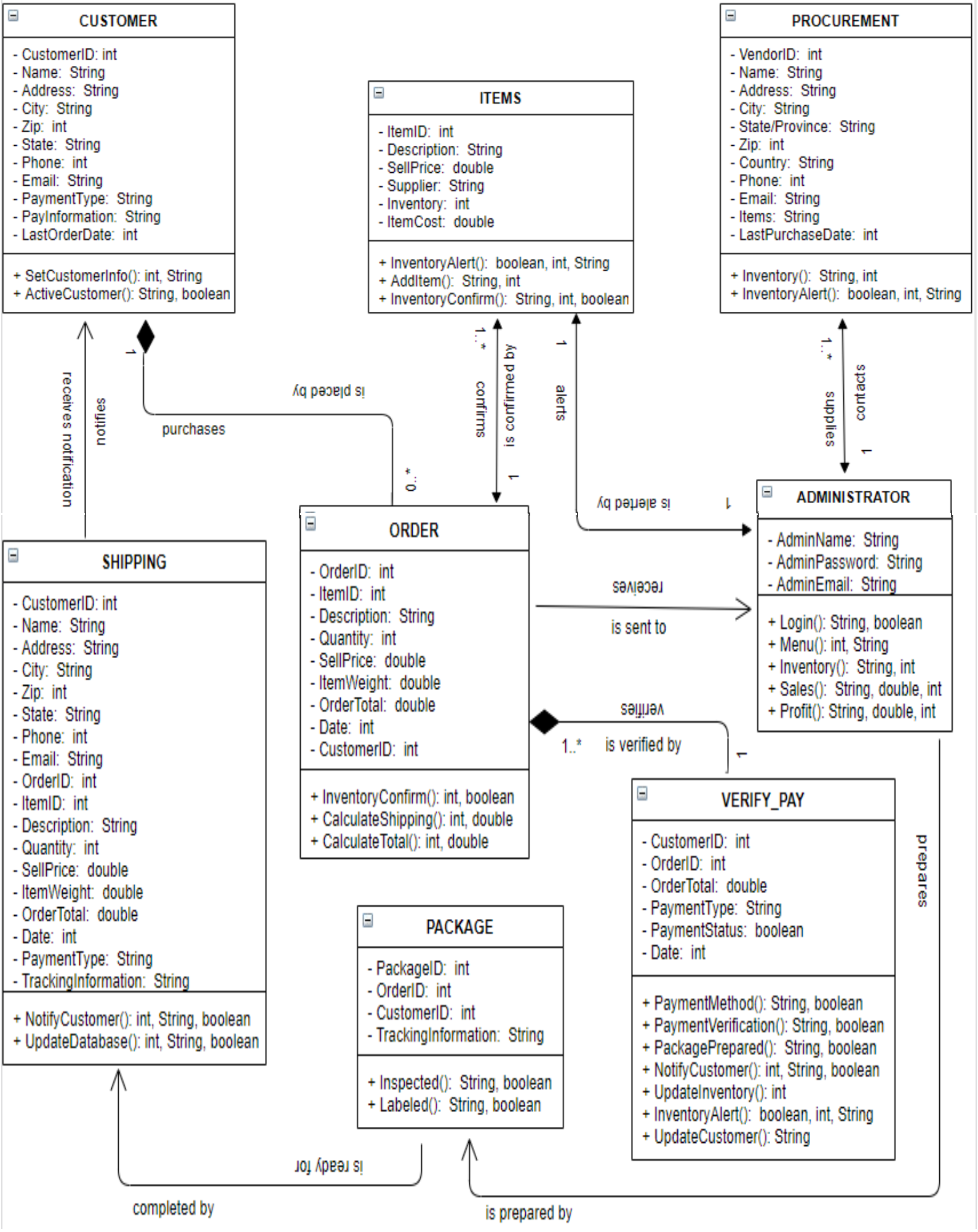
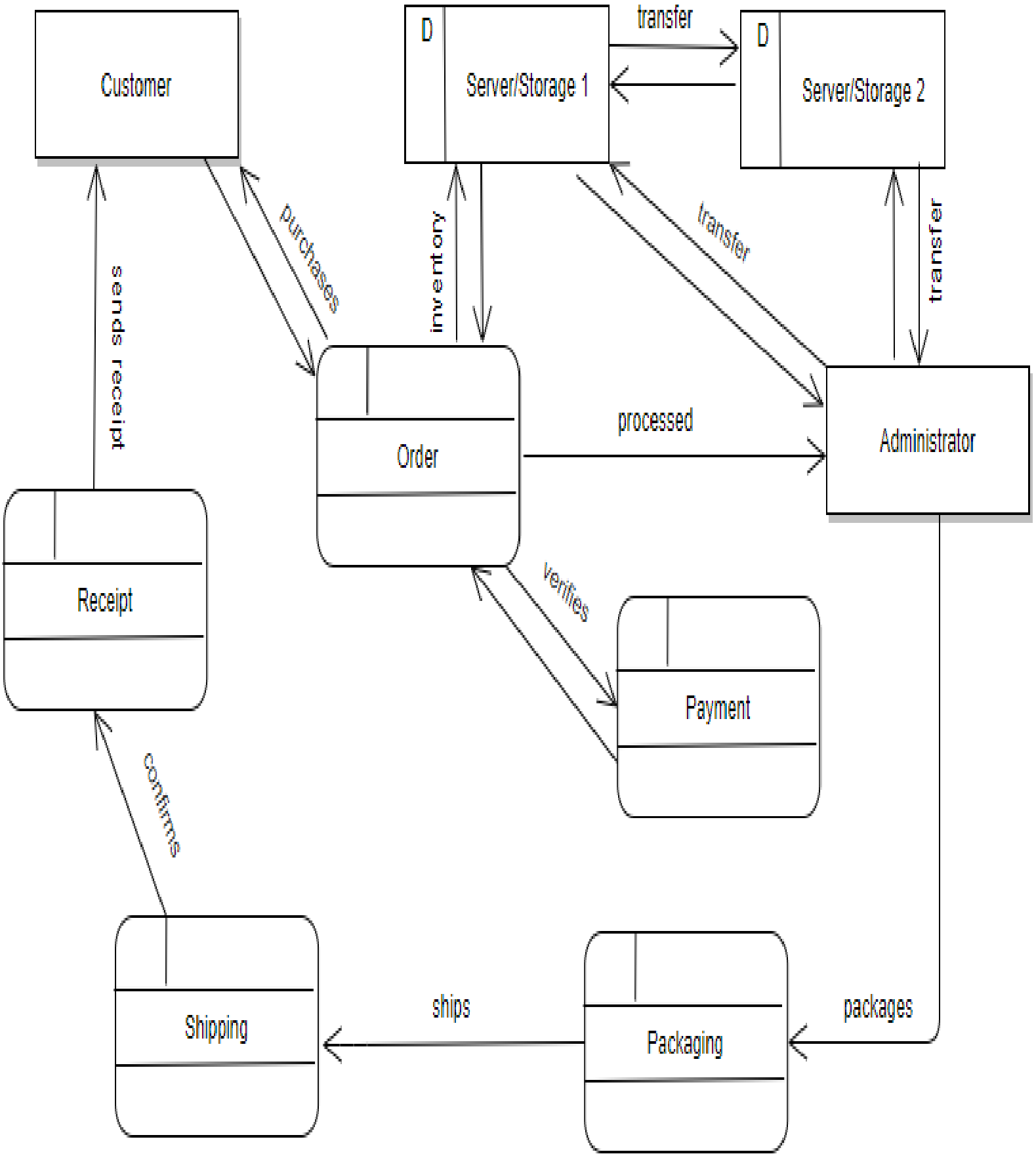

CUSTOMER
- CustomerID: int
- Name: String
- Address: String
- City: String
- Zip: int
- State: String
- Phone: int
- Email: String
- PaymentType: String
- PayInformation: String
- LastOrderDate: int
+ SetCustomerInfo(): int, String
+ ActiveCustomer(): String, boolean
ITEMS
- ItemID: int
- Description: String
- SellPrice: double
- Supplier: String
- Inventory: int
- ItemCost: double
+ InventoryAlert(): boolean, int, String
+ AddItem(): String, int
+ InventoryConfirm(): String, int, boolean
PROCUREMENT
- VendorID: int
- Name: String
- Address: String
- City: String
- State/Province: String
- Zip: int
- Country: String
- Phone: int
- Email: String
- Items: String
- LastPurchaseDate: int
+ Inventory(): String, int
+ InventoryAlert(): boolean, int, String
receives notification
notifies
1
purchases
is placed by
0..*
1..*
confirms
is confirmed by
1
1
alerts
is alerted by
1
1..*
supplies
contacts
1
SHIPPING
- CustomerID: int
- Name: String
- Address: String
- City: String
- Zip: int
- State: String
- Phone: int
- Email: String
- OrderID: int
- ItemID: int
- Description: String
- Quantity: int
- SellPrice: double
- ItemWeight: double
- OrderTotal: double
- Date: int
- PaymentType: String
- TrackingInformation: String
+ NotifyCustomer(): int, String, boolean
+ UpdateDatabase(): int, String, boolean
ORDER
- OrderID: int
- ItemID: int
- Description: String
- Quantity: int
- SellPrice: double
- ItemWeight: double
- OrderTotal: double
- Date: int
- CustomerID: int
+ InventoryConfirm(): int, boolean
+ CalculateShipping(): int, double
+ CalculateTotal(): int, double
receives
is sent to
ADMINISTRATOR
- AdminName: String
- AdminPassword: String
- AdminEmail: String
+ Login(): String, boolean
+ Menu(): int, String
+ Inventory(): String, int
+ Sales(): String, double, int
+ Profit(): String, double, int
verifies
1..*
is verified by
1
VERIFY_PAY
- CustomerID: int
- OrderID: int
- OrderTotal: double
- PaymentType: String
- PaymentStatus: boolean
- Date: int
+ PaymentMethod(): String, boolean
+ PaymentVerification(): String, boolean
+ PackagePrepared(): String, boolean
+ NotifyCustomer(): int, String, boolean
+ UpdateInventory(): int
+ InventoryAlert(): boolean, int, String
+ UpdateCustomer(): String
prepares
PACKAGE
- PackageID: int
- OrderID: int
- CustomerID: int
- TrackingInformation: String
+ Inspected(): String, boolean
+ Labeled(): String, boolean
is ready for
completed by
is prepared by

Data Flow Diagram



Back - Up Plan

The system will consist of two dedicated computers that are stationed at separate physical locations. The devices that will comprise the network can be accessed via the on-site workstations and the ethernet / wi-fi (routers) on the Local Area Networks (LAN) as well as the internet. One device is the designated primary machine (the other device will continually be prepared to run the server software; In case of a system malfunction) which will host the website and allow access to the database – attached external storage. The design will be a unique variation of a Redundant Array of Independent / Inexpensive Disks (RAID) level configuration, which will ensure that the data will always be available and safe. The servers will be communicating constantly to update the customer, inventory and transaction data securely. All data will have several layers of security to protect it as well as encryption. The Administrator's workstation (laptop) will be programmed to synchronize with the server / database (all recent data changes), every log in.

There will be three devices storing identical data simultaneously to prevent the complete loss of data and to protect the integrity of the data. The data will be validated at multiple points (input and update) with hash and checksum algorithms as well as a transaction registry. There will be hardware failure processes and alerts to switch the servers in case of a malfunction as well as a strict protocol for any attempted data breaches; If an incorrect password is entered five times the devices will be programmed to lock out all network access (servers and storage) for 24 hours, unless it is from one of the physical on-site workstations.

The back-up plan is to replace any hardware if / when a device fails and always be prepared to reconfigure the system

System Analysis,
Installation
And
Configuration
For
Equinox Distributors LLC

Prepared for:

Scott Colegrove CEO

Compiled by:

Daniel Cucinotta

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Conspectus

The system will consist of several types of devices and equipment connected to a secure network, which will be established at two separate physical locations. Optimally designed with all new computer hardware and configured with a cost-free, open source operating system for the server and using *only* **free**, non-licensed, public domain software for encryption, security, server monitoring, firewall, etc., which will eliminate unnecessary recurring fees substantially. The computer hardware was chosen for its sufficient processing power as well as its moderate cost, portability and multi-use functionality. [The majority of the overall cost is invested initially in the quality of the hardware, yet, all are common devices which can be repurposed if necessary].

Several security features will be established - multiple levels on separate devices. A Redundant Array of Inexpensive/Independent Disks (RAID) configuration will be implemented with encrypted external storage for the safety, security and availability of the data/ information.

The servers will host the website and store all data/information from transactions on the system's local drive temporarily, until it is backed up daily to the external RAID drives, which will be located both sites. The devices will communicate frequently to ensure continuity. Checksum and hashing software will be utilized during all data exchanges to verify integrity (via intranet and internet). (FACTORY DEFAULT PASSWORDS WILL BE CHANGED ON ALL DEVICES!)

The network will solely be connected through the ethernet ports for added protection against possible wireless router signal hacking, and remote access will only be allowed from a limited number of specific devices that will need the correct comprehensive login credentials.

Hardware and Equipment

PRODUCT	MODEL #	QUANTITY	PRICE/UNIT
Hewlett Packard - 15.6" Touch-Screen Laptop	15-DY0013DX	2	$650.00
SanDisk - Ultra 512GB Internal SATA SSD	SDSSDH3-512G-G25	4	$75.00
Tripp Lite SATA SSD Enclosure RAID Adapter	U457-2M2-SATAG2	4	$75.00
TP-Link AC1750 Smart Wi-Fi Router	Archer A7	2	$100.00
Phizli 10' CAT8 Ethernet Cable 40 Gbps 2000Mhz	[ASIN - Amazon] B085VSJHR8	4	$15.00
Brother All-In-One Printer Work Smart Series	MFC-497DW	1	$100.00
		TOTAL →	*$2,260*

- *HP 15.6" Laptop with Touchscreen: Intel Core i5 Processor, 12GB RAM, 256GB SSD & Optane* – The quad-core processor has eight-way processing which provides optimum high-efficiency power on a low-voltage platform. SSDs with Optane are faster compared to NAND SSDs. Optane/SSD combination executes efficiently - the ability to save files lightning-fast and store large amounts of data ultra-quick. This laptop has sufficient storage and enhanced communication capabilities. PCI-e SSDs are ideal for server applications and daily backups.

- *SanDisk - Ultra 512GB Internal SATA Solid State Drive* - Transfer data up to 600 MB/s.

- *Tripp Lite SATA SSD Enclosure RAID Adapter* – This SSD drive enclosure supports USB 3.1 (Generation 2); up to 10 Gb/s for speedy data transfers. It can read data up to 70% faster and write up to 40% faster when connected to a device that is UASP enabled (such as the Linux Ubuntu Server distribution version). It offers multiple RAID options which gives flexibility to store and access data in several different ways.

- *TP-Link Dual Band Smart Wi-Fi Router, Gigabit Wireless Internet Router & VPN Server* – This powerful router has many features, is extremely reliable and reaches transfer speeds up to 50 MB/s.

- *10' CAT8 Ethernet Cable, 40Gbps, 2000Mhz with RJ45 –* The latest category of ISO/IEC approved cable technology. This high-speed ethernet cable can transmit speeds of 40Gb/s and can support a bandwidth up to 2000Mhz.

- *Brother - Work Smart Series MFC-J497DW Wireless All-In-One Printer –* This economy inkjet printer offers fine quality combined with speed - 12 ppm (mono) & 6 ppm (color). It has wireless capability and the wonderful duplex feature which can print on both sides of the page.

Operating System and Software

- The operating system will be Linux Ubuntu Server 18.04 - BSD (Berkeley Software Distribution), a free, open-source platform that is easy to use, secure and stable, with current and future updates available. This version is very capable and flexible; allowing many other programs and utilities to be installed.

- For enhanced security, Veracrypt will encrypt the internal computer drive on each laptop as well as the external storage drives attached. Other capabilities include preventing access through a backdoor, eliminates data leaks, protection from data theft and is effective at defeating brute force attacks.

- Zabbix, which is a server monitoring application, will be utilized to alert of suspicious activity, hardware failure, network loss, device(s) and/or component(s) in a critical state, system status and other essential functions. Security and performance notifications can be received via email and/or text message.

- SoftEther VPN (Virtual Private Network) will be installed to encrypt network data with a 256-bit AES (Advanced Encryption Standard). MPLS (Multi-Protocol Label Switching) is a processing method that speeds up data transfer and efficiently routes traffic. It supports IPV6, has dynamic DNS (Domain Name Server) packet filtering and tested to have no leaks.

- Sha256sum is a file verification tool that will be installed on the system to ensure the integrity of all the data that will be transferred between the network devices. This program protects the accuracy of the financial transactions and customer data/information.

- UncomplicatedFirewall is a powerful firewall that offers packet filtering and allows a user to have full control of many features with logging and rule definitions.

Installation and Configuration

At both physical locations that will be housing the servers and external storage, a complete system will be installed.

Each system network will be attached to the internet via an ISP (Internet Service Provider) compatible modem, provided by the ISP for compatibility.

The router will be attached to the modem by one CAT8 - RJ45 ethernet cable and then another cable will connect to the ethernet port on the HP laptop.

The internal Solid-State Drives (2 for each locale) need to be placed into the RAID enclosures, then connected to the computer and configured with secure parameters.

Linux Ubuntu Server 18.04 will be installed on the computer with a USB flash drive as a bootloader with the operating system disc image.

Ubuntu server settings will be configured specifically for this particular network to host the website as well as accommodate the storage model. Updates will be set to automatic for security purposes. UASP will be enabled to boost performance with the RAID enclosure controllers.

Veracrypt, Zabbix, SoftEther, sha256sum and UncomplicatedFirewall will all be installed and configured individually with the most optimal and secure settings.

Many tasks (essential and elective) will be scheduled and executed regularly through automation, such as daily backups, system maintenance, security checks, etc.

The Brother printer will be connected at the office (main location - primary system).

Relational Database Management System

The tables will need to be fully populated with data. These are only a few commands that will be useful.

```
BEGIN
        CREATE DATABASE Equinox;
END
```

```
BEGIN
        CREATE TABLE Items
        (
        ItemID int(3),
        Description varchar(30),
        SellPrice double(6),
        Supplier varchar(30)
        Inventory int(5)
        ItemCost double(6)
        );
END
```

```
BEGIN
        SELECT * ItemID
        FROM Items
        WHERE Inventory < 20
        ORDER BY Item
        PRINT 'Order Now – Only 20 Left in Stock!'
END
```

```
BEGIN
        SELECT * ItemID
        FROM Items
        WHERE Inventory = 0
        ORDER BY Item
        IF Inventory = 0
        PRINT 'Item Is Out of Stock'
END
```

```
BEGIN
        SELECT *
        FROM Customers
        WHERE State = 'NC'
        ORDER BY Name
END
```

Training and Support

Training will be provided to Scott Colegrove CEO during the installation processes at both locations. All physical connections can be noted and/or filmed during the system construction for record. All software will be installed on the laptop/server with configurations that will be set for safe, secure and fast communications between all of the devices on the network. The hardware and the system are designed to be able to handle significant storage with the feature of easy increased scalability.

References will be provided in this manual as sources of information and documentation. Literature and support pertaining to all the devices and software that is being utilized will be furnished to ensure immediate solutions for basic issues that may arise with the network, system and/or device(s).

Contact information for direct on-call support from Daniel Cucinotta can be published in an internal company memorandum to be accessible by any IT professional that may be working for Equinox Distributors in the future.

REFERENECES AND SUPPORT

Linux Ubuntu Server Guide - https://help.ubuntu.com/lts/serverguide/index.html

VeraCrypt Documentation - https://www.veracrypt.fr/en/Documentation.html

Zabbix Manual - https://www.zabbix.com/documentation/4.0/manual

SoftEther Documents - https://www.softether.org/4-docs

SoftEther Manual - https://www.softether.org/4-docs/1-manual

Sha256sum Tutorial - https://ubuntu.com/tutorials/tutorial-how-to-verify-ubuntu#1-overview

Sha256sum Manual - http://manpages.ubuntu.com/manpages/bionic/man1/sha256sum.1.html

UncomplicatedFirewall Manual - manpages.ubuntu.com/manpages/bionic/man8/ufw.8.html

Tutorials

Ubuntu Server - https://www.youtube.com/watch?v=RDwoDj2cW6c

https://www.youtube.com/watch?v=63KuNVSdT_g&t=472s

VeraCrypt - https://www.youtube.com/watch?v=gbHt-OsSKuo

https://www.youtube.com/watch?v=cxo8xosH_TI

SoftEther VPN - https://www.youtube.com/watch?v=sh9cbj34sMg

Zabbix - https://www.youtube.com/watch?v=rhhpkI9Zm6w

UncomplicatedFirewall (UFW) - https://www.youtube.com/watch?v=f9-iYQ25K-g

Recapitulation

The system is modelled with several key factors; User friendly navigation, security, portability, and extremely flexible – countless features and options to be used in conjunction.

The hardware will be high-powered and configured with ultra-secure parameters. The combination of the RAID, VPN, encryption, firewall and other security measures undertaken will be sufficient to host the website and e-commerce functionality. All devices are common and standard, which can be reallocated and/or repurposed at any time, very easily. The design is for simple increased scalability, if needed. The total of the initial cost is invested into new equipment.

*All software, utilities and the server operating system are open source (**FREE**) to eliminate any possible recurring costs. Linux is a secure platform for all of the business applications needed for Equinox Distributors.*

Support and references can be found in this manual for immediate solutions. My contact information will also be available for on-call services provided.