Lab 1: Apache Web Server Installation & Maintenance

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Task 1: Setting up Apache Web Server

Commands for Task 1

Listing 1: Apache Installation Commands

```
# Create Task1 directory
mkdir -p Lab1/Task1
cd Lab1/Task1

# Step 1: Install Apache
sudo apt update
sudo apt install apache2

# Step 2: Configure Firewall
sudo ufw app list
sudo ufw allow 'Apache'
sudo ufw status

# Step 3: Check Web Server
sudo systemctl status apache2

# Add webserverlab.com to hosts
echo "127.0.0.1 webserverlab.com" | sudo tee -a /etc/hosts

# Test the web server
curl http://localhost
curl http://webserverlab.com
```

Checkpoint 1

Show Apache default page at `http://webserverlab.com` or `http://localhost`

Task 2: Setting up Virtual Hosts

Commands for Task 2 - Part 1 (example.com)

Listing 2: Virtual Host Setup for example.com

```
# Create Task2 directory
mkdir -p Lab1/Task2
cd Lab1/Task2

# Create directory structure for example.com
sudo mkdir -p /var/www/example.com/html
sudo chown -R $USER:$USER /var/www/example.com/html
sudo chmod -R 755 /var/www/example.com

# Create index.html for example.com
cat > /var/www/example.com/html/index.html << 'EOF'
<html>
<head>
<title>Welcome to Example.com</title>
</head>
<body>
<h1>Success! The example.com server block is working!</h1>
</body>
</html>
EOF

# Create virtual host configuration
sudo tee /etc/apache2/sites-available/example.com.conf << 'EOF'
<VirtualHost *:80>
    ServerAdmin admin@example.com
    ServerName example.com
    ServerAlias www.example.com
    DocumentRoot /var/www/example.com/html
    ErrorLog ${APACHE_LOG_DIR}/error.log
    CustomLog ${APACHE_LOG_DIR}/access.log combined
</VirtualHost>
EOF

# Enable the site and disable default
sudo a2ensite example.com.conf
sudo a2dissite 000-default.conf

# Test configuration and restart
sudo apache2ctl configtest
sudo systemctl restart apache2

# Add example.com to hosts
echo "127.0.0.1␣example.com" | sudo tee -a /etc/hosts
```

Checkpoint 2

Show `http://example.com` working with custom content.

Testing Different Domains

Listing 3: Testing Domain Routing

```
1  # Test various URLs
2  curl http://example.com
3  curl http://webserverlab.com
4  curl http://127.0.0.1
```

Checkpoint 3

Explain what happens when accessing different URLs and why.

Commands for Task 2 - Part 2 (anothervhost.com)

Listing 4: Virtual Host Setup for anothervhost.com

```
1  # Create directory structure for anothervhost.com
2  sudo mkdir -p /var/www/anothervhost.com/html
3  sudo chown -R $USER:$USER /var/www/anothervhost.com/html
4  sudo chmod -R 755 /var/www/anothervhost.com
5
6  # Create index.html for anothervhost.com
7  cat > /var/www/anothervhost.com/html/index.html << 'EOF'
8  <html>
9  <head>
10 <title>Welcome to AnotherVHost.com</title>
11 </head>
12 <body>
13 <h1>Success! The anothervhost.com virtual host is working!</h1>
14 <p>This is a different virtual host with unique content.</p>
15 </body>
16 </html>
17 EOF
18
19 # Create virtual host configuration
20 sudo tee /etc/apache2/sites-available/anothervhost.com.conf << '
     EOF'
21 <VirtualHost *:80>
22     ServerAdmin admin@anothervhost.com
23     ServerName anothervhost.com
24     ServerAlias www.anothervhost.com
25     DocumentRoot /var/www/anothervhost.com/html
26     ErrorLog ${APACHE_LOG_DIR}/anothervhost_error.log
27     CustomLog ${APACHE_LOG_DIR}/anothervhost_access.log combined
28 </VirtualHost>
29 EOF
30
31 # Enable the site
32 sudo a2ensite anothervhost.com.conf
33 sudo apache2ctl configtest
```

```
34  sudo systemctl restart apache2
35
36  # Add to hosts
37  echo "127.0.0.1␣anothervhost.com" | sudo tee -a /etc/hosts
```

Checkpoint 4

Show `http://anothervhost.com` working with custom content.

Task 3: Hosting Dynamic Websites

Commands for Task 3

Listing 5: Task 3 Directory Setup

```
1  # Create Task3 directory
2  mkdir -p Lab1/Task3
3  cd Lab1/Task3
```

Dynamic Website 1: User Registration Form (example.com)

Listing 6: User Registration Form HTML/JavaScript

```
1   <!DOCTYPE html>
2   <html>
3   <head>
4       <title>Example.com - User Registration</title>
5       <style>
6           body { font-family: Arial, sans-serif; margin: 40px; }
7           .container { max-width: 500px; margin: 0 auto; }
8           input[type="text"], input[type="email"], input[type="
                password"] {
9               width: 100%; padding: 10px; margin: 5px 0; border: 1
                    px solid #ddd;
10          }
11          input[type="submit"] {
12              background: #4CAF50; color: white; padding: 10px 20px
                    ;
13              border: none; cursor: pointer; margin-top: 10px;
14          }
15          .message { margin-top: 20px; padding: 10px; border-radius
                : 5px; }
16      </style>
17  </head>
18  <body>
19      <div class="container">
20          <h1>Example.com - User Registration</h1>
21          <form onsubmit="return␣validateForm()">
22              <label>Full Name:</label>
```

```
23              <input type="text" id="name" required>
24
25              <label>Email:</label>
26              <input type="email" id="email" required>
27
28              <label>Password:</label>
29              <input type="password" id="password" required>
30
31              <label>Confirm Password:</label>
32              <input type="password" id="confirmPassword" required>
33
34              <label>Phone Number:</label>
35              <input type="text" id="phone" required>
36
37              <input type="submit" value="Register">
38          </form>
39          <div id="message" class="message"></div>
40      </div>
41
42      <script>
43          function validateForm() {
44              event.preventDefault();
45              let name = document.getElementById('name').value;
46              let email = document.getElementById('email').value;
47              let password = document.getElementById('password').
                    value;
48              let confirmPassword = document.getElementById('
                    confirmPassword').value;
49              let phone = document.getElementById('phone').value;
50
51              if (password !== confirmPassword) {
52                  showMessage('Error: Passwords do not match!', '
                        red');
53                  return false;
54              }
55
56              if (phone.length < 10) {
57                  showMessage('Error: Phone number must be at least
                         10 digits!', 'red');
58                  return false;
59              }
60
61              showMessage(`Success! Welcome <b>${name}</b>.
                    Registration complete for ${email}. Phone: ${phone
                    }`, 'green');
62              return false;
63          }
64
65          function showMessage(text, color) {
66              const messageDiv = document.getElementById('message')
                    ;
```

```
67            messageDiv.innerHTML = text;
68            messageDiv.style.color = color;
69            messageDiv.style.border = '2px solid ${color}';
70            messageDiv.style.backgroundColor = color === 'green'
                  ? '#e8f5e8' : '#ffe8e8';
71         }
72      </script>
73 </body>
74 </html>
```

Bash Command to Deploy Website 1

Listing 7: Deploy User Registration Form

```
1  # Create dynamic content for example.com
2  cat > /var/www/example.com/html/index.html << 'EOF'
3  <!DOCTYPE html>
4  <html>
5  <head>
6      <title>Example.com - User Registration</title>
7      <style>
8          body { font-family: Arial, sans-serif; margin: 40px; }
9          .container { max-width: 500px; margin: 0 auto; }
10         input[type="text"], input[type="email"], input[type="
                password"] {
11             width: 100%; padding: 10px; margin: 5px 0; border: 1
                  px solid #ddd;
12         }
13         input[type="submit"] {
14             background: #4CAF50; color: white; padding: 10px 20px
                  ;
15             border: none; cursor: pointer; margin-top: 10px;
16         }
17         .message { margin-top: 20px; padding: 10px; border-radius
                : 5px; }
18     </style>
19 </head>
20 <body>
21     <div class="container">
22         <h1>Example.com - User Registration</h1>
23         <form onsubmit="return␣validateForm()">
24             <label>Full Name:</label>
25             <input type="text" id="name" required>
26
27             <label>Email:</label>
28             <input type="email" id="email" required>
29
30             <label>Password:</label>
31             <input type="password" id="password" required>
32
33             <label>Confirm Password:</label>
```

```
34              <input type="password" id="confirmPassword" required>
35
36              <label>Phone Number:</label>
37              <input type="text" id="phone" required>
38
39              <input type="submit" value="Register">
40          </form>
41          <div id="message" class="message"></div>
42      </div>
43
44      <script>
45          function validateForm() {
46              event.preventDefault();
47              let name = document.getElementById('name').value;
48              let email = document.getElementById('email').value;
49              let password = document.getElementById('password').
                    value;
50              let confirmPassword = document.getElementById('
                    confirmPassword').value;
51              let phone = document.getElementById('phone').value;
52
53              if (password !== confirmPassword) {
54                  showMessage('Error: Passwords do not match!', '
                        red');
55                  return false;
56              }
57
58              if (phone.length < 10) {
59                  showMessage('Error: Phone number must be at least
                         10 digits!', 'red');
60                  return false;
61              }
62
63              showMessage('Success! Welcome <b>${name}</b>.
                    Registration complete for ${email}. Phone: ${phone
                    }', 'green');
64              return false;
65          }
66
67          function showMessage(text, color) {
68              const messageDiv = document.getElementById('message')
                    ;
69              messageDiv.innerHTML = text;
70              messageDiv.style.color = color;
71              messageDiv.style.border = '2px solid ${color}';
72              messageDiv.style.backgroundColor = color === 'green'
                    ? '#e8f5e8' : '#ffe8e8';
73          }
74      </script>
75 </body>
76 </html>
```

```
77  EOF
```

Dynamic Website 2: Product Order Form (anothervhost.com)

Listing 8: Product Order Form HTML/JavaScript

```html
1   <!DOCTYPE html>
2   <html>
3   <head>
4       <title>AnotherVHost - Product Order</title>
5       <style>
6           body { font-family: Arial, sans-serif; margin: 40px; }
7           .container { max-width: 600px; margin: 0 auto; }
8           .form-group { margin: 15px 0; }
9           label { display: block; margin-bottom: 5px; }
10          input, select, textarea { width: 100%; padding: 8px;
                border: 1px solid #ddd; }
11          button { background: #2196F3; color: white; padding: 10px
                20px; border: none; cursor: pointer; }
12          .order-summary { margin-top: 20px; padding: 15px; border:
                1px solid #ddd; }
13      </style>
14  </head>
15  <body>
16      <div class="container">
17          <h1>AnotherVHost - Product Order Form</h1>
18          <form onsubmit="return␣processOrder()">
19              <div class="form-group">
20                  <label>Product Selection:</label>
21                  <select id="product" onchange="updatePrice()">
22                      <option value="">Select a product</option>
23                      <option value="laptop" data-price="1200">
                            Laptop - $1200</option>
24                      <option value="phone" data-price="800">
                            Smartphone - $800</option>
25                      <option value="tablet" data-price="500">
                            Tablet - $500</option>
26                  </select>
27              </div>
28
29              <div class="form-group">
30                  <label>Quantity:</label>
31                  <input type="number" id="quantity" min="1" value=
                        "1" onchange="updatePrice()">
32              </div>
33
34              <div class="form-group">
35                  <label>Shipping Address:</label>
36                  <textarea id="address" rows="3" required></
                        textarea>
37              </div>
```

```html
38
39            <div class="form-group">
40                <label>Payment Method:</label>
41                <select id="payment">
42                    <option value="credit">Credit Card</option>
43                    <option value="debit">Debit Card</option>
44                    <option value="paypal">PayPal</option>
45                </select>
46            </div>
47
48            <button type="submit">Place Order</button>
49        </form>
50
51        <div id="orderSummary" class="order-summary" style="
            display:␣none;">
52            <h3>Order Summary</h3>
53            <div id="summaryContent"></div>
54        </div>
55    </div>
56
57    <script>
58        function updatePrice() {
59            const productSelect = document.getElementById('
                product');
60            const quantityInput = document.getElementById('
                quantity');
61            const selectedOption = productSelect.options[
                productSelect.selectedIndex];
62
63            if (selectedOption.value) {
64                const price = selectedOption.getAttribute('data-
                    price');
65                const quantity = parseInt(quantityInput.value);
66                const total = price * quantity;
67
68                document.getElementById('orderSummary').style.
                    display = 'block';
69                document.getElementById('summaryContent').
                    innerHTML = `
70                    <p><strong>Product:</strong> ${selectedOption
                        .text}</p>
71                    <p><strong>Unit Price:</strong> $${price}</p>
72                    <p><strong>Quantity:</strong> ${quantity}</p>
73                    <p><strong>Total Amount:</strong> $${total}</
                        p>
74                `;
75            } else {
76                document.getElementById('orderSummary').style.
                    display = 'none';
77            }
78        }
```

```
79
80          function processOrder() {
81              event.preventDefault();
82
83              const product = document.getElementById('product').
                    value;
84              const quantity = document.getElementById('quantity').
                    value;
85              const address = document.getElementById('address').
                    value;
86              const payment = document.getElementById('payment').
                    value;
87
88              if (!product) {
89                  alert('Please select a product!');
90                  return false;
91              }
92
93              if (!address.trim()) {
94                  alert('Please enter shipping address!');
95                  return false;
96              }
97
98              const selectedOption = document.getElementById('
                    product').options[document.getElementById('product
                    ').selectedIndex];
99              const price = selectedOption.getAttribute('data-price
                    ');
100             const total = price * quantity;
101
102             alert('Order placed successfully!\n\nProduct: ${
                    selectedOption.text}\nQuantity: ${quantity}\nTotal
                    : $${total}\nShipping to: ${address}\nPayment: ${
                    payment}');
103
104             document.querySelector('form').reset();
105             document.getElementById('orderSummary').style.display
                     = 'none';
106
107             return false;
108         }
109     </script>
110 </body>
111 </html>
```

Bash Command to Deploy Website 2

Listing 9: Deploy Product Order Form

```
1  # Create dynamic content for anothervhost.com
2  cat > /var/www/anothervhost.com/html/index.html << 'EOF'
```

```html
<!DOCTYPE html>
<html>
<head>
    <title>AnotherVHost - Product Order</title>
    <style>
        body { font-family: Arial, sans-serif; margin: 40px; }
        .container { max-width: 600px; margin: 0 auto; }
        .form-group { margin: 15px 0; }
        label { display: block; margin-bottom: 5px; }
        input, select, textarea { width: 100%; padding: 8px;
            border: 1px solid #ddd; }
        button { background: #2196F3; color: white; padding: 10px
            20px; border: none; cursor: pointer; }
        .order-summary { margin-top: 20px; padding: 15px; border:
            1px solid #ddd; }
    </style>
</head>
<body>
    <div class="container">
        <h1>AnotherVHost - Product Order Form</h1>
        <form onsubmit="return processOrder()">
            <div class="form-group">
                <label>Product Selection:</label>
                <select id="product" onchange="updatePrice()">
                    <option value="">Select a product</option>
                    <option value="laptop" data-price="1200">
                        Laptop - $1200</option>
                    <option value="phone" data-price="800">
                        Smartphone - $800</option>
                    <option value="tablet" data-price="500">
                        Tablet - $500</option>
                </select>
            </div>

            <div class="form-group">
                <label>Quantity:</label>
                <input type="number" id="quantity" min="1" value=
                    "1" onchange="updatePrice()">
            </div>

            <div class="form-group">
                <label>Shipping Address:</label>
                <textarea id="address" rows="3" required></
                    textarea>
            </div>

            <div class="form-group">
                <label>Payment Method:</label>
                <select id="payment">
                    <option value="credit">Credit Card</option>
                    <option value="debit">Debit Card</option>
```

```
46              <option value="paypal">PayPal</option>
47            </select>
48         </div>
49
50         <button type="submit">Place Order</button>
51      </form>
52
53      <div id="orderSummary" class="order-summary" style="
           display:␣none;">
54         <h3>Order Summary</h3>
55         <div id="summaryContent"></div>
56      </div>
57   </div>
58
59   <script>
60      function updatePrice() {
61         const productSelect = document.getElementById('
              product');
62         const quantityInput = document.getElementById('
              quantity');
63         const selectedOption = productSelect.options[
              productSelect.selectedIndex];
64
65         if (selectedOption.value) {
66            const price = selectedOption.getAttribute('data-
                 price');
67            const quantity = parseInt(quantityInput.value);
68            const total = price * quantity;
69
70            document.getElementById('orderSummary').style.
                 display = 'block';
71            document.getElementById('summaryContent').
                 innerHTML = `
72               <p><strong>Product:</strong> ${selectedOption
                    .text}</p>
73               <p><strong>Unit Price:</strong> $${price}</p>
74               <p><strong>Quantity:</strong> ${quantity}</p>
75               <p><strong>Total Amount:</strong> $${total}</
                    p>
76            `;
77         } else {
78            document.getElementById('orderSummary').style.
                 display = 'none';
79         }
80      }
81
82      function processOrder() {
83         event.preventDefault();
84
85         const product = document.getElementById('product').
              value;
```

```
86              const quantity = document.getElementById('quantity').
                    value;
87              const address = document.getElementById('address').
                    value;
88              const payment = document.getElementById('payment').
                    value;
89
90              if (!product) {
91                  alert('Please select a product!');
92                  return false;
93              }
94
95              if (!address.trim()) {
96                  alert('Please enter shipping address!');
97                  return false;
98              }
99
100             const selectedOption = document.getElementById('
                    product').options[document.getElementById('product
                    ').selectedIndex];
101             const price = selectedOption.getAttribute('data-price
                    ');
102             const total = price * quantity;
103
104             alert('Order placed successfully!\n\nProduct: ${
                    selectedOption.text}\nQuantity: ${quantity}\nTotal
                    : $${total}\nShipping to: ${address}\nPayment: ${
                    payment}');
105
106             document.querySelector('form').reset();
107             document.getElementById('orderSummary').style.display
                     = 'none';
108
109             return false;
110         }
111     </script>
112 </body>
113 </html>
114 EOF
115
116 # Restart Apache to apply changes
117 sudo systemctl restart apache2
```

Checkpoint 5

Show both dynamic websites working:

- http://example.com - User Registration Form

- http://anothervhost.com - Product Order Form

Summary

All tasks completed with proper folder structure:

- `Lab1/Task1/` - Apache installation and basic setup

- `Lab1/Task2/` - Virtual hosts configuration

- `Lab1/Task3/` - Dynamic websites deployment