# Lab 1: Apache Web Server Installation & MaintenanceMD

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## Task 1: Setting up Apache Web Server

**Commands for Task 1**

**Listing 1: Apache Installation Commands**

| Line | Command | Description |
|------|---------|-------------|
| 1 | # Create Task1 directory | |
| 2 | mkdir -p Lab1/Task1 | Creates directory structure. |
| 3 | cd Lab1/Task1 | Navigate to the new directory. |
| 4 | # Step 1: Install Apache | |
| 5 | sudo apt update | Update package list. |
| 6 | sudo apt install apache2 | Install Apache web server. |
| 7 | # Step 2: Configure Firewall | |
| 8 | sudo ufw app list | List available UFW applications. |

| Line | Command | Description |
|---|---|---|
| 9 | sudo ufw allow 'Apache' | Allow traffic for Apache. |
| 10 | sudo ufw status | Check UFW status. |
| 11 | # Step 3: Check Web Server | |
| 12 | sudo systemctl status apache2 | Check Apache service status. |
| 13 | # Add webserverlab.com to hosts | |
| 14 | `echo "127.0.0.1 webserverlab.com" | sudo tee -a /etc/hosts` |
| 15 | # Test the web server | |
| 16 | curl http://localhost | Test access via localhost. |
| 17 | curl http://webserverlab.com | Test access via domain name. |

Checkpoint 1

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

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## Task 2: Setting up Virtual Hosts

**Commands for Task 2 - Part 1 (example.com)**
**Listing 2: Virtual Host Setup for example.com**

| Line | Command | Description |
|---|---|---|
| | | |

| 1 | # Create Task2 directory | |
|---|---|---|
| 2 | mkdir -p Lab1/Task2 | Creates directory structure. |
| 3 | cd Lab1/Task2 | Navigate to the new directory. |
| 4 | # Create directory structure for example.com | |
| 5 | sudo mkdir -p /var/www/example.com/html | Create document root directory. |
| 6 | sudo chown -R \$USER:\$USER /var/www/example.com/html | Change ownership for user access. |
| 7 | sudo chmod -R 755 /var/www/example.com | Set directory permissions. |
| 8 | # Create index.html for example.com | |
| 9 | cat > /var/www/example.com/html/index.html << 'EOF' | Start creating index.html. |
| 10 | <html> | HTML start tag. |
| 11 | <head> | Head section start. |

| 12 | &lt;title&gt;Welcome to Example.com&lt;/title&gt; | Page title. |
|----|---|---|
| 13 | &lt;/head&gt; | Head section end. |
| 14 | &lt;body&gt; | Body section start. |
| 15 | &lt;h1&gt;Success! The example.com server block is working!&lt;/h1&gt; | Custom content. |
| 16 | &lt;/body&gt; | Body section end. |
| 17 | &lt;/html&gt; | HTML end tag. |
| 18 | EOF | End of file input. |
| 19 | # Create virtual host configuration | |
| 20 | sudo tee /etc/apache2/sites-available/example.com.conf << 'EOF' | Create VHost config file. |
| 21 | &lt;VirtualHost *:80&gt; | Start VHost block for port 80. |
| 22 | ServerAdmin admin@example.com | Administrator email. |
| 23 | ServerName example.com | Primary domain name. |

| 24 | ServerAlias www.example.com | Alternate domain name. |
|---|---|---|
| 25 | DocumentRoot /var/www/example.com/html | Root directory for the domain. |
| 26 | ErrorLog \${APACHE_LOG_DIR}/error.log | Error log file. |
| 27 | CustomLog \${APACHE_LOG_DIR}/access.log combined | Access log file. |
| 28 | </VirtualHost> | End of VHost block. |
| 29 | EOF | End of file input. |
| 30 | #Enable the site and disable default | |
| 31 | sudo a2ensite example.com.conf | Enable the new VHost. |
| 32 | sudo a2dissite 000-default.conf | Disable the default site. |
| 33 | #Test configuration and restart | |
| 34 | sudo apache2ctl configtest | Check configuration syntax. |
| 35 | sudo systemctl restart apache2 | Restart Apache service. |

| 36 | # Add example.com to hosts | |
|---|---|---|
| 37 | `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**

- curl http://example.com
- curl http://webserverlab.com
- 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**

| Line | Command | Description |
|---|---|---|
| 1 | #Create directory structure for anothervhost.com | |
| 2 | sudo mkdir -p /var/www/anothervhost.com/html | Create document root directory. |
| 3 | sudo chown -R \$USER:\$USER /var/www/anothervhost.com/html | Change ownership. |
| 4 | sudo chmod -R 755 /var/www/anothervhost.com | Set directory permissions. |

| 5 | #Create index.html for anothervhost.com | |
|---|---|---|
| 6 | cat > /var/www/anothervhost.com/html/index.html << 'EOF | Start creating index.html. |
| 7 | <html> | HTML start tag. |
| 8 | <head> | Head section start. |
| 9 | <title>Welcome to AnotherVHost.com</title> | Page title. |
| 10 | </head> | Head section end. |
| 11 | <body> | Body section start. |
| 12 | <h1>Success! The anothervhost.com virtual host is working!</h1> | Custom content. |
| 13 | <p>This is a different virtual host with unique content.</p> | Additional custom content. |
| 14 | </body> | Body section end. |
| 15 | </html> | HTML end tag. |
| 16 | EOF | End of file input. |

| 17 | # Create virtual host configuration | |
|---|---|---|
| 18 | sudo tee /etc/apache2/sites-available/anothervhost.com.conf << EOF' | Create VHost config file. |
| 19 | <VirtualHost *:80> | Start VHost block for port 80. |
| 20 | ServerAdmin admin@anothervhost.com | Administrator email. |
| 21 | ServerName anothervhost.com | Primary domain name. |
| 22 | ServerAlias www.anothervhost.com | Alternate domain name. |
| 23 | DocumentRoot /var/www/anothervhost.com/html | Root directory for the domain. |
| 24 | ErrorLog \${APACHE_LOG_DIR}/anothervhost_error.log | Error log file. |
| 25 | CustomLog \${APACHE_LOG_DIR}/anothervhost_access.log combined | Access log file. |
| 26 | </VirtualHost > | End of VHost block. |
| 27 | EOF | End of file input. |

| 28 | # Enable the site | |
|----|-------------------|---|
| 29 | sudo a2ensite anothervhost.com.conf | Enable the new VHost. |
| 30 | sudo apache2ctl configtest | Check configuration syntax. |
| 31 | sudo systemctl restart apache2 | Restart Apache service. |
| 32 | #Add to hosts | |
| 33 | `echo "127.0.0.1 anothervhost.com" | sudo tee -a /etc/hosts` |

Checkpoint 4

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

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## Task 3: Hosting Dynamic Websites

**Commands for Task 3**

**Listing 5: Task 3 Directory Setup**

- #Create Task3 directory
- mkdir -p Lab1/Task3
- cd Lab1/Task3

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

Listing 6: User Registration Form HTML/JavaScript

(The following is the content of the HTML/JavaScript file)

HTML
<!DOCTYPE html>

```html
<html>
<head>
<title>Example.com User Registration</title>
<style>
body { font-family: Arial, sans-serif; margin: 40px; }
.container { max-width: 500px; margin: 0 auto; }
input[type="text"], input[type="email"], input[type="password"] {
width: 100%; padding: 10px; margin: 5px 0; border: 1px solid #ddd;
}
input[type="submit"] {
background: #4CAF50; color: white; padding: 10px 20px;
border: none; cursor: pointer; margin-top: 10px;
}
.message { margin-top: 20px; padding: 10px; border-radius: 5px; }
</style>
</head>
<body>
<div class="container">
<h1>Example.com User Registration</h1>
<form onsubmit="return validateForm()">
<label>Full Name: </label>
<input type="text" id="name" required>
<label>Email:</label>
<input type="email" id="email" required>
<label>Password: </label>
<input type="password" id="password" required>
<label>Confirm Password: </label>
<input type="password" id="confirmPassword" required>
<label>Phone Number: </label>
<input type="text" id="phone" required>
<input type="submit" value="Register">
</form>
<div id="message" class="message"></div>
</div>
<script>
function validateForm() {
event.preventDefault();
let name = document.getElementById('name').value;
let email = document.getElementById('email').value;
let password = document.getElementById('password').value;
let confirmPassword = document.getElementById('confirmPassword').value;
let phone = document.getElementById('phone').value;

if (password !== confirmPassword) {
```

```
showMessage('Error: Passwords do not match!', 'red');
return false;
}

if (phone.length < 10) {
showMessage('Error: Phone number must be at least 10 digits!', 'red');
return false;
}

showMessage(`Success! Welcome <b>${name}</b>. Registration complete for ${email}. Phone:
${phone}`, 'green');
return false;
}

function showMessage(text, color) {
const messageDiv = document.getElementById('message');
messageDiv.innerHTML = text;
messageDiv.style.color = color;
messageDiv.style.border = '2px solid ${color}';
messageDiv.style.backgroundColor = color === 'green' ? '#e8f5e8' : '#ffe8e8';
}
</script>
</body>
</html>
```

**Listing 7: Deploy User Registration Form**

- #Create dynamic content for example.com
- cat > /var/www/example.com/html/index.html << 'EOF'
  (Followed by the complete HTML/JavaScript content above)
- EOF

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

Listing 8: Product Order Form HTML/JavaScript

(The following is the content of the HTML/JavaScript file)

```
HTML
<!DOCTYPE html>
<html>
<head>
<title>Another VHost - Product Order</title>
<style>
body { font-family: Arial, sans-serif; margin: 40px; }
.container { max-width: 600px; margin: 0 auto; }
```

```html
.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>Another VHost - 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>
<option value="paypal">PayPal</option>
</select>
</div>
<button type="submit">Place Order</button>
</form>
<div id="orderSummary" class="order-summary" style="display: none;">
<h3>Order Summary</h3>
<div id="summaryContent"></div>
</div>
</div>
<script>
```

```javascript
function updatePrice() {
const productSelect = document.getElementById('product');
const quantityInput = document.getElementById('quantity');
const selectedOption = productSelect.options[productSelect.selectedIndex];

if (selectedOption.value) {
const price = selectedOption.getAttribute('data-price');
const quantity = parseInt(quantityInput.value);
const total = price * quantity;

document.getElementById('orderSummary').style.display = 'block';
document.getElementById('summaryContent').innerHTML = `
<p><strong>Product:</strong> ${selectedOption.text}</p>
<p><strong>Unit Price:</strong> $${price}</p>
<p><strong>Quantity:</strong> ${quantity}</p>
<p><strong>Total Amount:</strong> $${total}</p>
`;
} else {
document.getElementById('orderSummary').style.display = 'none';
}
}

function processOrder() {
event.preventDefault();
const product = document.getElementById('product').value;
const quantity = document.getElementById('quantity').value;
const address = document.getElementById('address').value;
const payment = document.getElementById('payment').value;

if (!product) {
alert('Please select a product!');
return false;
}

if (!address.trim()) {
alert('Please enter shipping address!');
return false;
}

const selectedOption =
document.getElementById('product').options[document.getElementById('product').selectedIndex
];
const price = selectedOption.getAttribute('data-price');
const total = price * quantity;
```

```
alert(`Order placed successfully!\n\nProduct: ${selectedOption.text}\nQuantity:
${quantity}\nTotal: $${total}\nShipping to: ${address}\nPayment: ${payment}`);
document.querySelector('form').reset();
document.getElementById('orderSummary').style.display = 'none';
return false;
}
</script>
</body>
</html>
```