**Abstract**

In this project, we decided to use the nopCommerce open-source eCommerce solution for our simulated small business. Leveraging the pre-configured web server provided to our group, we installed the nopCommerce solution package and built our security program around the web site. Our security program consists of nginx configured web server and load balancer, SSL certificate for encryption, firewall and a secure backend SQL server.

**Materials and Methods (cont.)**

**Nginx**

For our web server we installed and configured nginx to be the primary component of our logic layer. We modified the default nginx SSL virtual host file and adjusted the virtual host response to HTTPS requests on port 443 and 80.

**SSL**

As part of our solution we implemented an SSL certificate to ensure we have a secure encryption on requests. We were able to generate the servers public certificate and private keys through our Linux terminal. We also created a strong Diffie-Hellman group on the server to ensure PFS protocols are used with the clients.

**Conclusion**

The importance of cybersecurity has quickly risen over the recent decades due to the overall advancement of technology. This risk is multiplied for small businesses that may not have the resources to maintain the proper security measures necessary to mitigate this risk, which often results in a target on the back of these smaller companies due to the enticing fact that the valuable information that they hold within their systems is most likely insecure. The task for our project was to create a security plan for simulated small business to ensure that the business is not vulnerable to any attacks or breaches that may come. We did this through setting up and configuring a Virtual Machine, creating, and connecting to an SQL Server/DBMS, developing user base, developing network connections, configuring a firewall, configuring the Nginx web server, and configuring SSL. To ensure a secure checkout process, we decided that the best option would be implementing secure SSL. We were able to implement a self-signed SSL certificate by generating the server’s public certificate and private key. We also created a strong Diffie-Hellman group on the server to ensure PFS protocols are used with clients and successfully tested our SSL encryption and set up a permanent redirect for our SSL. We were also able to successfully implement the SSL by configuring our Nginx server to be able to use it through modifying the default Nginx SSL virtual host file and making sure that the virtual host would respond to HTTPS requests on port 443 and 80. Overall, this project was extremely successful based on not only meeting the goals and deliverables that were set but throughout going above and beyond while creating the most secure small business that we could give the resources that we were able to obtain such as enhancing the overall security of the site by adding such measures as reCaptcha.

**Research Objective**

1. Identify an open source e-commerce website solution and install it on provided web server
2. Develop a comprehensive security program to protect the web server such as security policy and tools

**Materials and Methods**

**NopCommerce**

For our simulated small business we use the nopCommerce open-source solution package. We installed a .NET Core framework on our Linux terminal and registered the Microsoft key. We created customized directories for the configuration files and created the nopCommerce server on the machine.

**Firewall (ufw)**

For network traffic we enabled the ufw firewall on our Ubunto VM and adjusted the setting to allow SSL traffic. Additionally, we made HTTP and HTTPS traffic allowed by activating the “Nginx Full” application.

**SQL Server**

For the data layer of our system we installed and configured a Microsoft SQL Server database to keep track of inventory and customer data. We established a secure connection between the web server and database.

**Tools**

This project was sponsored by Dr. Lei Li.

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**References**


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