**Eavesdropper**

As out lined in our earlier assignment Eavesdropper is a web-based chrome application that allows users to track websites for releases of their most desired items. The program will regularly check the HTML code of a specific website that the user has chosen. You can have Eavesdropper check for pre-set conditions of the code so that you only get notifications of items that interest you. Eavesdropper is designed for customers that are in the market for specific items and are only interested in availability and price changes of these items. Our program enables users to set parameters, so they are not flooded with irrelevant notifications.

Like a lot of small startup businesses, we have a very tight budget so money for software, and hardware is limited. In addition, we want to develop our application on a small desktop or laptop initially but will be easy to scale as business expands. Everything we need for the development of our services and applications can be done using opensource software. Open-source software is software that is free to use and change as long as the changes and code are issued back to the original maintainer or maintainers **(1 GNU Free Software Foundation)** Free or opensource software is ideal for our purpose since it requires no initial financial output. We will be using what is called a LAMP stack, and open-source application and coding stack. LAMP stands for Linux, Apache webserver, MySQL database and PHP or Python for coding, and we will look at each part separately.

Most the world’s web servers run on Linux developed by Linus Torvalds **(2 Linus Torvalds)** as do the worlds data centres. There are countless Linux Distros or Distributions, each with there own offerings, but for our purpose we will use CentOS 8 **(3)** which is a fork of RHEL(Red Hat Enterprise Linux) **(4 Red Hat).** Red Hat is the one of the oldest and most successful Linux distributions but is now a commercial operation Like Microsoft. CentOS is a direct fork of RHEL and includes nearly all its features free of charge. We will be using CentOS 8 which is a very stable, scalable platform that can easily be migrated to the cloud. CentOS 8 is running the 4.18 kernel which is far from the newest Linux kernel, but CentOS, like RHEL, is all about stability for production systems. **(5 Kernel Archives).** The Kernel is the heart of system, so stability is key. Major changes include a changeup to the YUM **(6 YUM)** package manager, which is now based on the DNF. While it maintains the same command-line interface and stable API for sysadmin and DevOps integration these changes should make YUM faster so all system packages can be upgraded to the latest and most stable version. For developers, besides Git 2.18, CentOS offers these version control systems: Mercurial 4.8 and Subversion 1.10. Python (7Python.org) 3.6 is now CentOS’s default Python implementation, even though 3.8.10 is the latest release. There are several other default languages included in the build, Node.js 10.1, PHP 7.2, Ruby 2.5, Perl 5.26, and SWIG 3.0. The CentOS GCC compiler is based on version 8.2. It includes support for more recent C++ language standard versions, better optimizations, new code hardening techniques, improved warnings, and new hardware support. So, we have a very stable operating system with built in programming languages and compilers.

Since we are a web-based application, we need a webserver CentOS 8 comes with 2 web servers, Apache HTTP Server 2.4 is the latest stable release (8 Apache.org) and is licensed under Apache License 2.0. Apache is probably the longest running webserver and is an excellent feature packed webserver. The other option is and NGINX with the most stable release 1.18.0 and release under BSD licence 2. NGINX **(9 NGINX)** is a far newer web server around since 2004 and is a high performance easy to configure, more light weight and flexible web server that can also be used as a load balancer, mail proxy service and a HTTP caching service. Due to our limited budget on the physical hardware, load balancing and caching are good inbuilt options that reduce overhead. Of the two servers NGINX will be our choice.

As a we based application, that tracks the changes in price and quantity of rare items for fee paying customers we need a data base to keep track of information, such as customer names, payment history items of interest. By keeping relevant information on our customers our app can be more finely tuned and tailored to the interests of a variety of users. Individual users require different information, and it is important to keep track of this information. As our system improves and evolves, we will be able to offer more options for the customer to refine their parameters for a better experience. One of the features of our app is to send SMS messages or an email to notify the customer of any changes. To store this information, we need a database. CentOS 8 comes with several data bases but for our needs we will use MySQL version 8 **(10) MySQL** is an open-source relational database management system it can be tailored to deploy cloud-native applications it is very scalability, secure, reliable. In its simplest form it is easy to set up and configure and has a native web interface for administration and enable a web interface to display user information. There is one caveat to MySQL is that it now owned by Oracle (11), but it is free to a large extent. MySQL can be used freely within a web site MySQL license can be used free of charge for all projects that themselves run under the GPL or comparable free license. Since our application is built and uses open-source product, we can use it under the GPL licence (12 GPL).

In order to keep our clients informed of changes in their items of interest we need to send an email or SMS message. For this we will use another opensource application called iReadMail **(13).** iRedMail is a single package email server that scales from a single user to a company. It uses Postfix SMTP mail server version 3.5.10 released under IBM opensource license 2.0. **(14).** Postfix currently compromises 33%of the worlds Internet mail servers. iRedMail uses secure connections, POP3, IMAP over TLS (transport layer security) for mail services, and web mail access webmail with HTTPS. Emails are encrypted in transit using TLS, and passwords are encrypted and stored in SSHA512 or BCRYPT (Berkley Standard Distribution). The package includes a data base package of your choice, Anti-Spam, Anti-Virus protection, and a Web Admin Panel for easy Administration. The Postfix SMTP (simple message transfer protocol or MTA message transfer agent) can be configured to not only send email notifications to users but also SMS messages to their cell phone or number of their choice. As stated iRedMail is free but does provide a paid for professional support service.

The last item is what are we going to run our application on. By choosing the components we have in that they are not resource intensive, we can get away with running our project on a late model desktop or laptop for portability. We would need something like a 11th Generation I5 processor or AMD Ryzen 9 4900HS with a minimum of 16 GB of DDR4 RAM with expansion to 32GB of RAM. A minimum of a 500GB hard drive, preferably 1TB SSD would be preferable, cost being a factor. Graphics should be reasonable, but since this is not a graphics heavy application, we are more interested in memory, storage and processor. There are numerous laptops and desktops that fit our requirements for around $2000.

So, we have put together a very comprehensive software and operating system tool kit. It is reliable, flexible, well documented, has hundreds of thousands of developers worldwide and scalable. All the components we have selected are used by major companies the world over. It is not resource intensive, so our hardware output is minimal, and all components are free. This way we can develop an app that delivers what we intend it to do.

References:

1 <https://www.gnu.org/home.en.html>

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3 <https://www.centos.org/>

4 <https://www.redhat.com/>

5 <https://www.kernel.org/>

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7<https://www.python.org/>

8 <https://httpd.apache.org/>

9 <https://www.nginx.com/>

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12 <https://www.gnu.org/licenses/gpl-3.0.en.html>

13 <https://www.iredmail.org/>

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