E-Commerce: Designing And Creating An Online Store
Introduction

• About Steve Green Ministries
  – Solo Performance Artist for 19 Years.
  – Released over 26 Records, Several Kids Movies, and Books.

• My History With Steve Green Ministries
  – Started maintaining their existing site 5 years ago
Project Goals

Goals:

- Develop a new website to coordinate with the release of Steve’s new record, *Somewhere Between*.
- Create a fully functional online store.
- Set up a PHP, MySQL, Apache, and OpenSSL testing environment.
Building The New Site

• New Site Requirements:
  – Use frames, so that content could be updated on one part of the page without reloading the entire page
  – Use flash to design and animate menus
  – All coding in HTML – our current server does not support any dynamic content.
Building The New Site

• **IFRAMES Example**
  – IFRAMES are virtual frames which allow you to position page content anywhere on the screen.
  – IFRAME position is relative to the top and left side of the browser window.

• Problem
  – Because the IFRAME is relative to the window size, it is very difficult to predict its position and design accordingly
Building The New Site

- **Solution**
  - Create a frameset which would adjust according to the user’s browser window.
Building The New Site

- Building Flash Navigation
  - Navigation Menu, Product Menu
- Using Action Script
  - Like Visual Basic in the Microsoft Office environment, Action Script can be used to control almost every aspect of a Flash movie.
  - Products Menu.fla
Building The New Site

• Old Steve Green Ministries Site:
  – Old Site

• New Steve Green Ministries Site:
  – New Site
  – www.stevegreenministries.org
Setting Up A Testing Environment

- LAMP
  - Linux (or Windows)
  - Apache web server
  - MySQL
  - PHP

The Apache Software Foundation
http://www.apache.org/
Setting Up A Testing Environment

- Apache Web Server
  - Automatic Windows Install with basic configuration
  - Modify the configuration file to load the PHP library and map “.php” extension to that library
  - Create virtual hosts (Listen on port 80 and 443)
  - Enable SSL using a dynamically loaded SSL library
  - Configure SSL for port 443
Setting Up A Testing Environment

- PHP
  - Automatic Installation of files with no configuration
  - Modify the PATH to include the PHP library folder
  - Modify php.ini to dynamically load the MCRYPT library (For encryption discussed later)
Setting Up A Testing Environment

• MySQL database server
  – Automatic Windows Installation with minimal configuration
  – Set up user accounts with desired privileges

• Problem
  – PHP lacked the ability to connect to the version of MySQL I installed because the newest version created a new password system.

• Solution
  – Install an older version of MySQL (less secure)
Setting Up A Testing Environment

• SSL – Secure Sockets Layer
  – SSL ensures the security of online transactions between the browser and the server
  – When a browser requests a secured page, the server will send its public key and a certificate of validity.
  – If the certificate is valid, the browser will then use the server’s public key to generate a symmetric key.
  – The browser uses the symmetric key to encrypt the information it sends to the server and decrypt the information it receives from the server.
Setting Up A Testing Environment

• SSL Installation
  – OpenSSL – A free, open source alternative
    • Downloaded the source and compiled for Windows in Visual Studio
    • Added the compiled source to the PATH and created an server certificate and a server key.
    • Certificate Authorities such as Verisign charge around $2000.00 for a two year certificate and key.
  – Apache Web Server
    • Modified the configuration file to use the new certificate and key
• Create MySQL Tables
  – Separate different types of information into different tables for security
  – Enforce data integrity with the use of primary and foreign keys
  – Research appropriate data types for each column
Building The Store

• Creating A Products Page
  – Much easier than coding in HTML
  – Created a recordset from an SQL query and populated a table with all the information
  – Stored the file name of the picture in the database for ease of updating
  – Stored the path of the detail page for drill down
  – Categories displayed by a $_GET variable

Products Page Code
Building The Store

• The Shopping Cart
  – 4 Basic Functions of a Shopping Cart:
    • Add an item
    • Update item quantities
    • Delete an item
    • Display cart contents & calculate totals
  – 2 Ways to Store User’s Shopping Cart
    • Use PHP Session Variables
    • *Tie to a database
Building The Store

• The Shopping Cart
  – The Database approach to a shopping cart allows for the cart to remain across visits.
  – How to recognize an individual browser:
    • PHP will assign a unique session id to each browser for every visit.
    • To make this session id remain, I stored it into a cookie
  – I simply associated the contents of each cart with the browser’s session id.

View Shopping Cart Code
Building The Store

• Adding Users
  – When a customer is ready to checkout, they must either login to an existing account or create an account.
  – To Protect Privacy:
    • Browser caching is turned off. It is possible to gain personal information by reading a browser’s cache.
    • All communication between the browser and server is encrypted using SSL.
    • All user data is encrypted before stored in the database.
    • Passwords are irreversibly encrypted using MD5
Building The Store

• Adding Users
  – Every user in put was validated using PHP
  – Add User Code 1 2 3
  – Add User Check Code 1 2 3

• User Authentication
  – Once a user has either signed in or created an account, the user id associated with that account is stored in the browser’s cookie.
  – The user id stored in the cookie is encoded and a second variable is created to verify the cookie’s integrity.
    – setcookie("client_id", base64_encode($single_row), time() + (3600 * 24))
    – setcookie("chk", base64_encode($single_row.getcid()), time() + (3600 * 24))
Building The Store

• Checkout Process
  – Sign in or create an account
  – Verify cart contents
  – Input Credit Card
  – Display a printable invoice for client records
• MCRYPT
  – Triple DES
    • A revision of DES (Data Encryption Standard)
    • It achieves 168bit encryption by incorporating 3 keys into the encryption process
    • This is a 2 way encryption which utilizes a secret key to encode and decode data
• MCrypt
  – Problem:
    • MCrypt returns a random encrypted string. These strings often contain characters which would invalidate an SQL statement. Also, the data types I used in the database would remove trailing spaces on strings and ultimately truncate my encrypted string.
  – Answer:
    • PHP has a function called “addslashes()” which places slashes in front of each problematic character in a string. This makes keeps the encrypted values from causing errors in the SQL statement. Also, I changed the data type of the encrypted columns to “blob” which can store an unlimited amount of binary data.
Building The Store

- The Backend Requirements:
  - View Unfilled Orders
  - View Filled Orders
  - Generate A Printable List Of All Unfilled Orders
  - Delete Orders
  - Clean The Shopping Cart Table
  - View Site Statistics
Building The Store

• The Backend Design
  – The backend must be secure – It has the decryption key
  – Separate Key for User Info and Credit Card Info
  – Store the admin pages on the user’s computer – not on the remote server
Building The Store

- Visit The Store
- View Store Code
Overview

• Goals Met:
  – Created a static site with flash navigation and frame linking
  – Set up a testing environment with PHP, MySQL, Apache, and SSL
  – Create an online store, complete with product listing, shopping cart, user accounts, and a backend
  – Ensure information privacy with the use of SSL and data encryption
Sources

- **Apache Reference:**
  - http://www.apache.org
  - http://www.modssl.org

- **PHP Reference:**

- **MySQL Reference:**
  - http://www.mysql.com

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  - http://www.phpwebcommerce.com/

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- **Mcrypt:**
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- **Triple DES:**
  - http://kingkong.me.berkeley.edu/~kenneth/courses/sims250/des.html