

System Analysis, Installation And Configuration For Equinox Distributors LLC

Prepared for:

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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.

REFERNECES 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.