Computer Forensics

Chapter 4 - Processing Crime and Incident Scenes

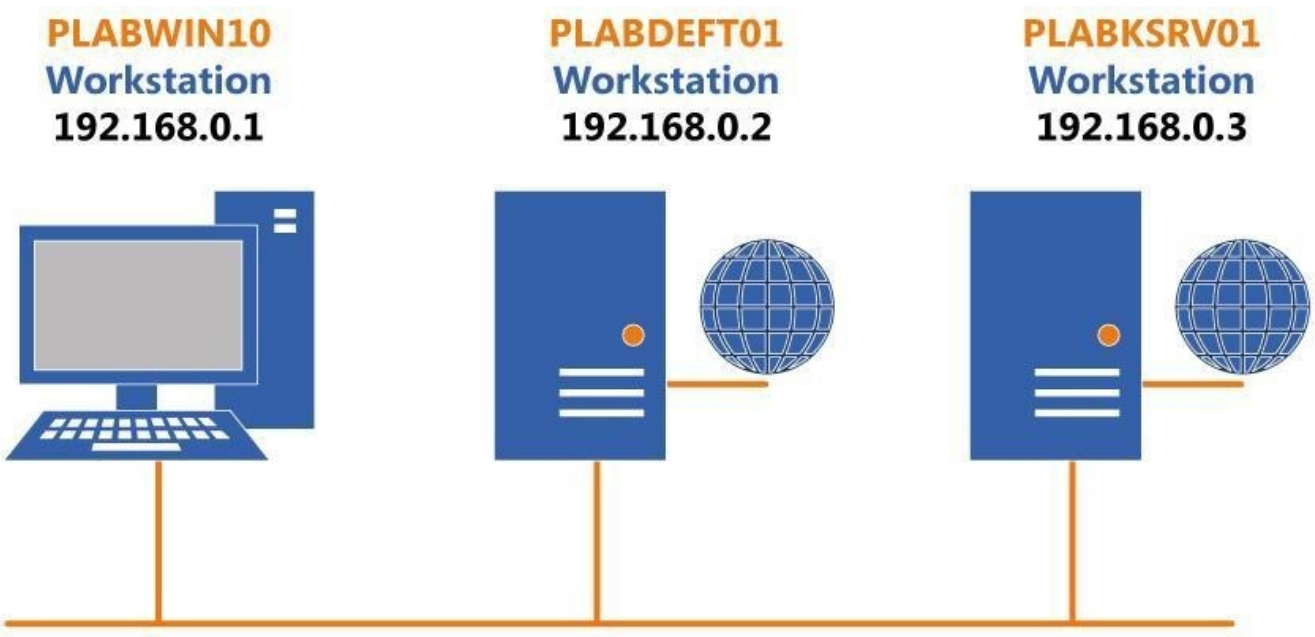
Introduction

The **Processing Crime and Incident Scenes** lab provides you with the instructions and devices to develop your hands-on skills in the following topics.

- Exercise 4-1 Conducting the Investigation: Acquiring Evidence with OSForensics
- Hands-On Project 4-3
- Hands-On Project 4-4
- Hands-On Project 4-5

Lab Diagram

During your session, you will have access to the following lab configuration. Depending on the exercises, you may or may not use all of the devices, but they are shown here in the layout to get an overall understanding of the topology of the lab.



Connecting to your Lab

In this module, you will be working on the following equipment to carry out the steps defined in each exercise.

PLABWIN10 (Windows 10 - Standalone Workstation)

Help and Support

For more information on using Practice Labs, please see our **Help and Support** page. You can also raise a technical support ticket from this page.

Click Next to proceed to the first exercise.

Exercise 4-1 - Acquiring Evidence with OSForensics

In the following activity, you use OSForensics to analyze an image file.

To get a better understanding of this technology, please refer to your course material or use your preferred search engine to research this topic in more detail.

Task 1 - Download USB Drive Images

In this task, you will download the USB drive images from a local intranet site.

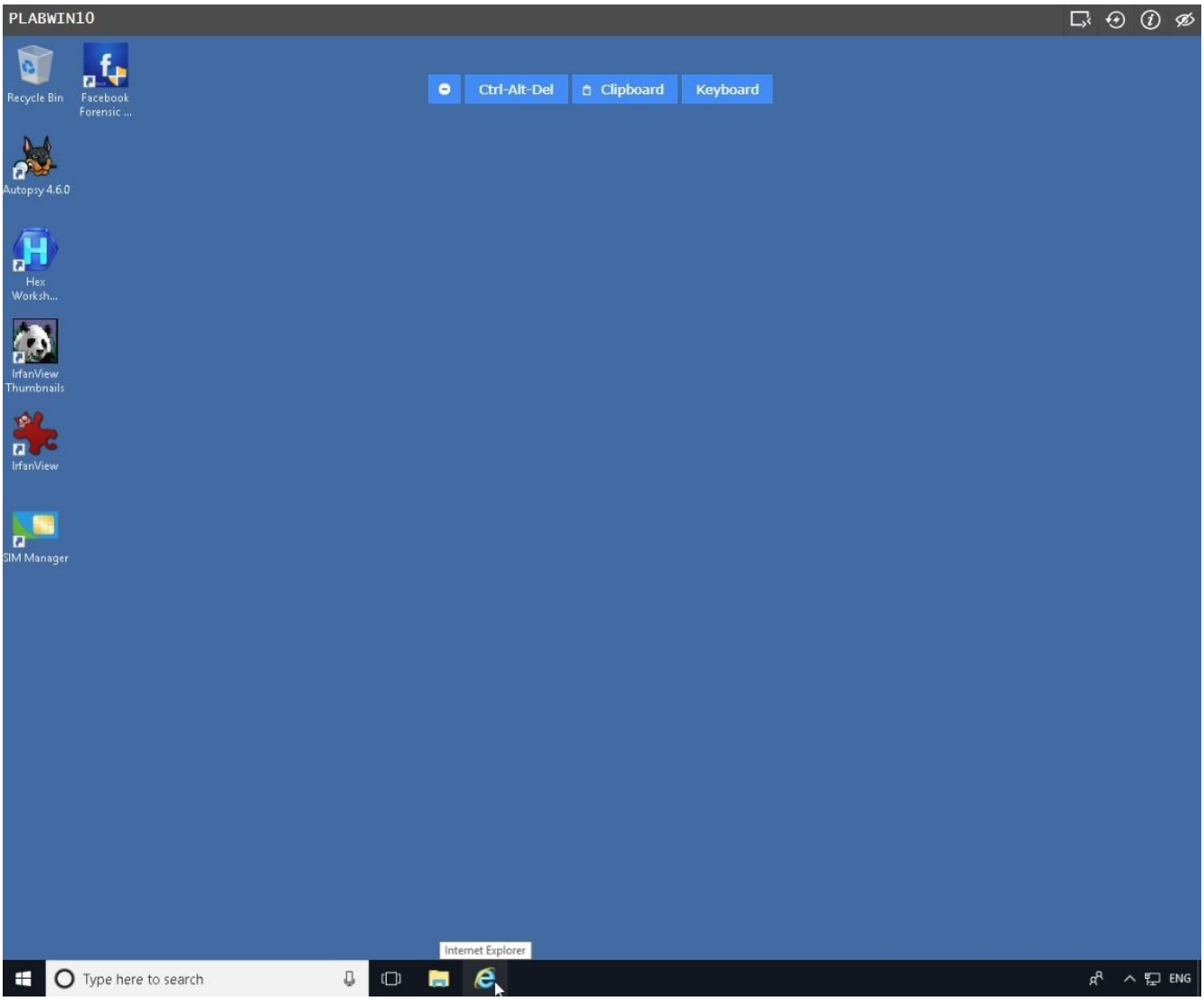
These USB drive images were collected from **digitalcorpora.org** web site.

To commence downloading the drive images, perform the following steps:

Step 1

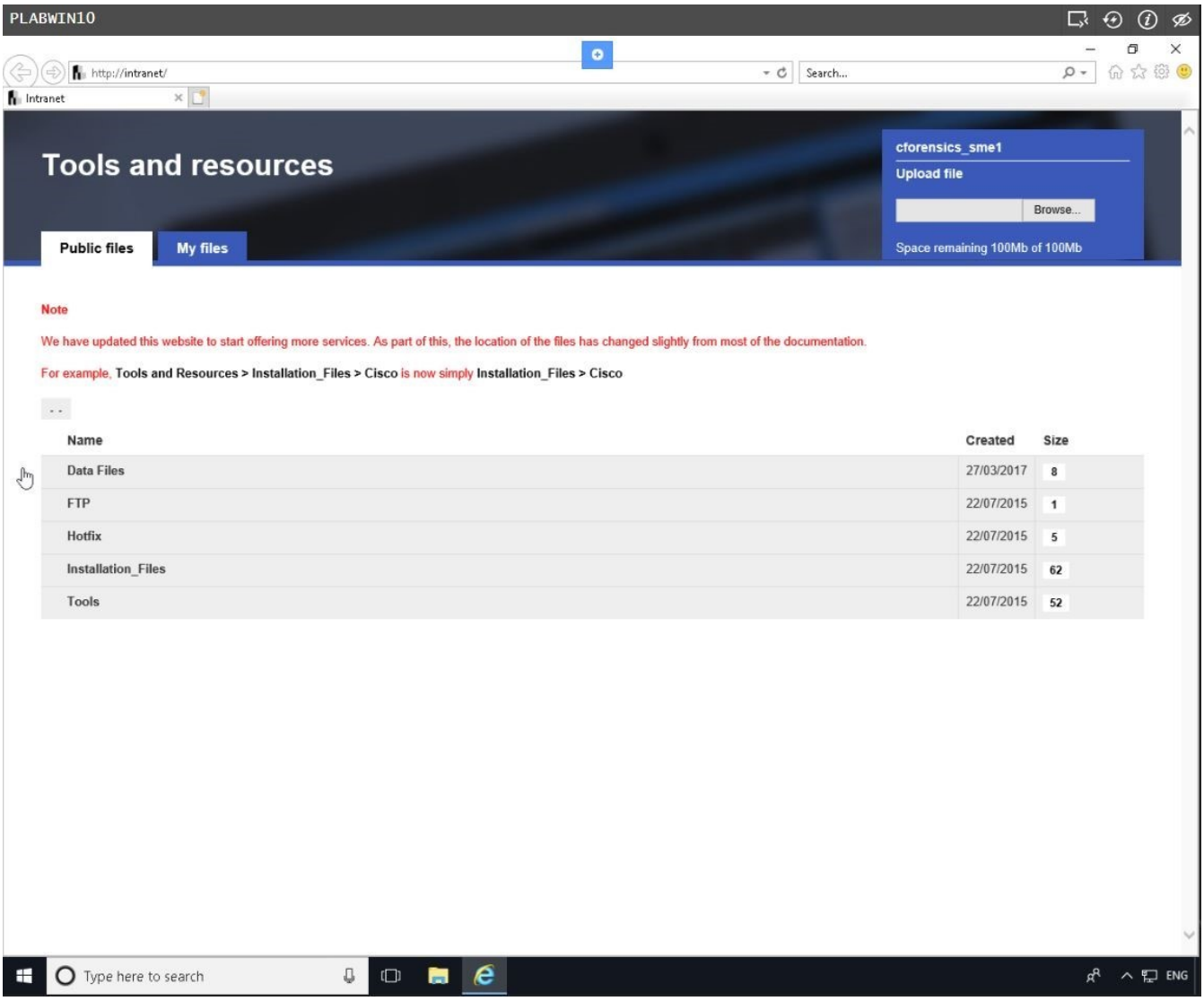
Ensure that you have powered on the required devices indicated in the Introduction.

Connect to **PLABWIN10** device.



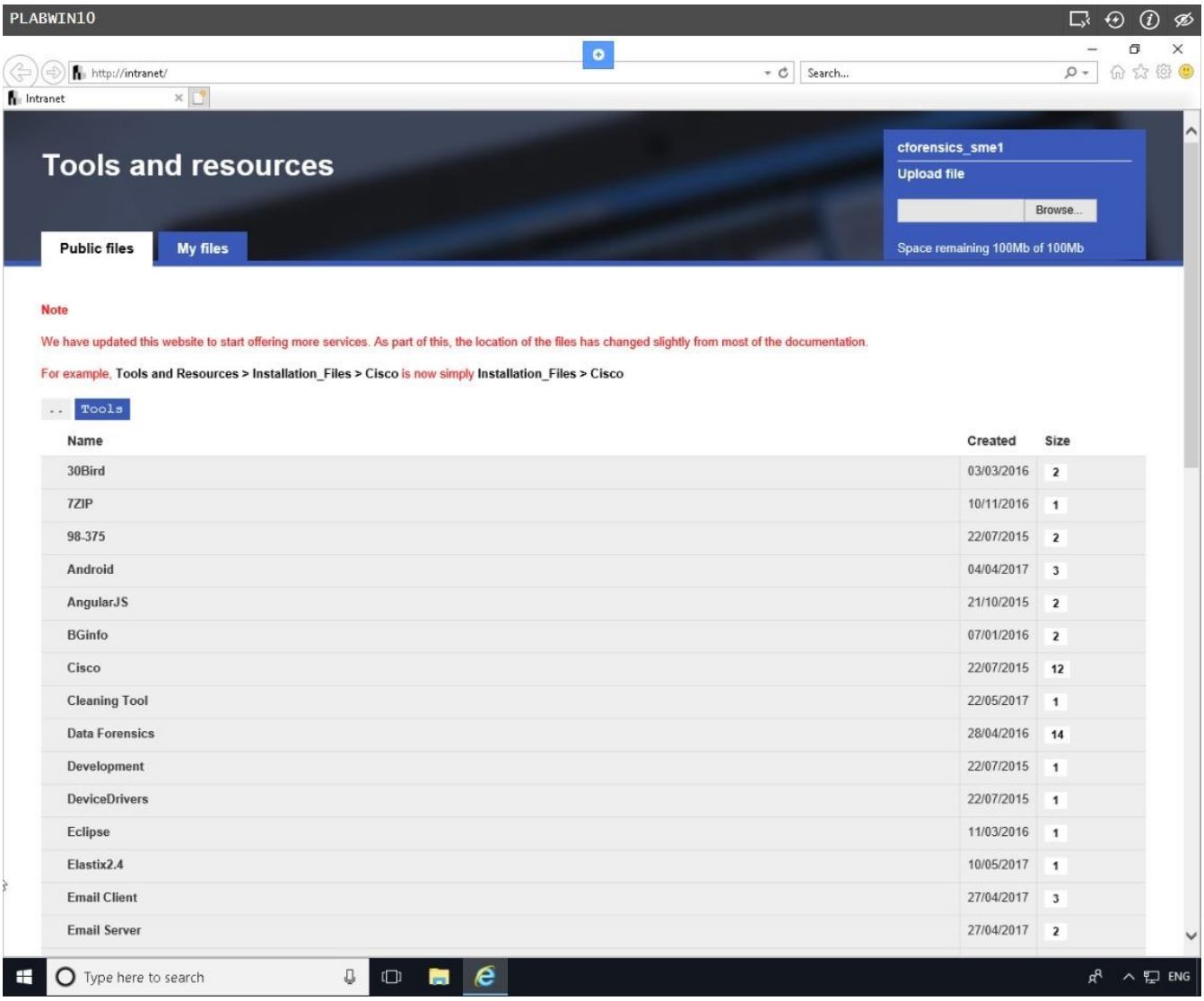
Step 2

On **Tools and resources** web page click **Tools**.



Step 3

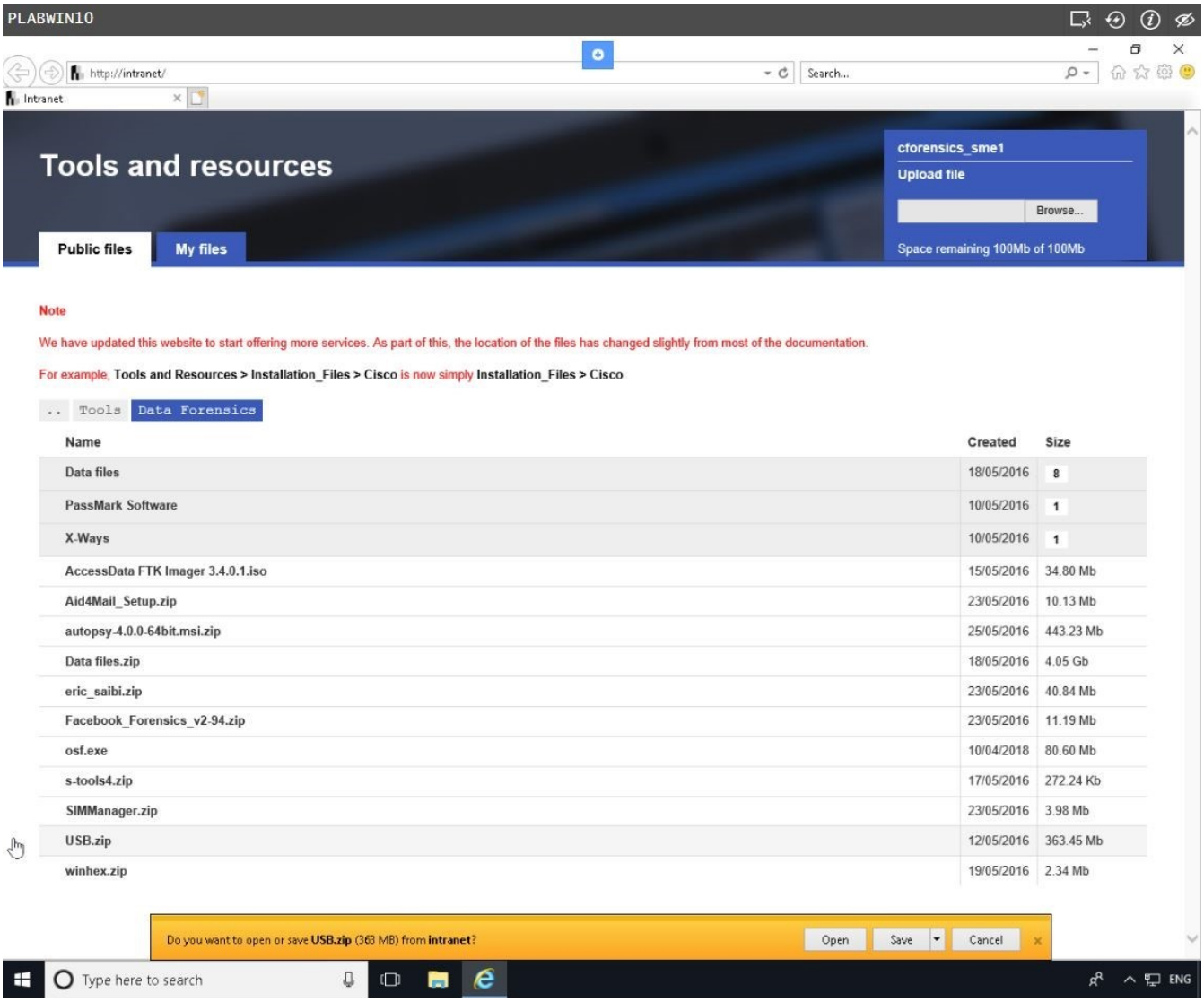
On the **[..] > Tools** page, click **Data Forensics**.



Step 4

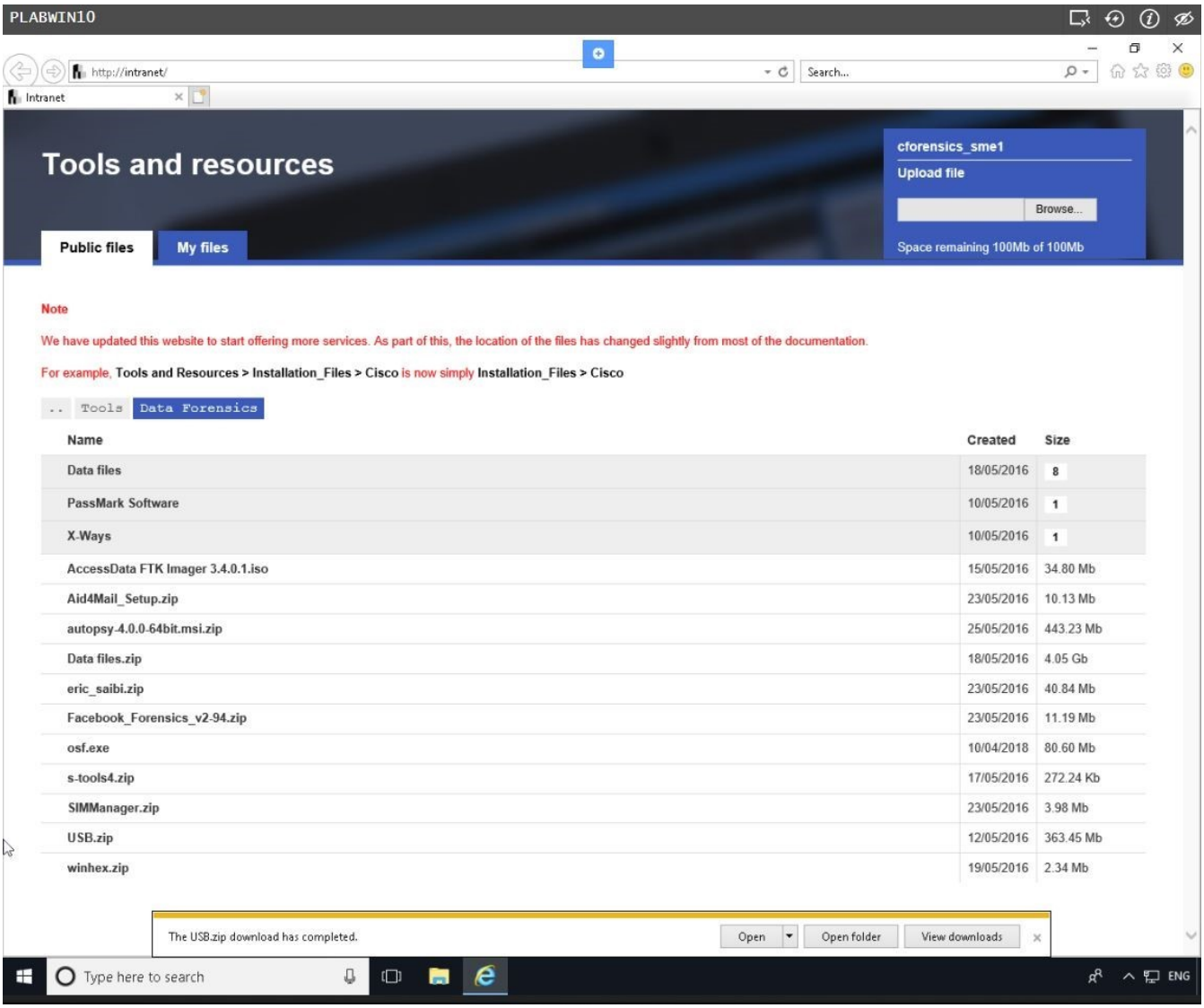
Click **USB.zip**.

When the notification toolbar appears, click **Save**.



Step 5

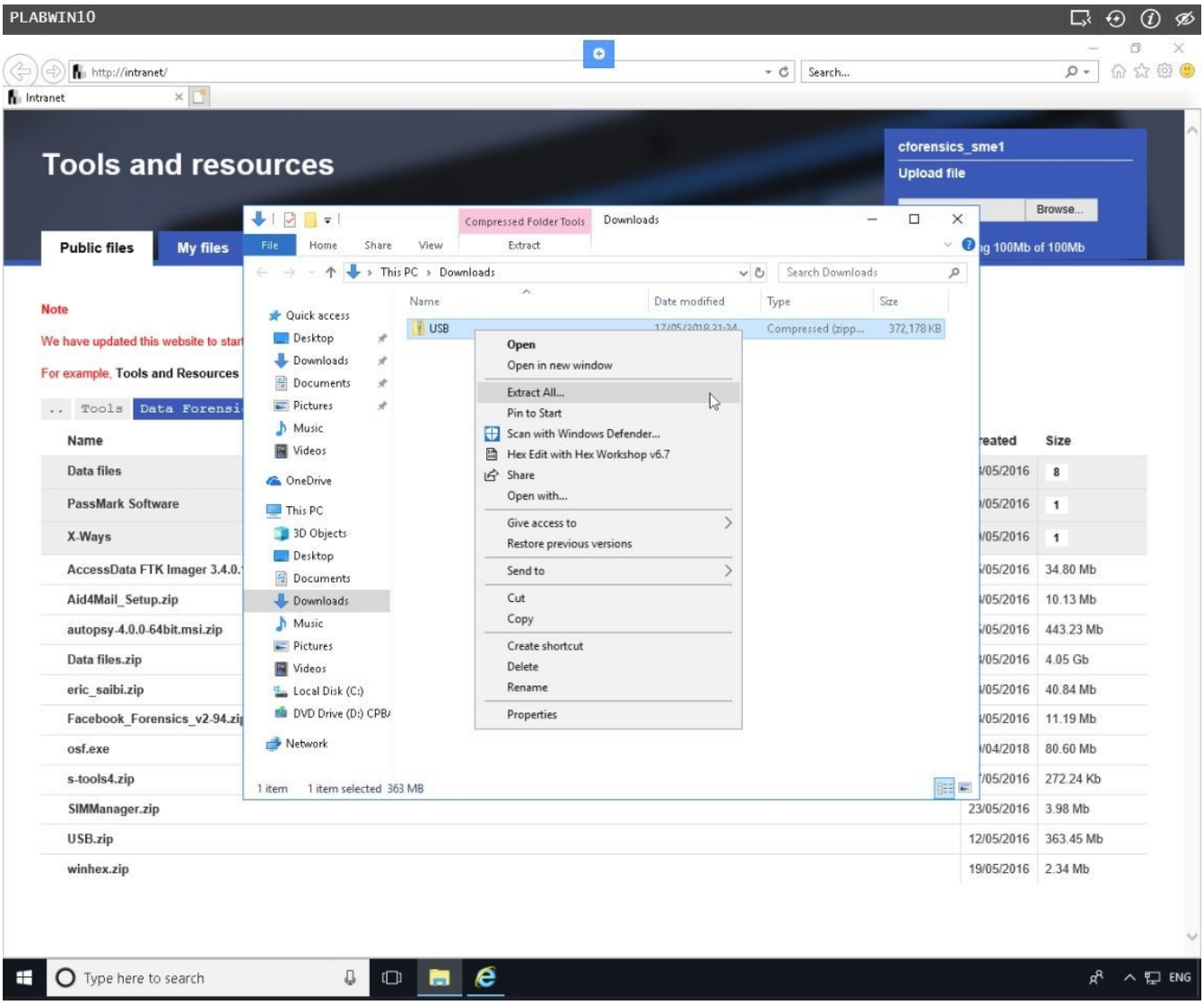
When download is successfully completed, click **Open folder**.



Step 6

On **File Explorer** window, you are redirected to **This PC > Downloads** folder path.

Right-click **USB** zip file and select **Extract All**....

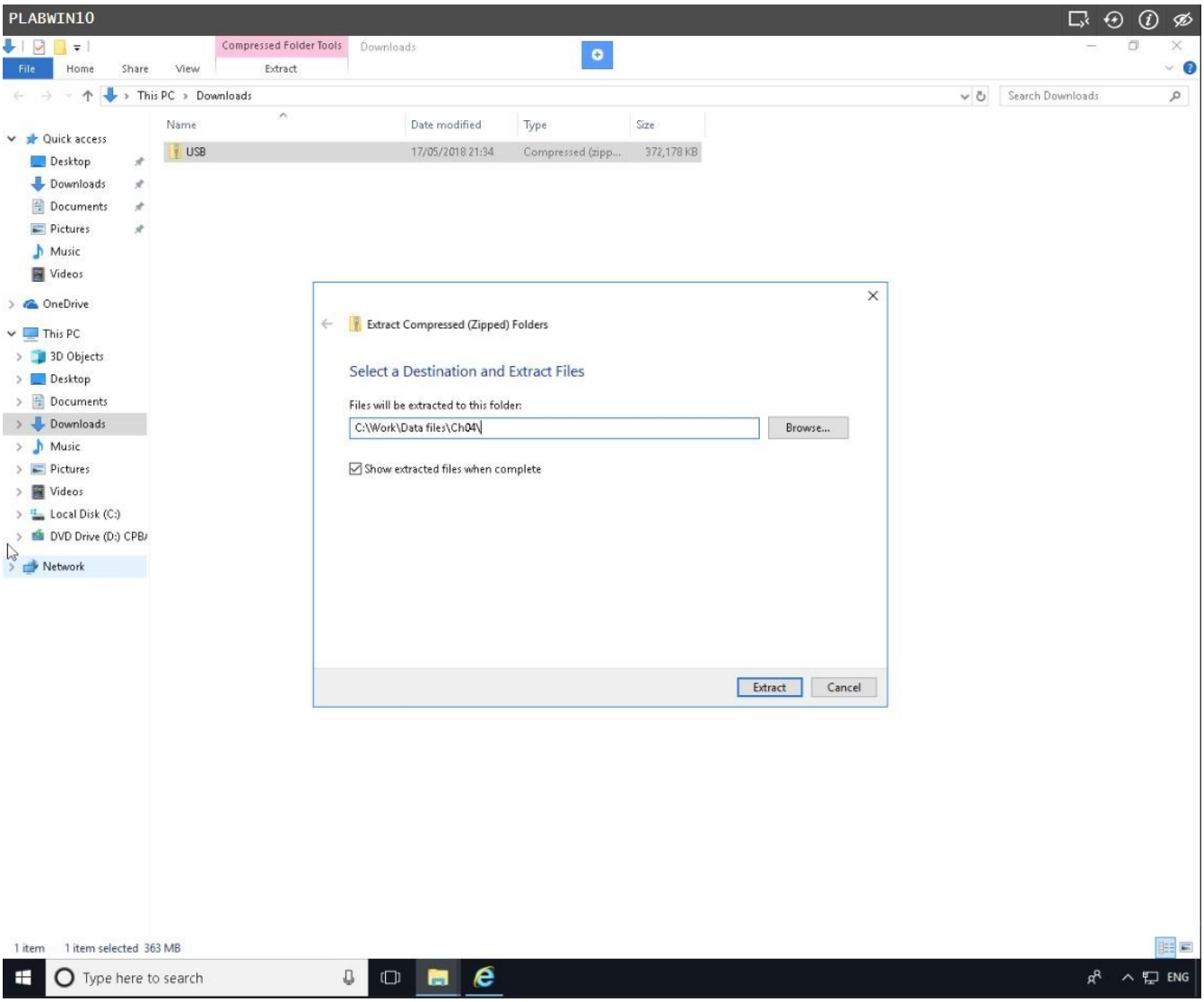


Step 7

On the **Extract Compressed (Zipped) Folders** dialog box, in the provided text box, type:

```
C:\Work\Data files\Ch04\
```

Click **Extract**.



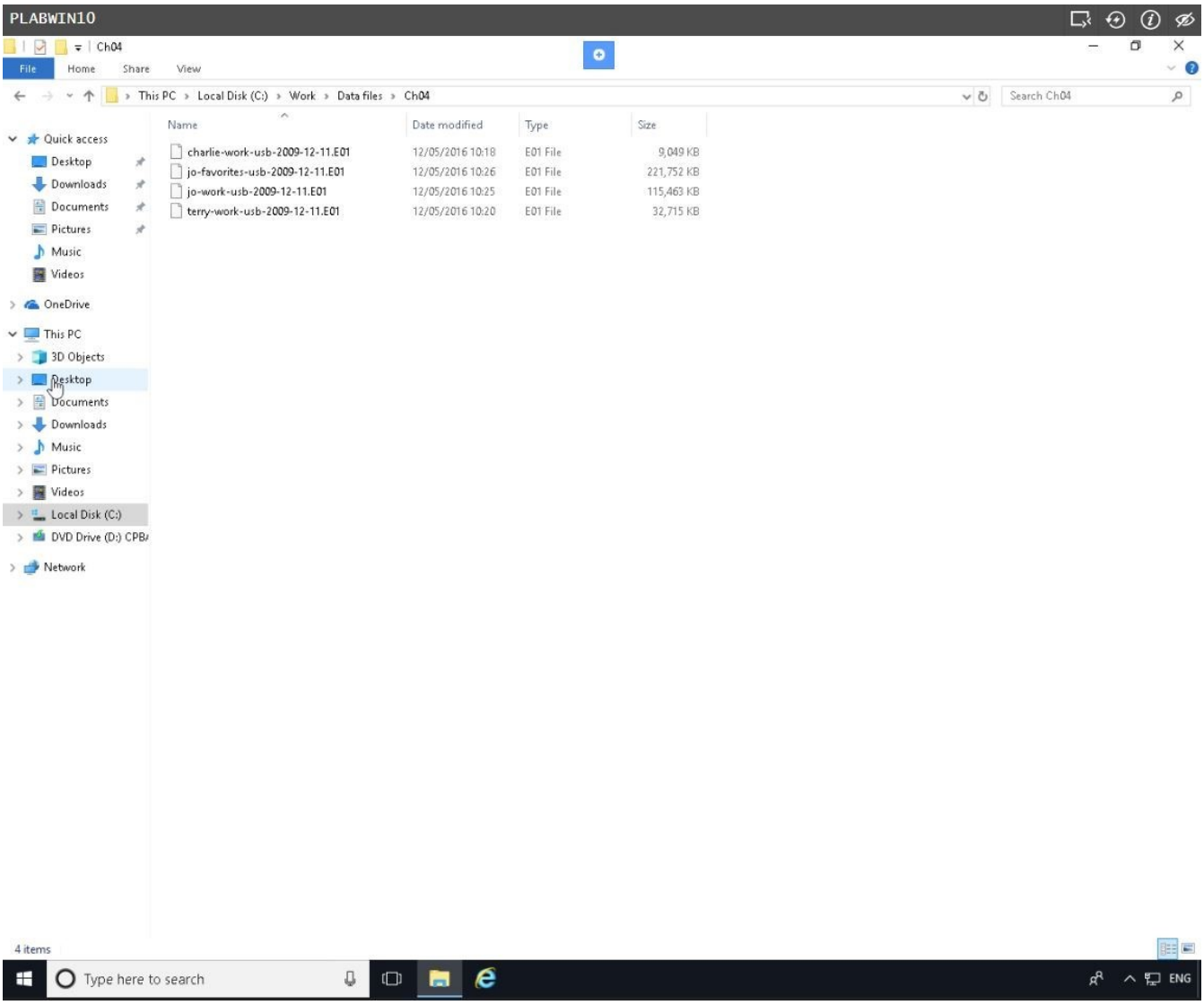
Step 8

When all the files have been extracted, a new File Explorer window opens.

The extracted files are found in **This PC > Local Disk (C:) > Work > Data files > Ch04** folder.

Close all instances **File Explorer** windows.

Similarly, close **Internet Explorer**.



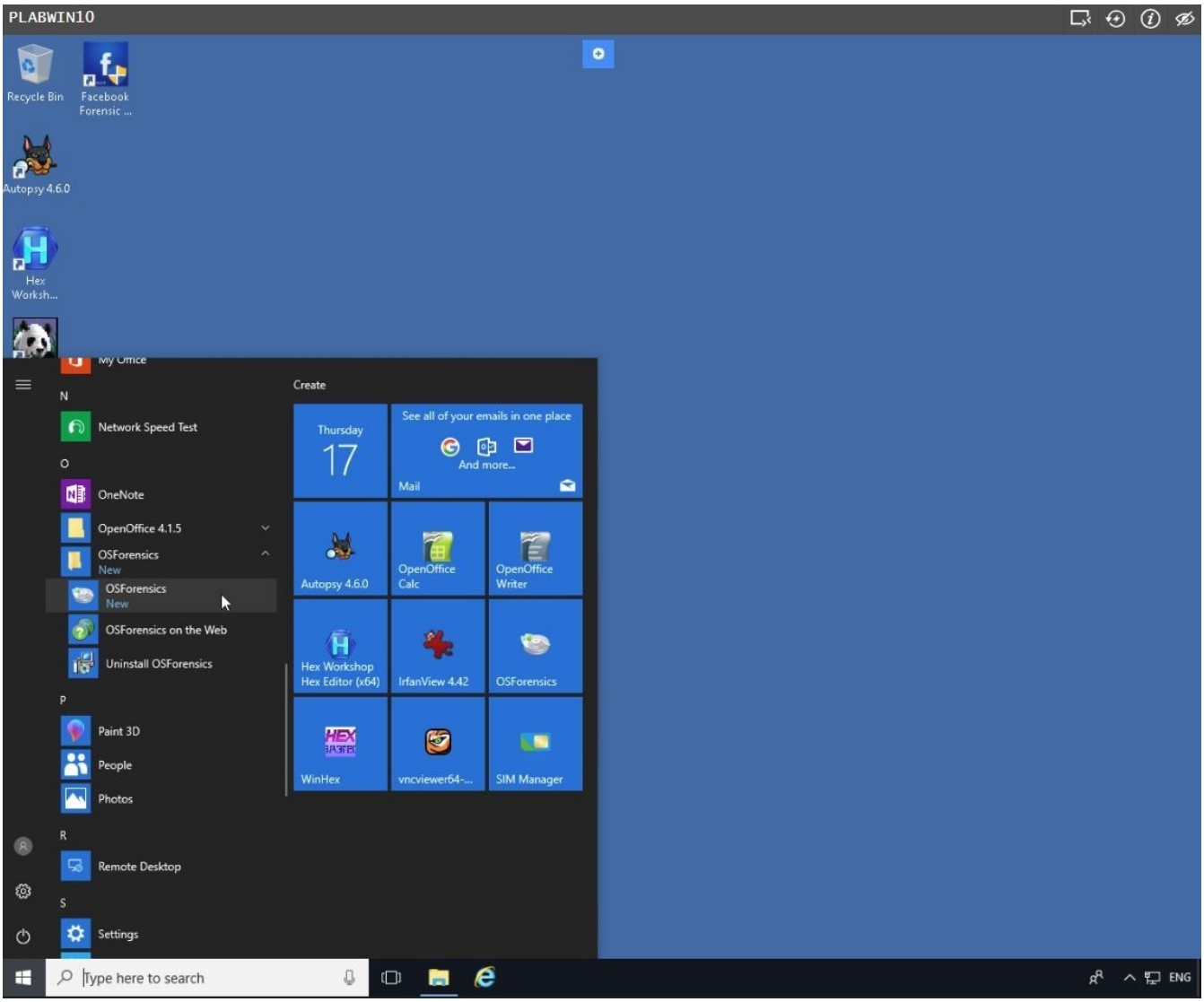
Task 2 - Extract Evidence Using OSForensics

Step 1

Ensure that you have powered on the required devices in the Introduction.

Connect to **PLABWIN10** and install **OSForensics** from **Tools and resources** on the intranet.

Click **Start**, scroll down to **OSForesnics**, then click **OSForensics**.

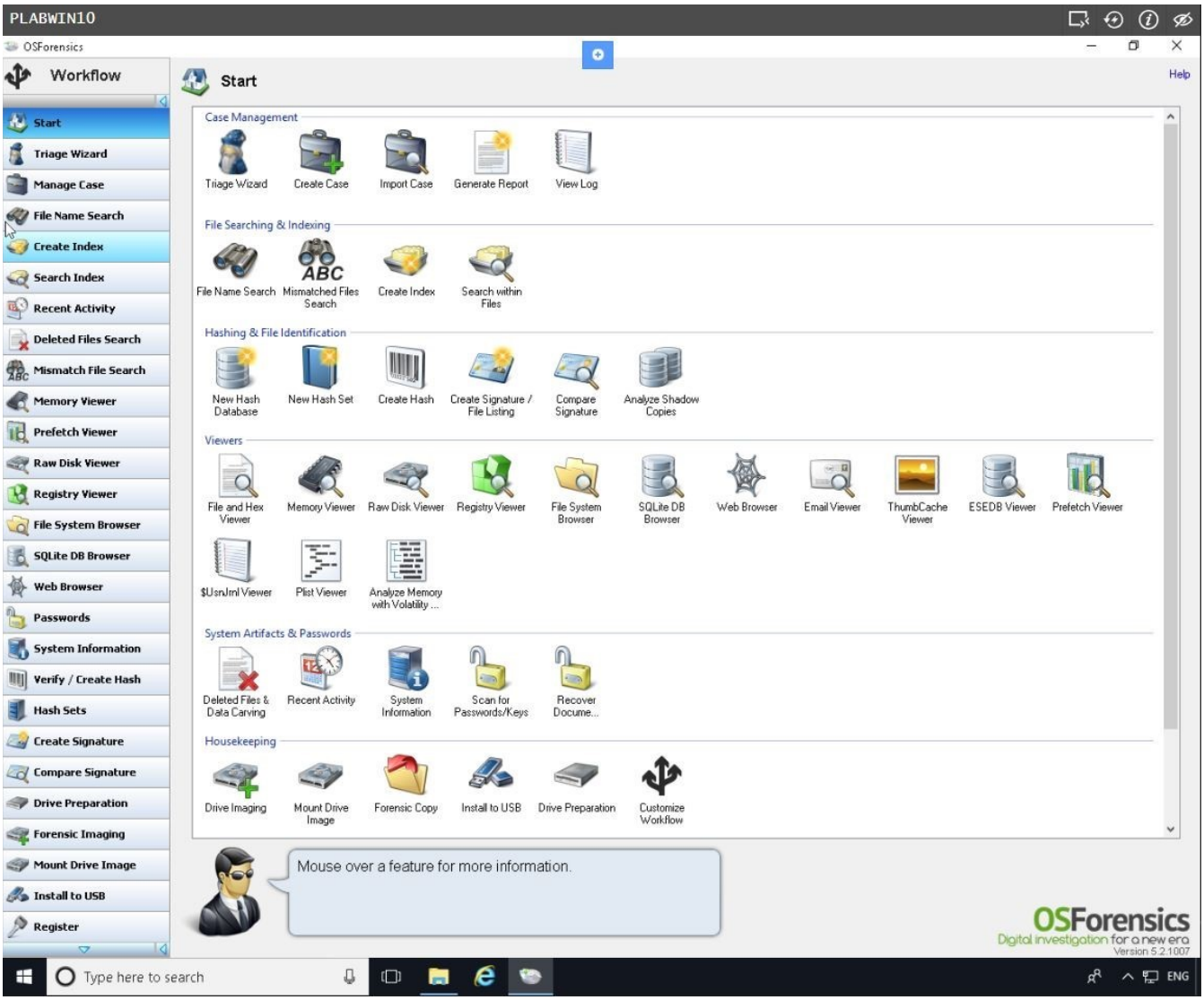


Step 2

On the **OSForensics** welcome message box, click **Continue Using Trial Version**.

Step 3

Click **Start** in the left pane, if necessary. In the right pane, click **Create Case**.



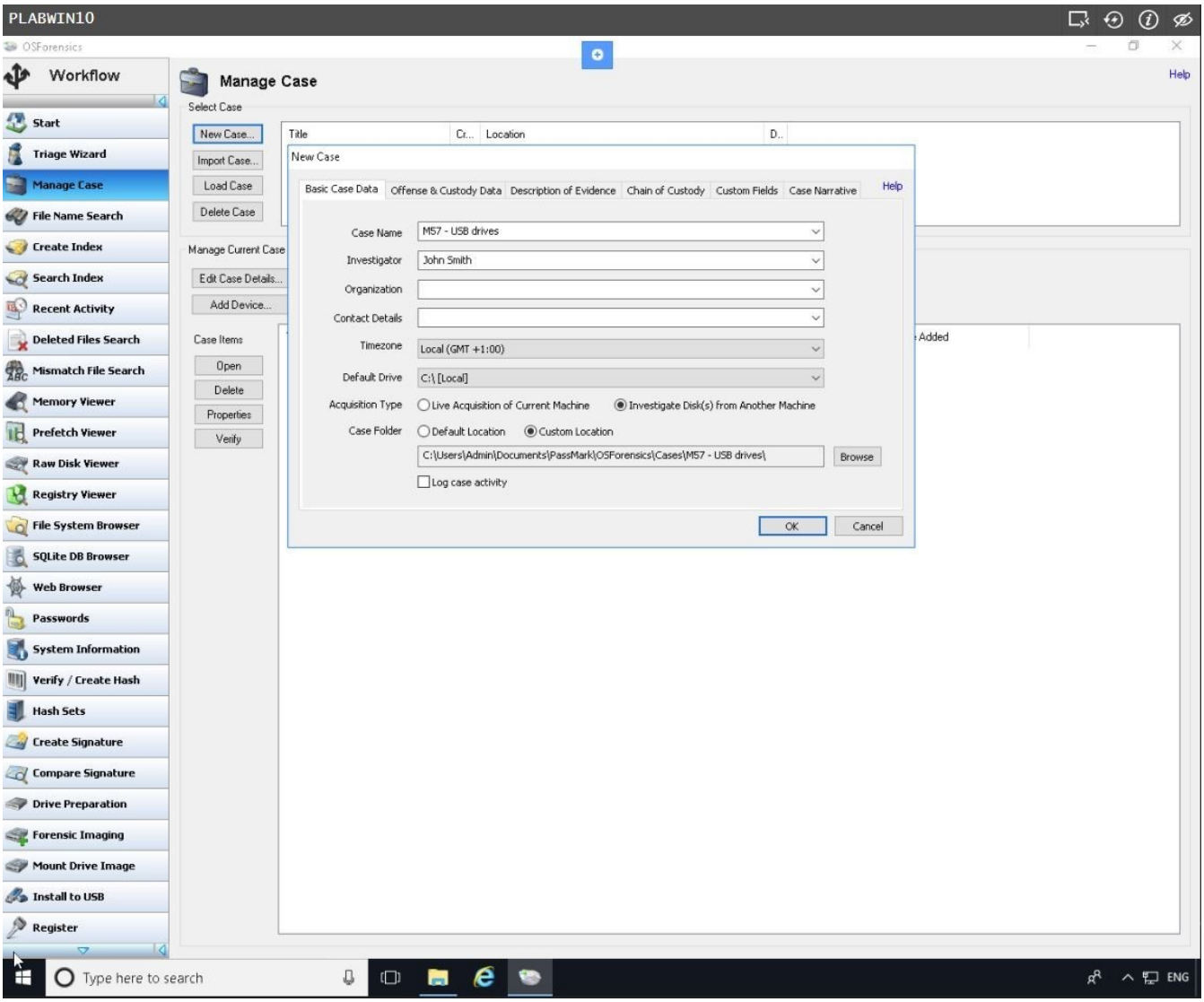
Step 4

In the New Case dialog box, enter your name. For the case name, type:

```
M57 - USB drives
```

Fill in the contact details and the organization, and then click **Investigate Disk (s) from Another Machine**.

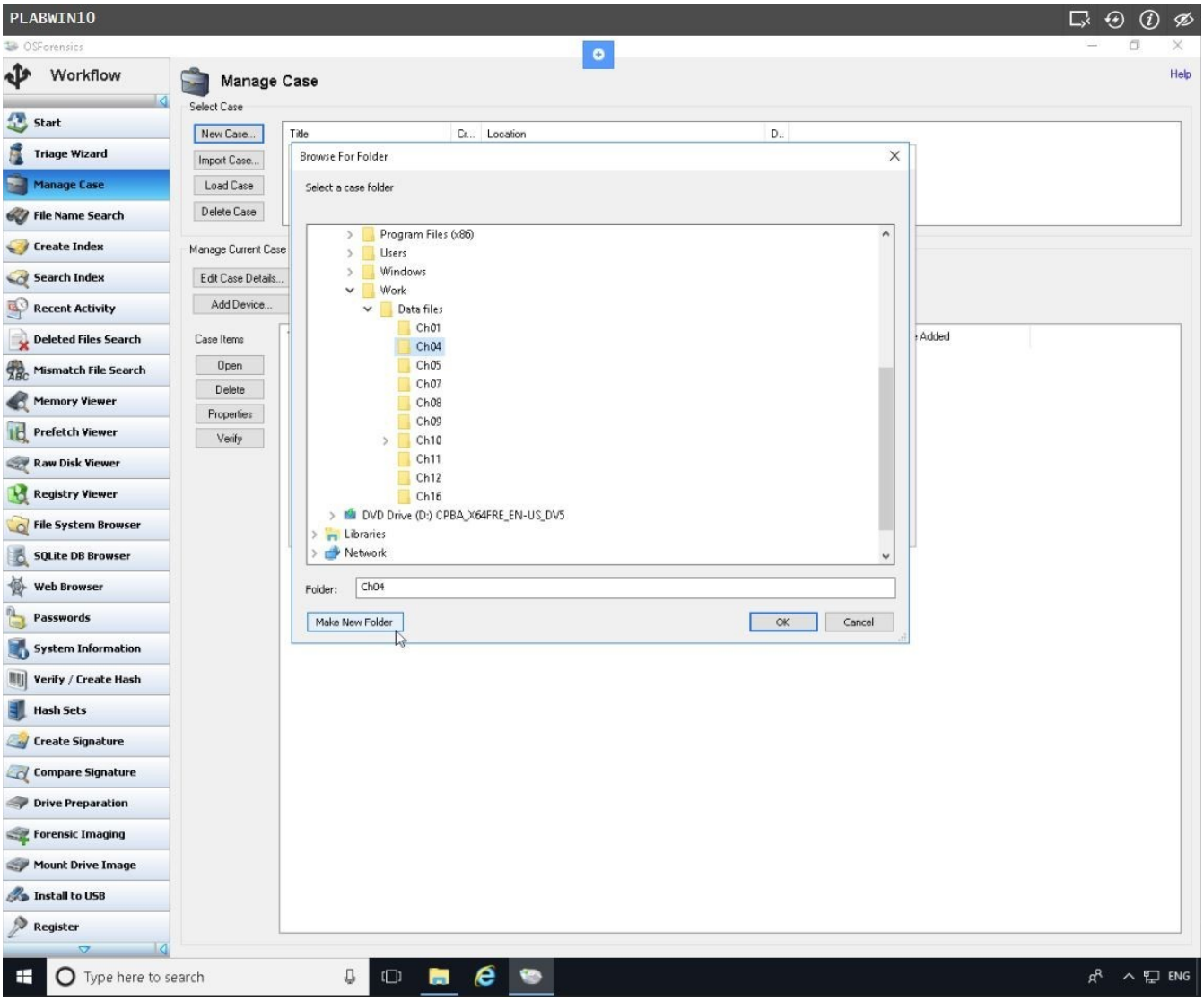
Click **Custom Location** for the case folder. Click the **Browse** button.



Step 5

On the **Browse For Folder** dialog box, navigate to **Local Disk (C:) > Work > Data files** and click **Chp04** folder.

Click **Make New Folder**.

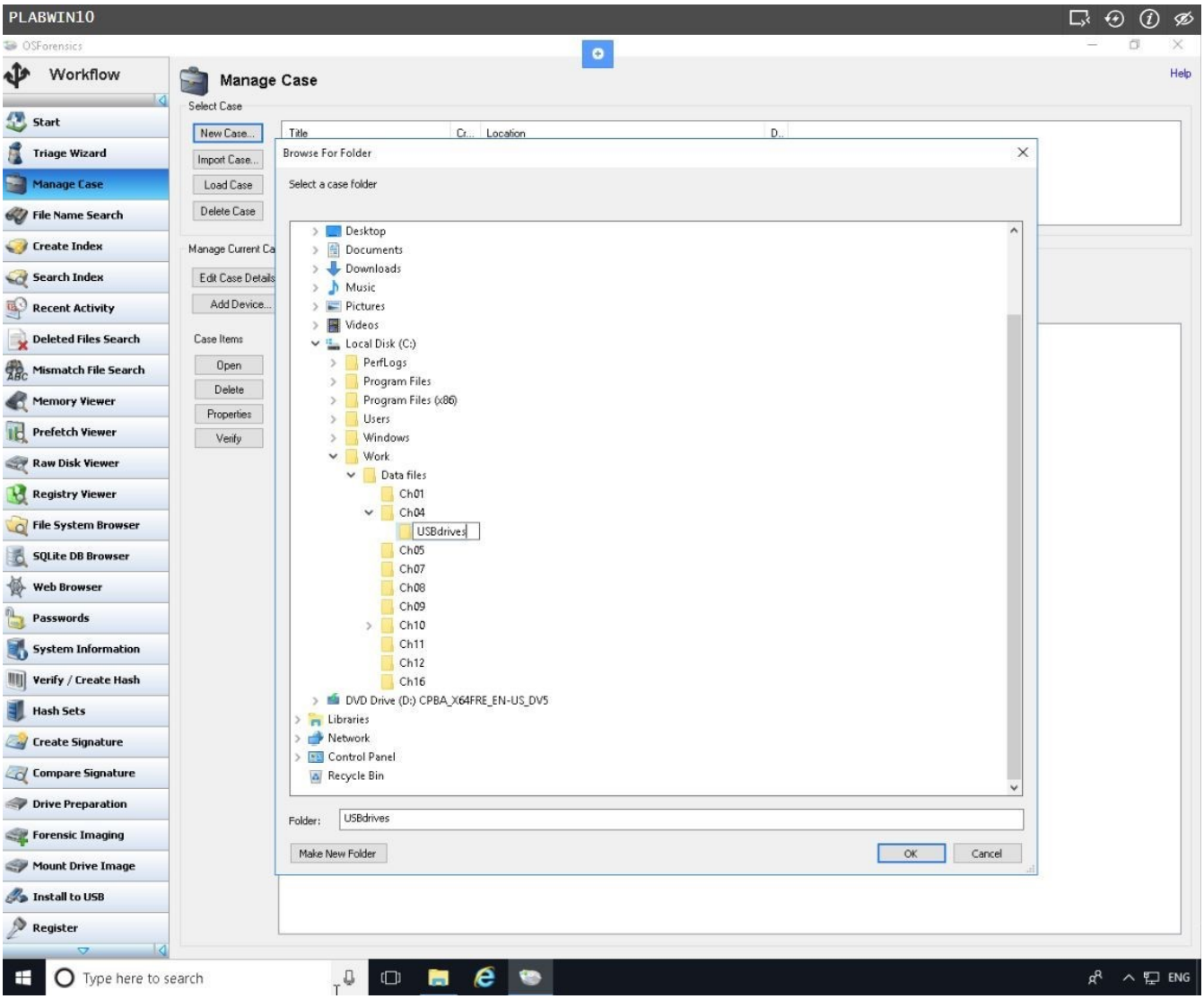


Step 6

Rename the folder as:

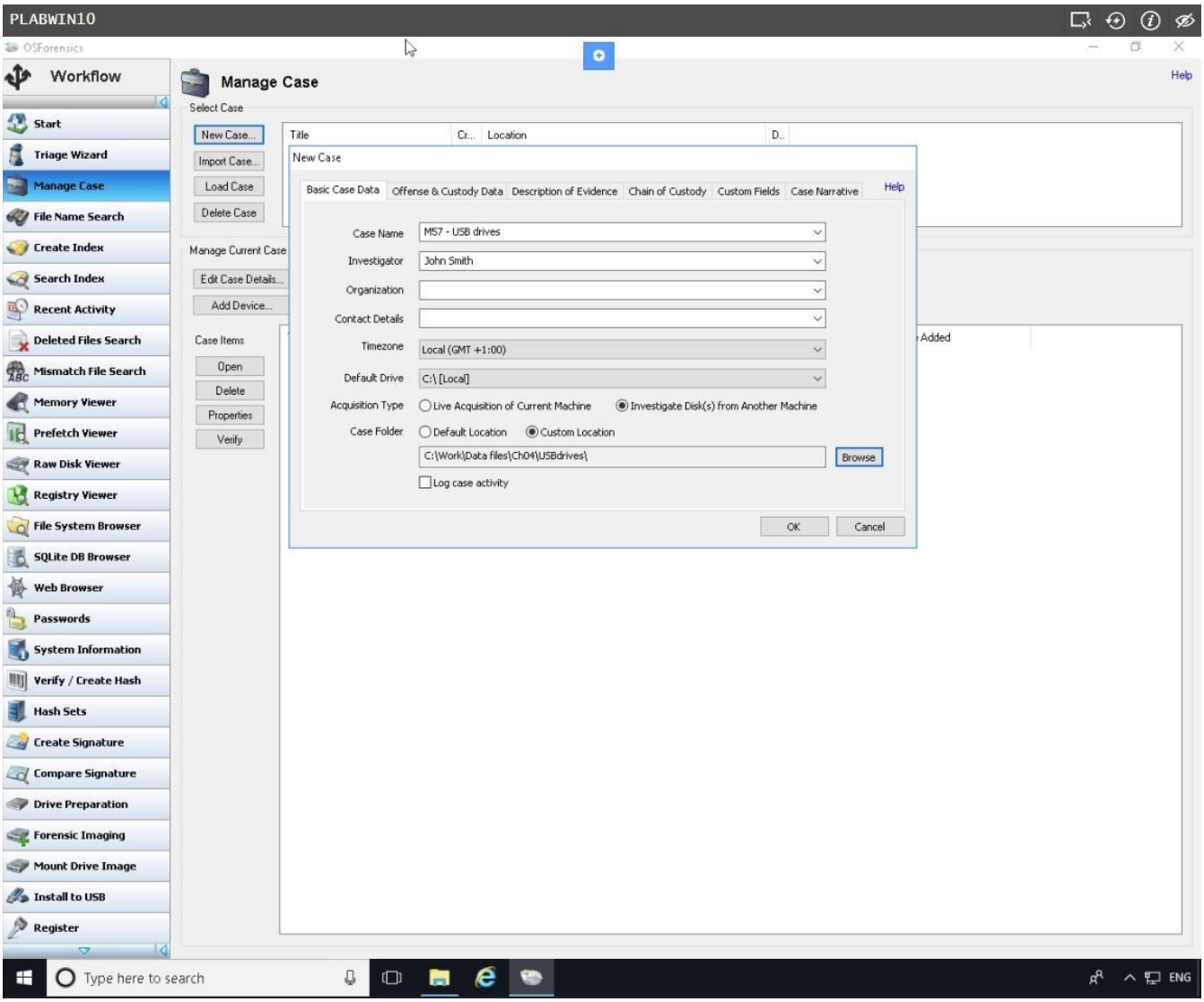
```
USBdrives
```

Click **OK**.



Step 7

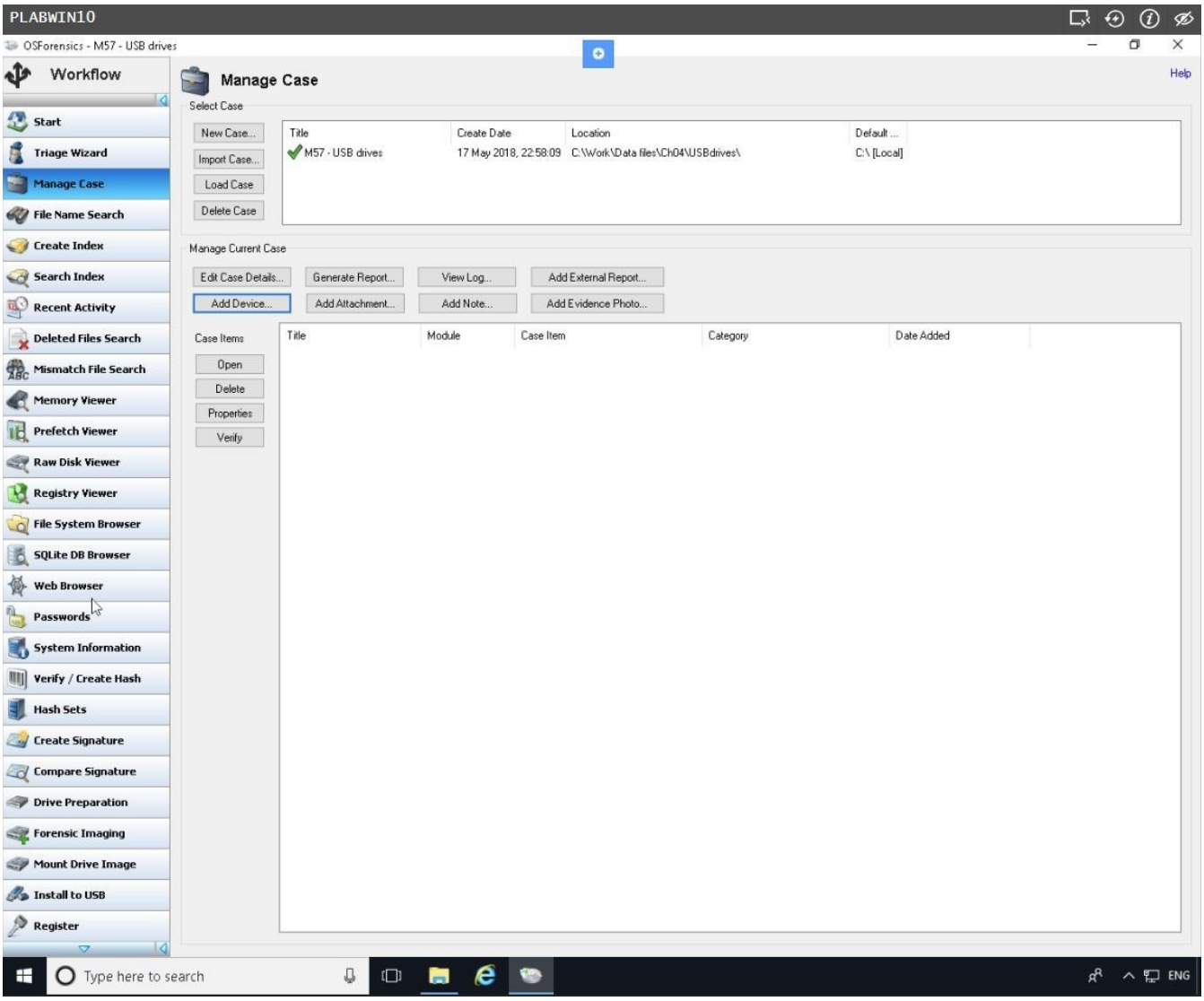
Click **OK** to save changes in **New Case** dialog box.



Step 8

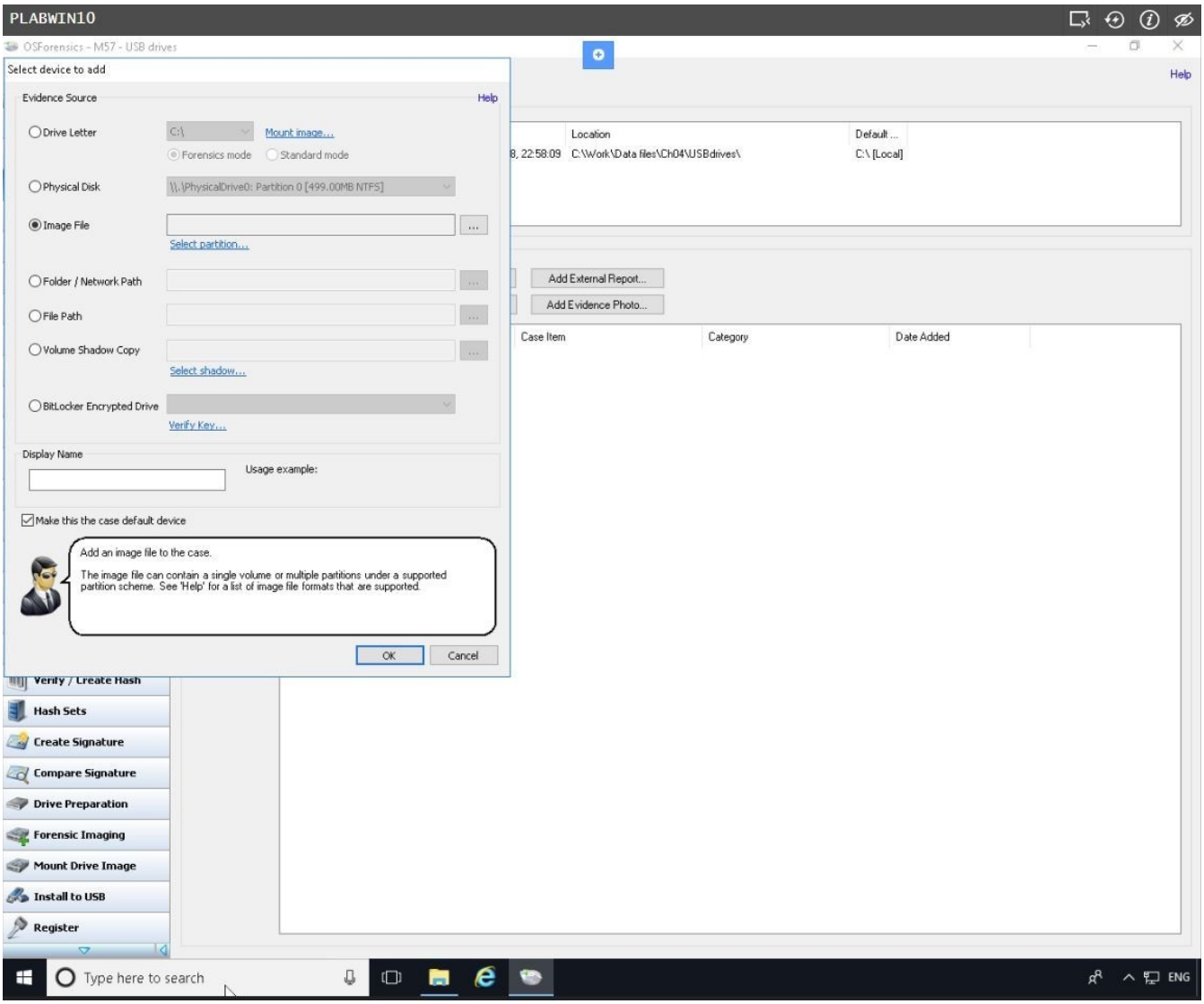
You should see the **Manage Case** window.

Click the **Add Device** button.



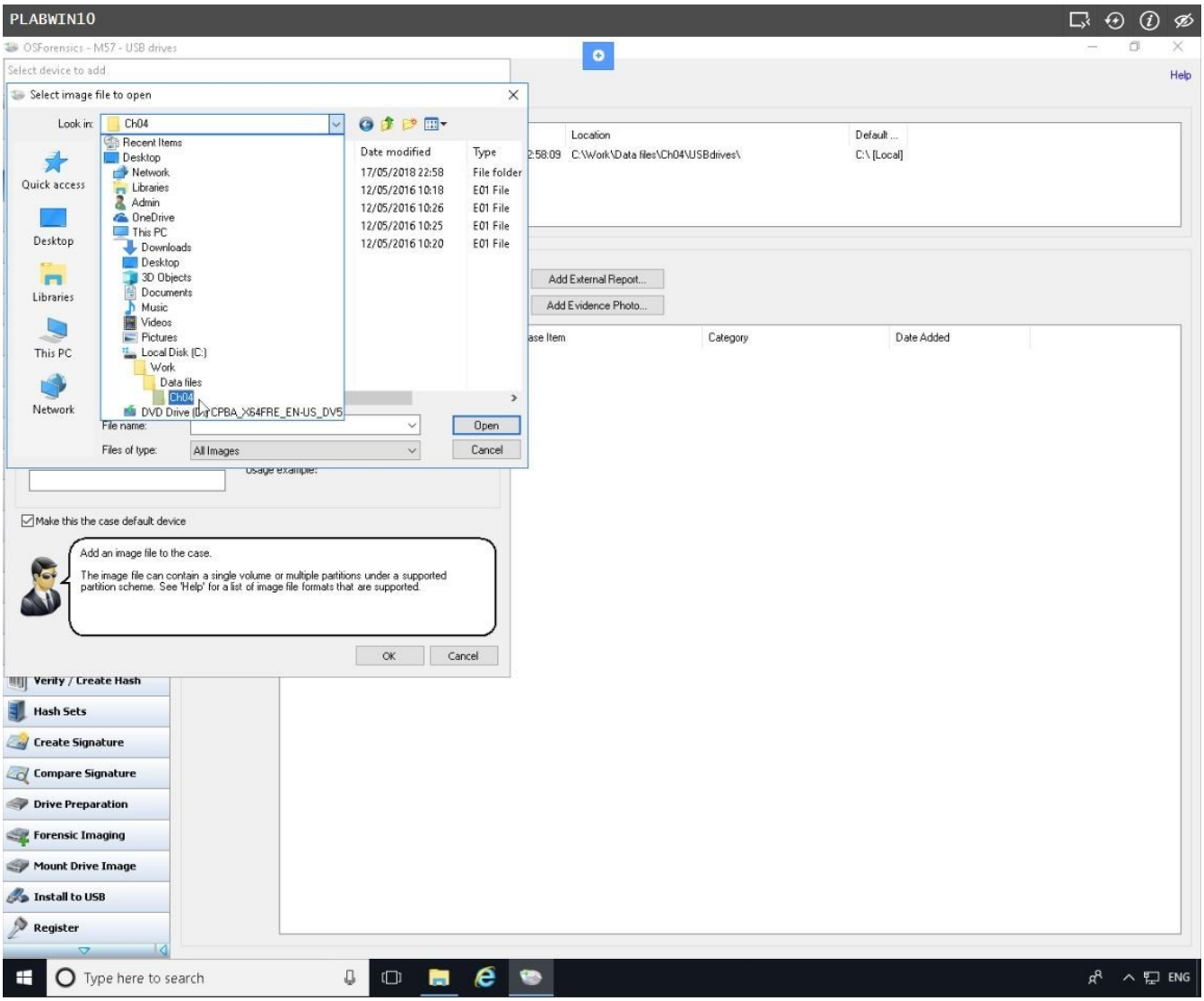
Step 9

On the **Select device to add** dialog box, click the **Image File** option and select **[...]** button.



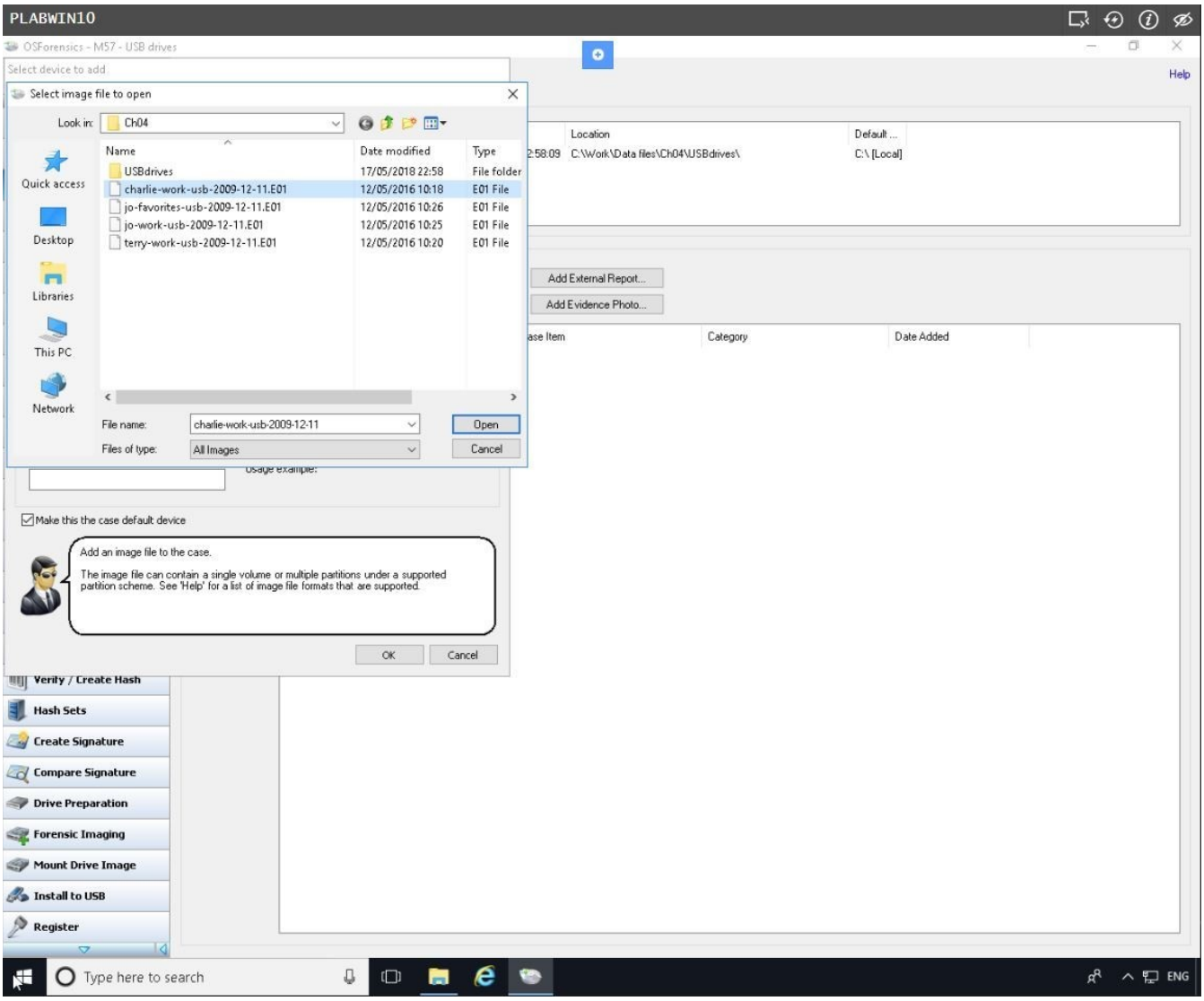
Step 10

On the **Select image file to open** dialog box, access the **Look in** drop-down list and navigate to **This PC > Local Disk (C:) > Work > Data files > Ch04** path.



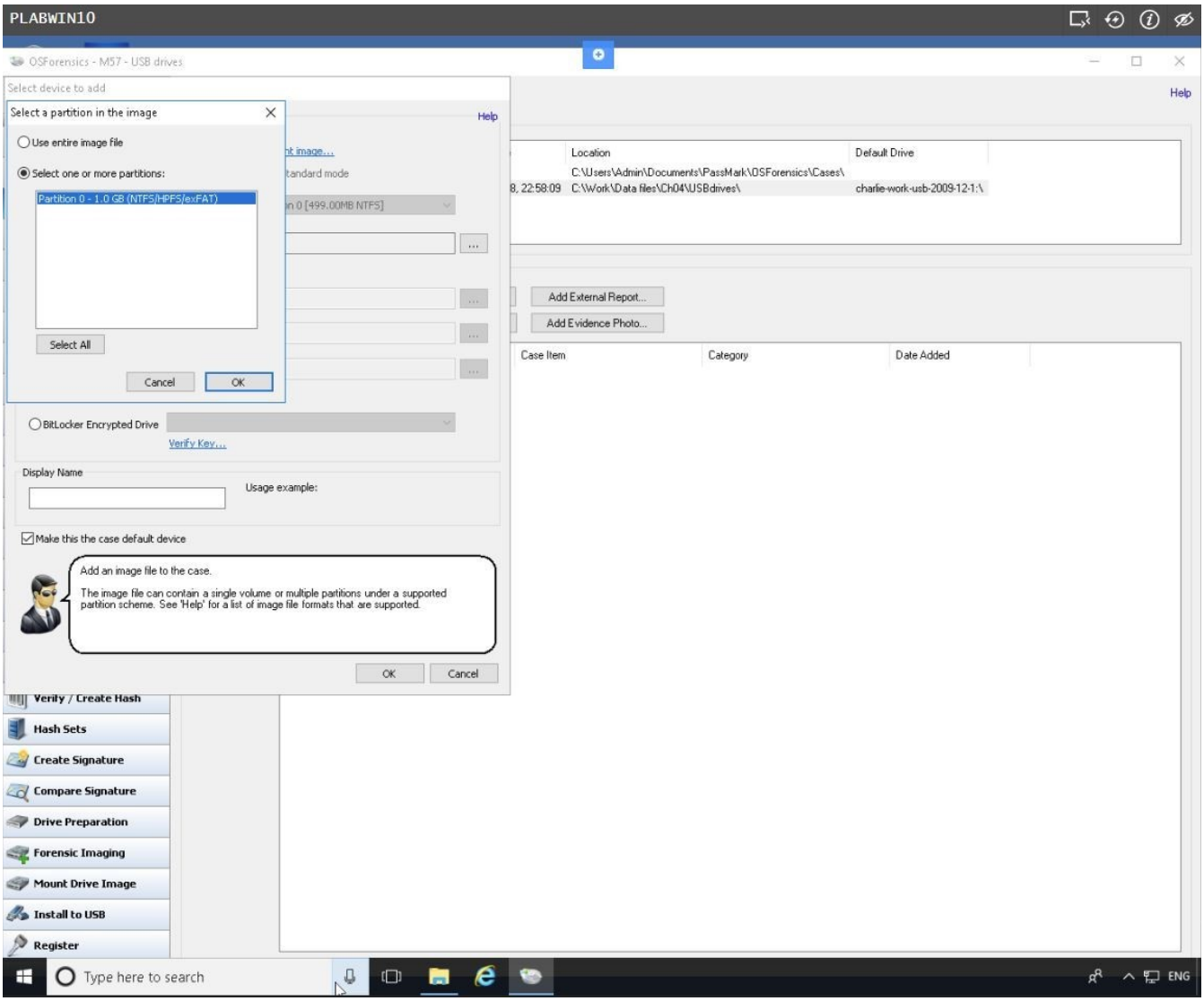
Step 11

Still on the **Select image file to open** dialog box, click **charlie-work-usb-2009-12-11.E01**, and click **Open**.



Step 12

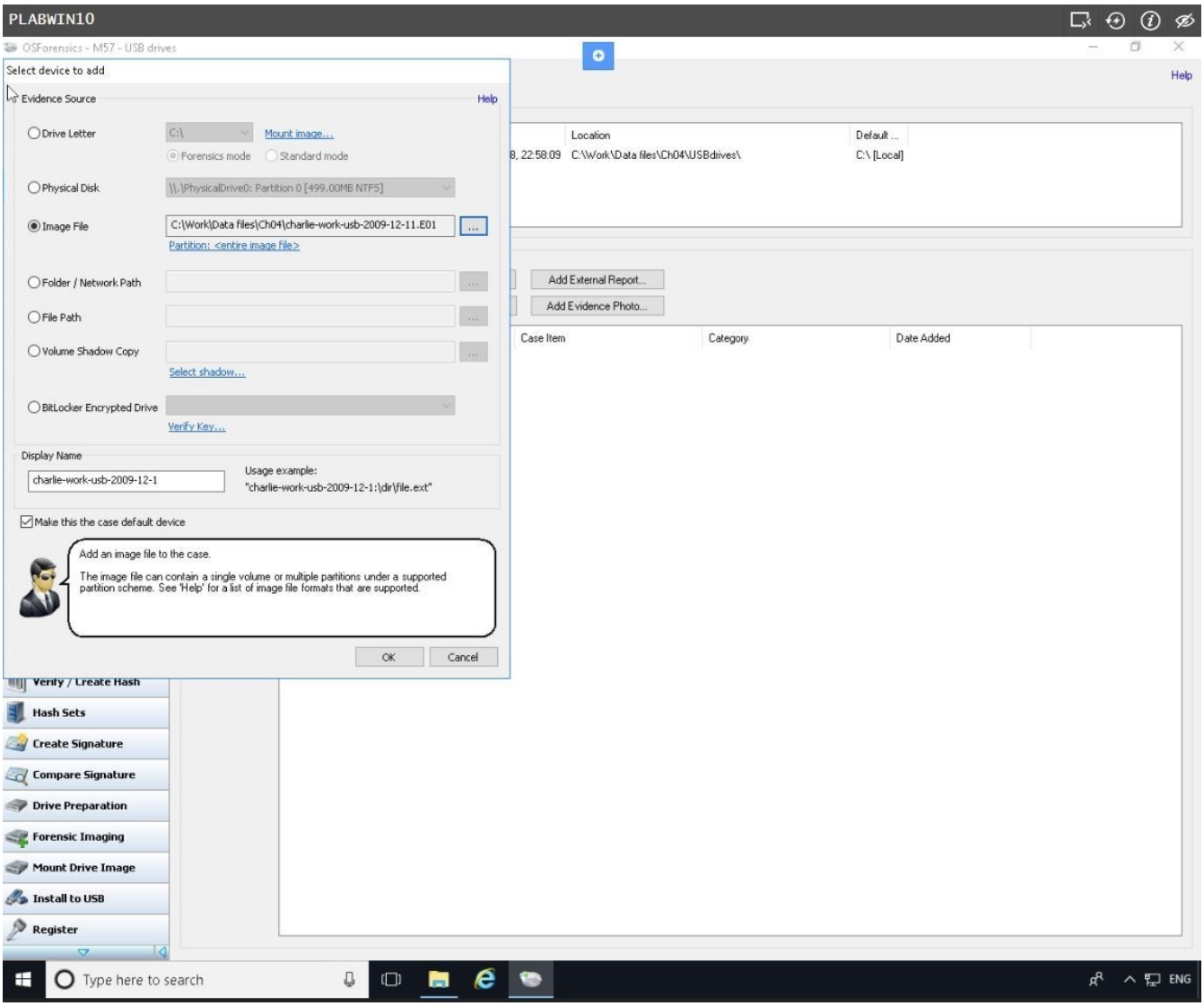
In the **Select a partition in the image** dialog box asking which partition to use, leave the default setting **Select one or more partitions**, and then click **OK**.



Step 13

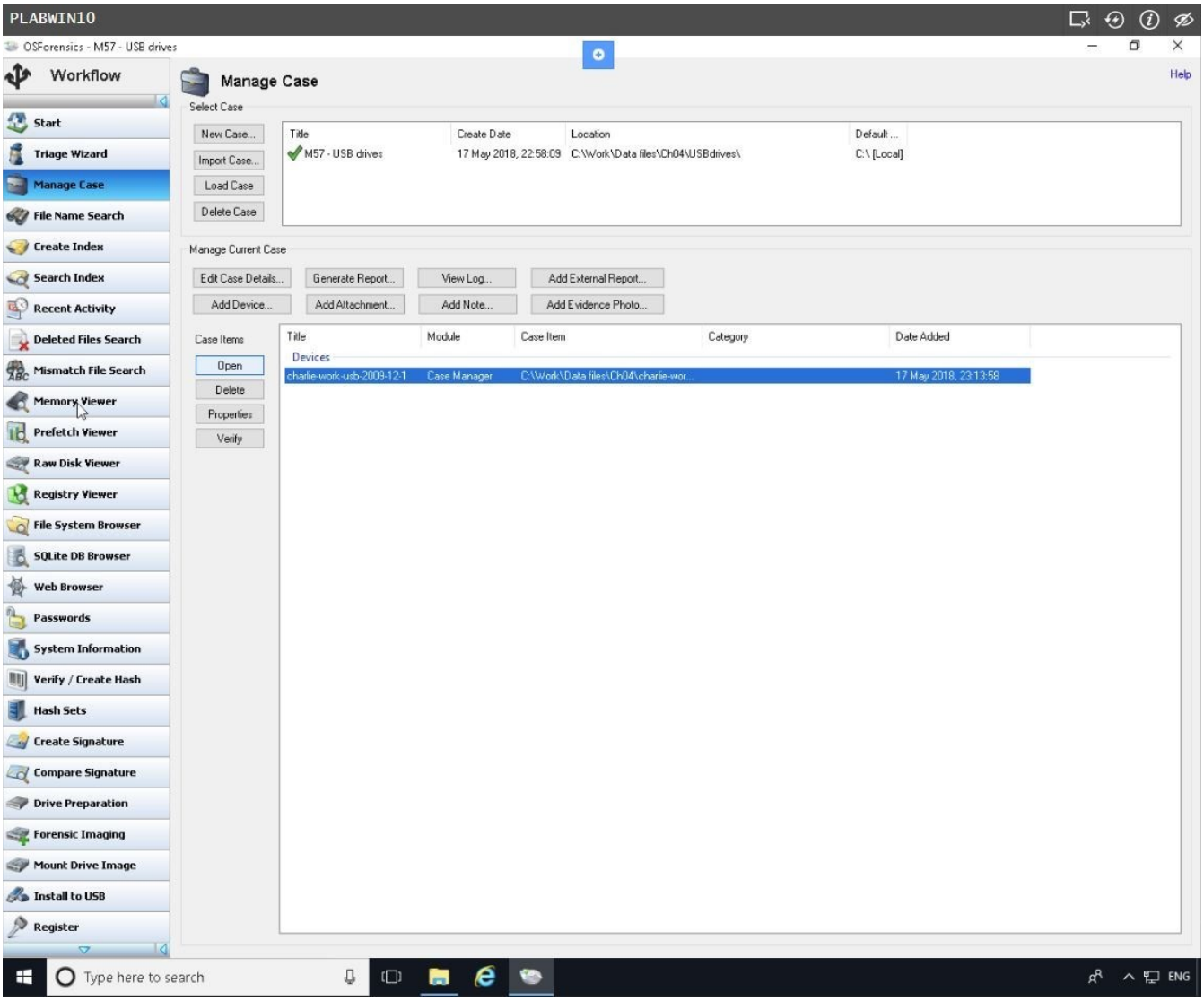
The completed "**Select device to add**" dialog box should be similar to the screen shot.

Click **OK**.



Step 14

Click the **charlie-work-usb-2009-12-11.E01** filename in the bottom pane on the right, and then click the **Open** button to the left.

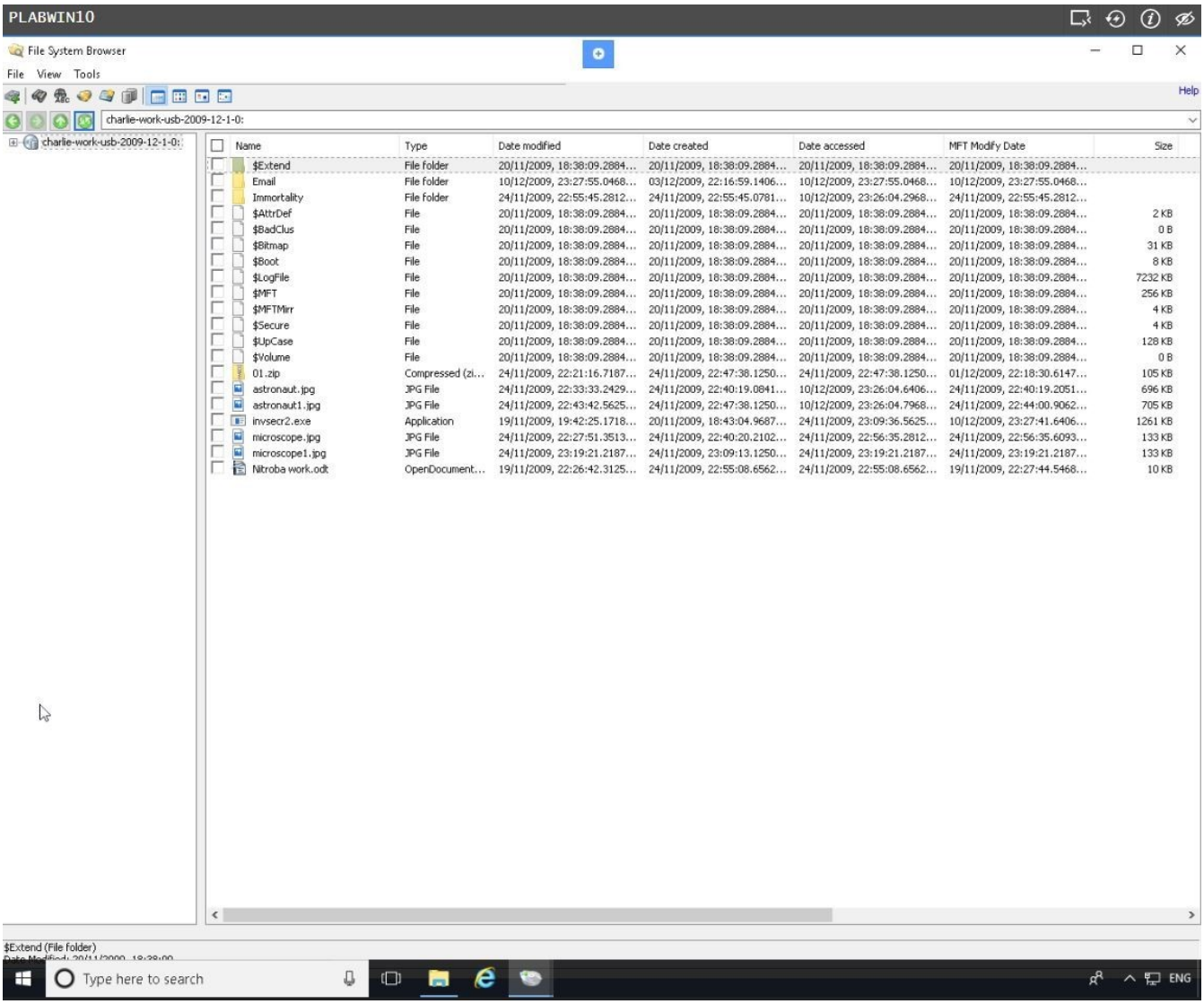


Step 15

The **File System Browser** window displays the files on a USB drive.

This window is fairly easy to use as tools to search for specific files are available.

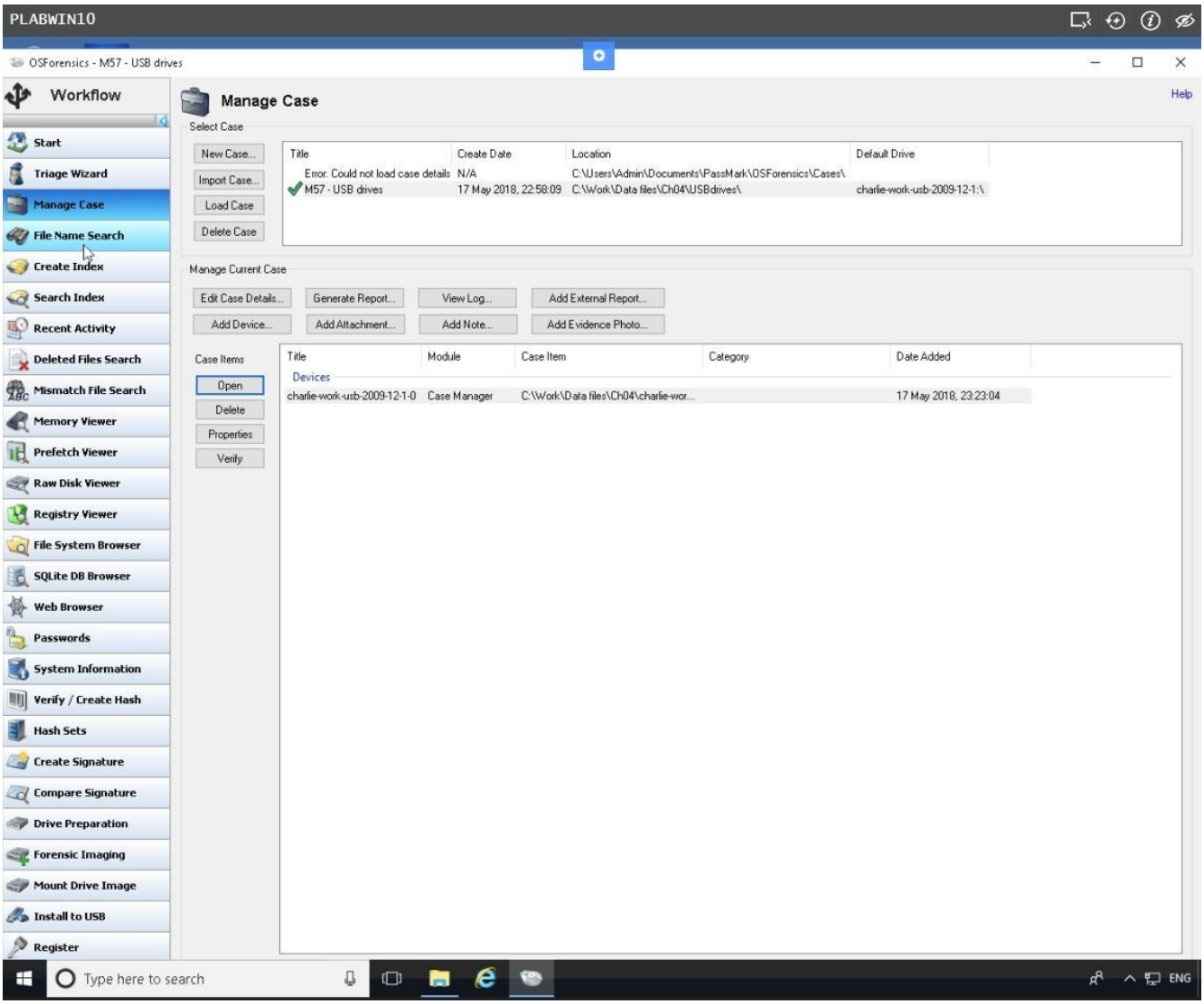
Close the window.



Step 16

You are back on the **OSForensics - M57-USB drives - Manage Case** window.

Click the **File Name Search** button in the left pane of the main window.

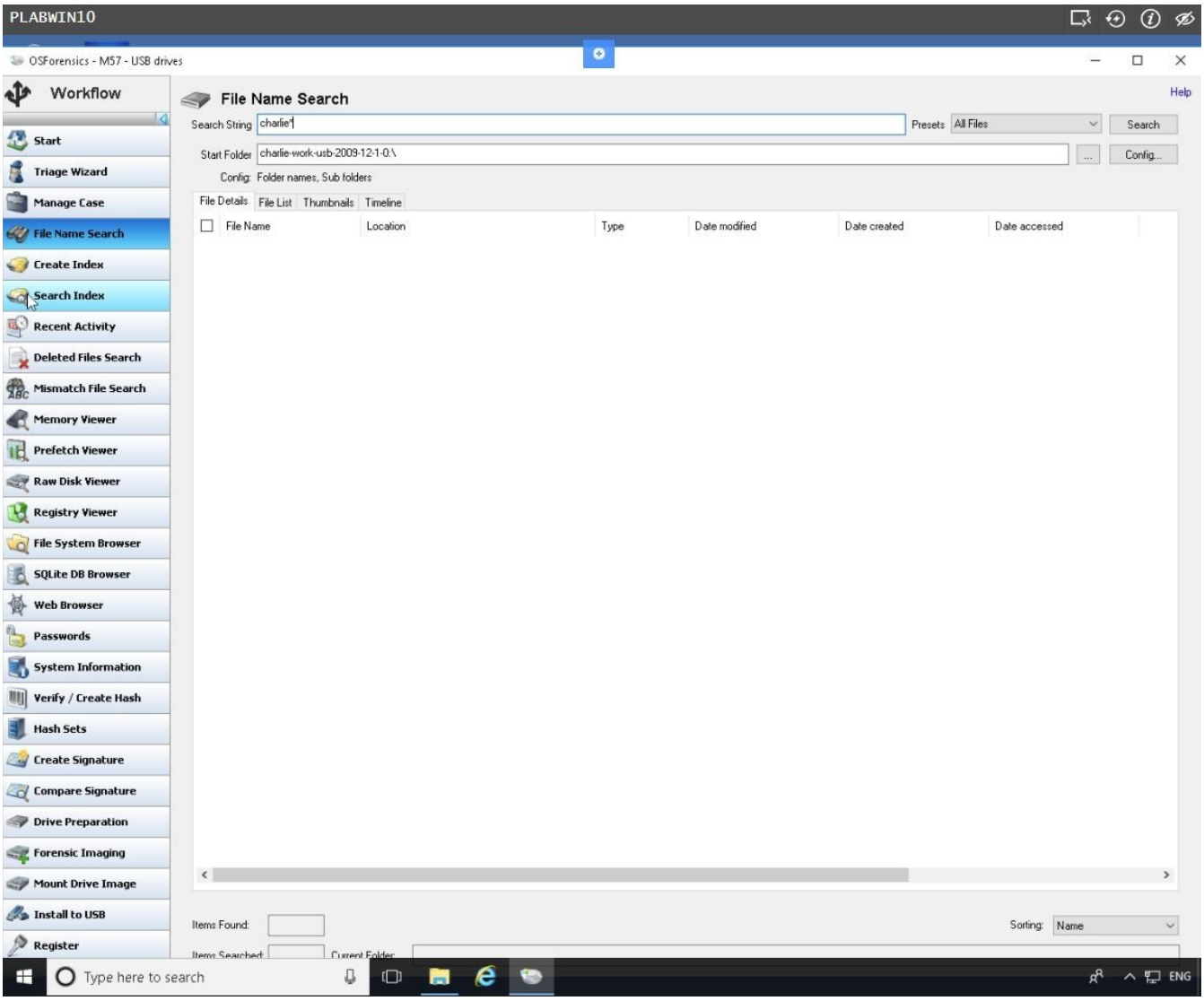


Step 17

In the **Search String** text box, type:

```
charlie*
```

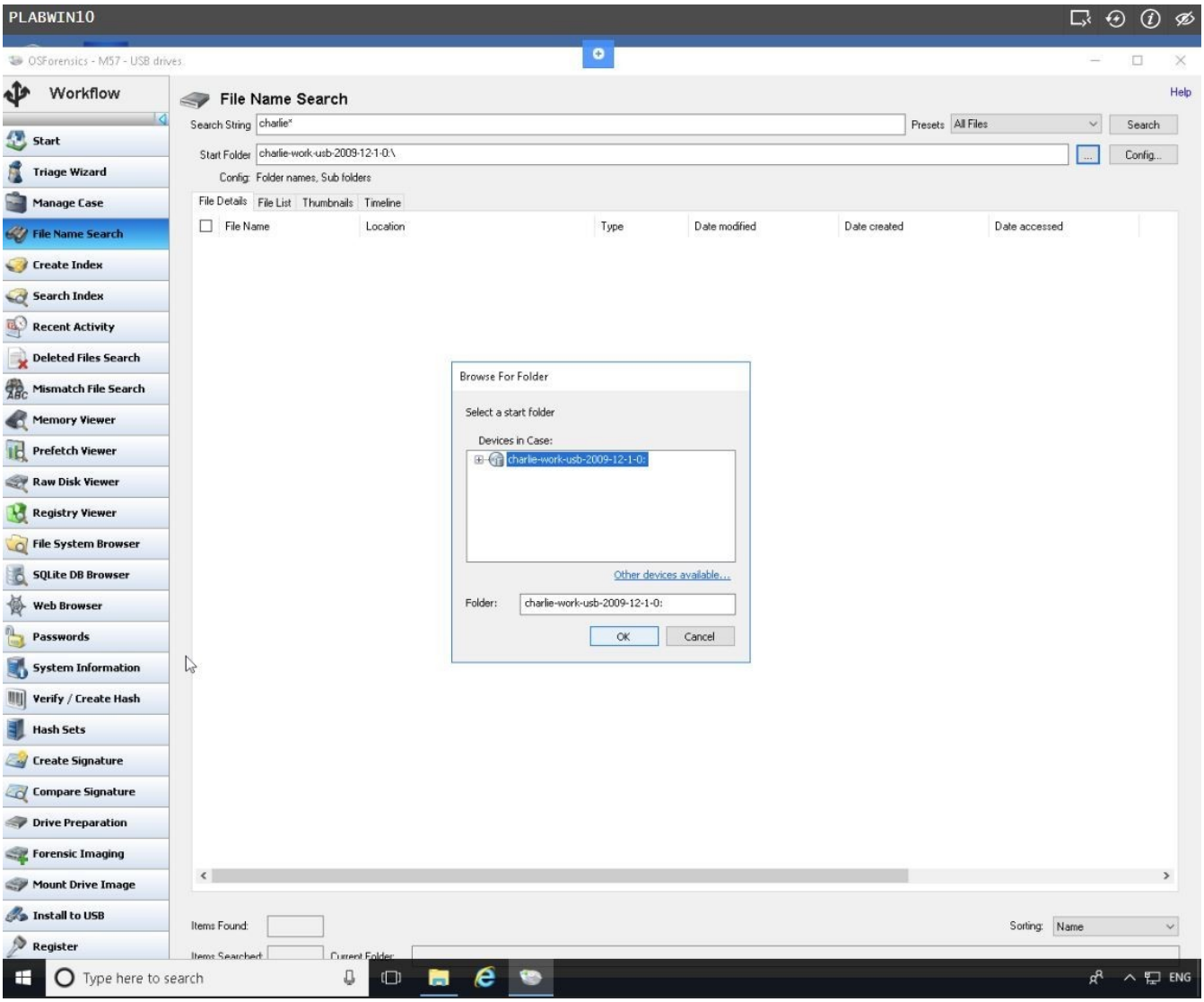
Beside the **Start Folder** field, click [...].



Step 18

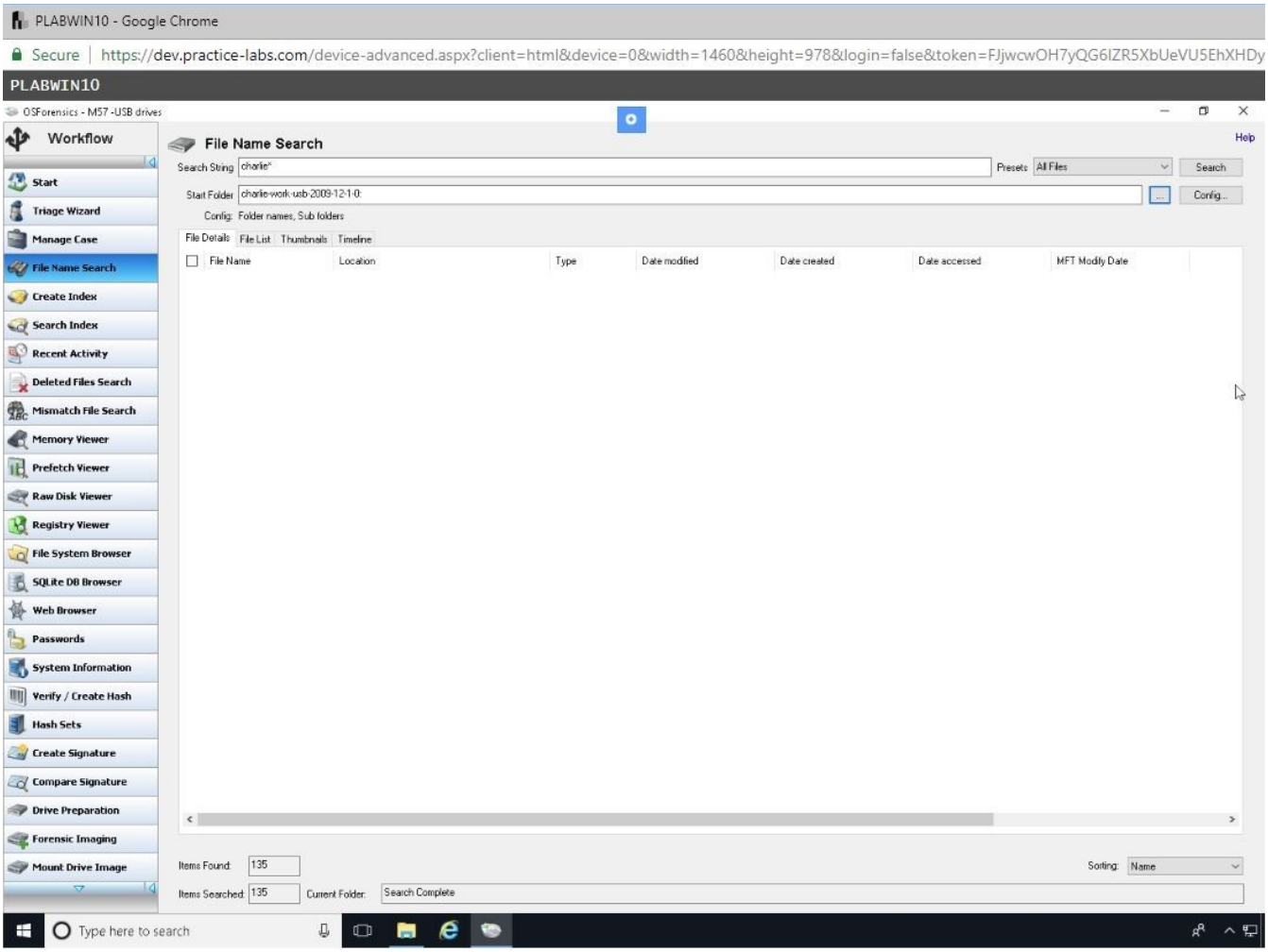
On the **Browse For Folder** dialog box, ensure that **Devices in Case** refers to **charlie-work-usb-2009-12-1-0**.

Click **OK**.



Step 19

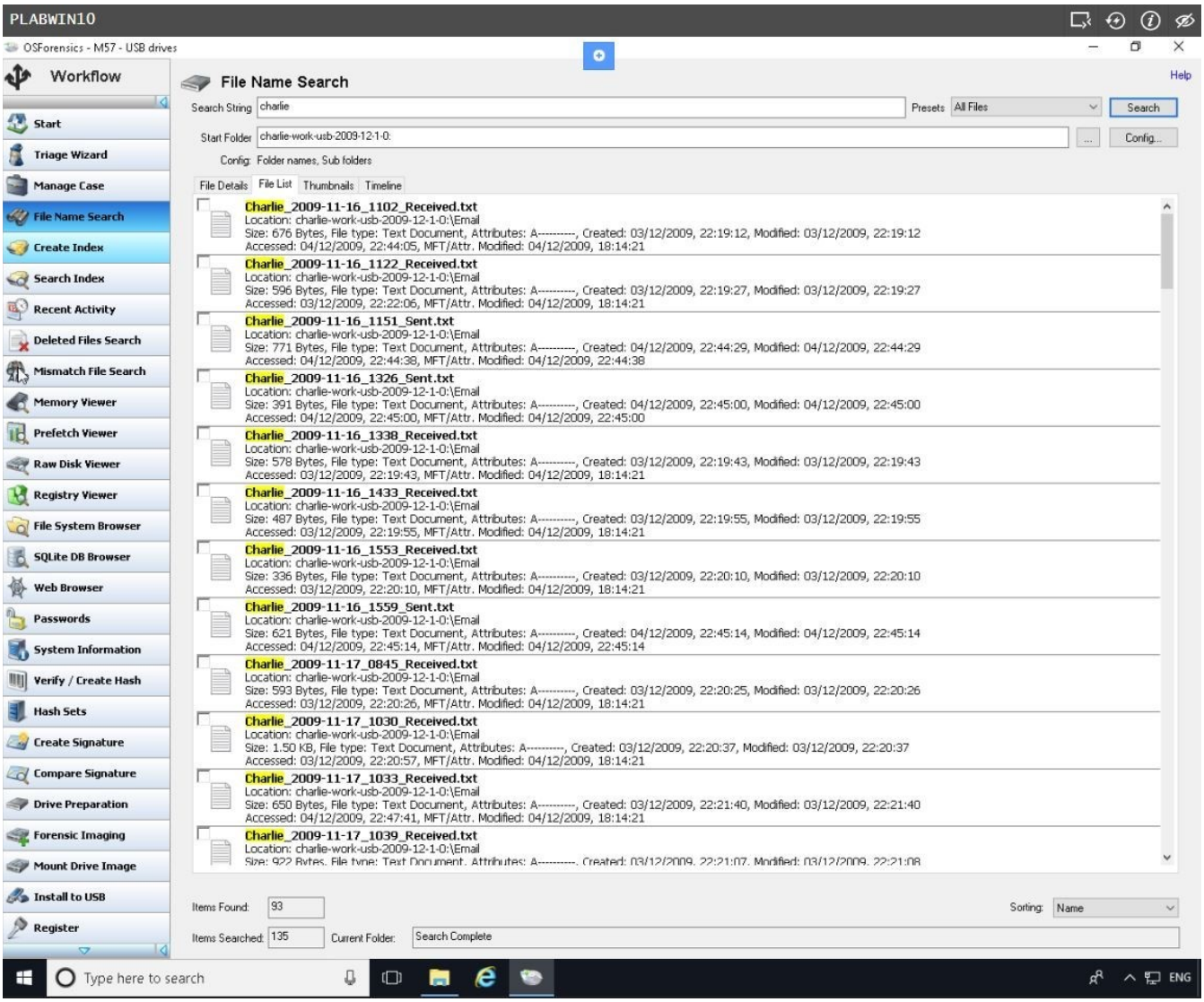
Back on **File Name Search** window, click **Search**.



Step 20

After a few moments a list of files found in Charlie's USB drive is displayed.

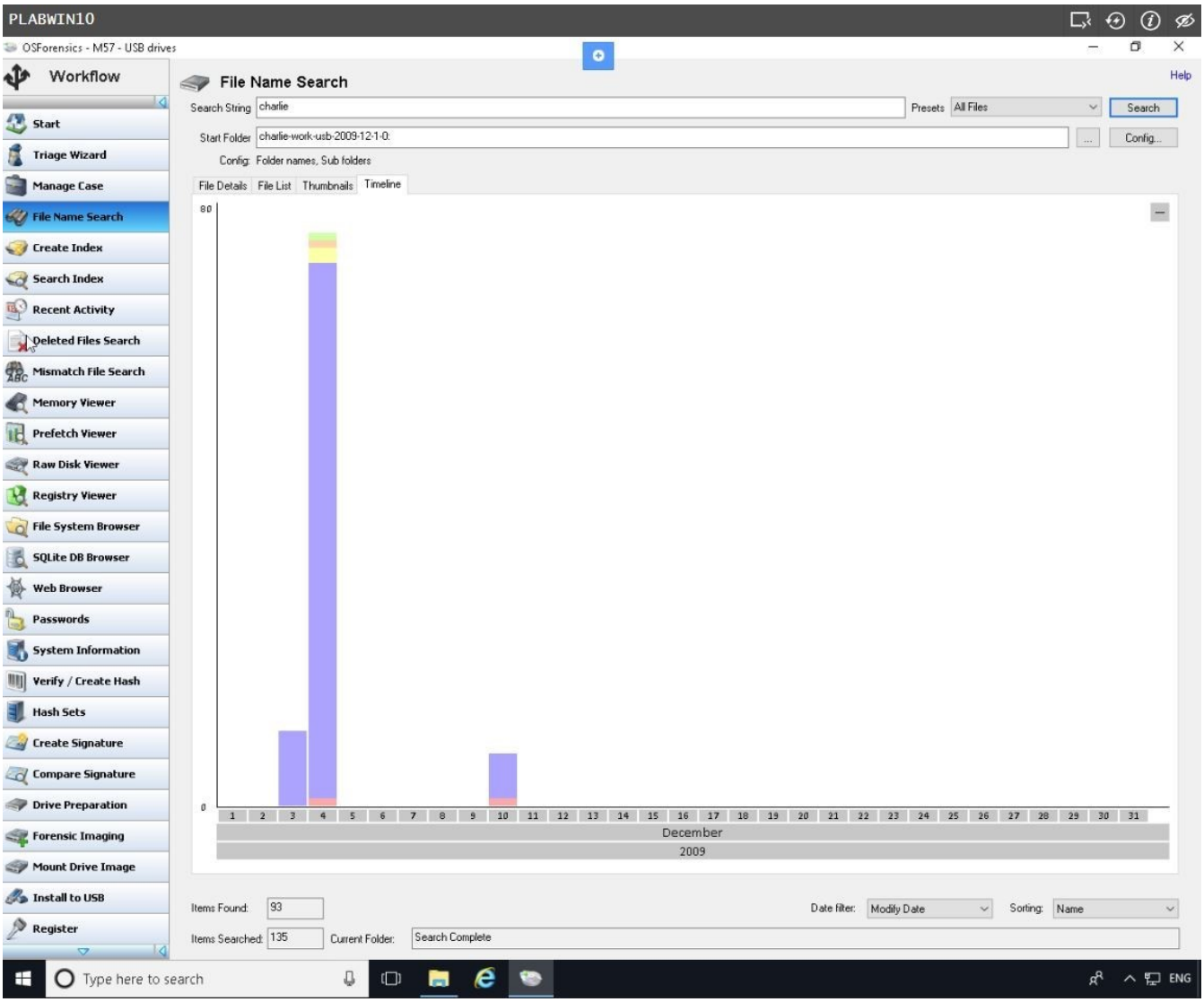
You can use the tabs at the top of the search results to see **Thumbnails** of files on the device.



Step 21

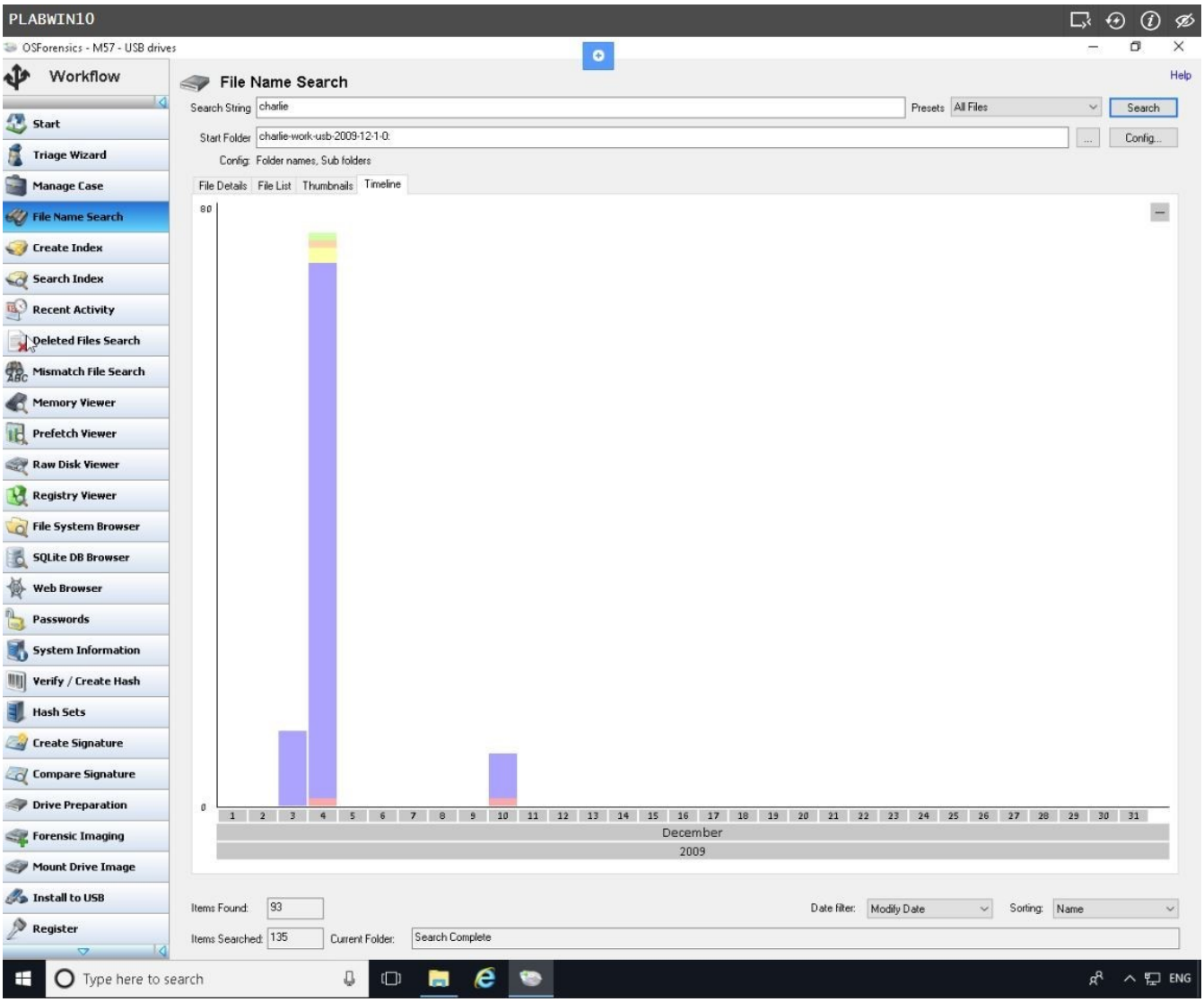
The files displayed in Thumbnails view.

Click **Timeline** tab.



Step 22

A timeline of the items is displayed.



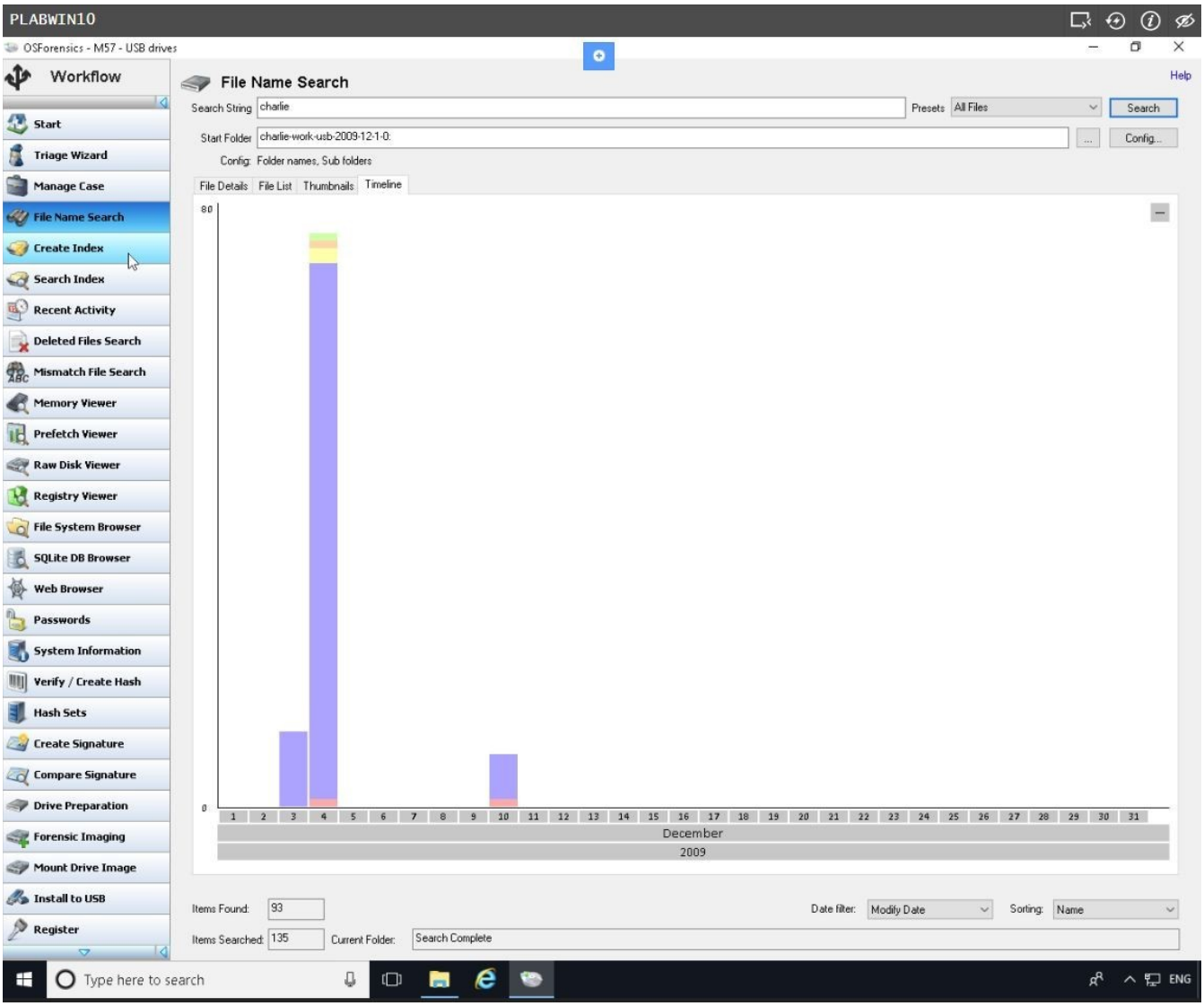
Task 3 - Create Index

To create an index of files found in the user's USB drive image, perform the following steps:

Step 1

On **PLABWIN10** device, the **OSForensics - M57-USB drives** window is open.

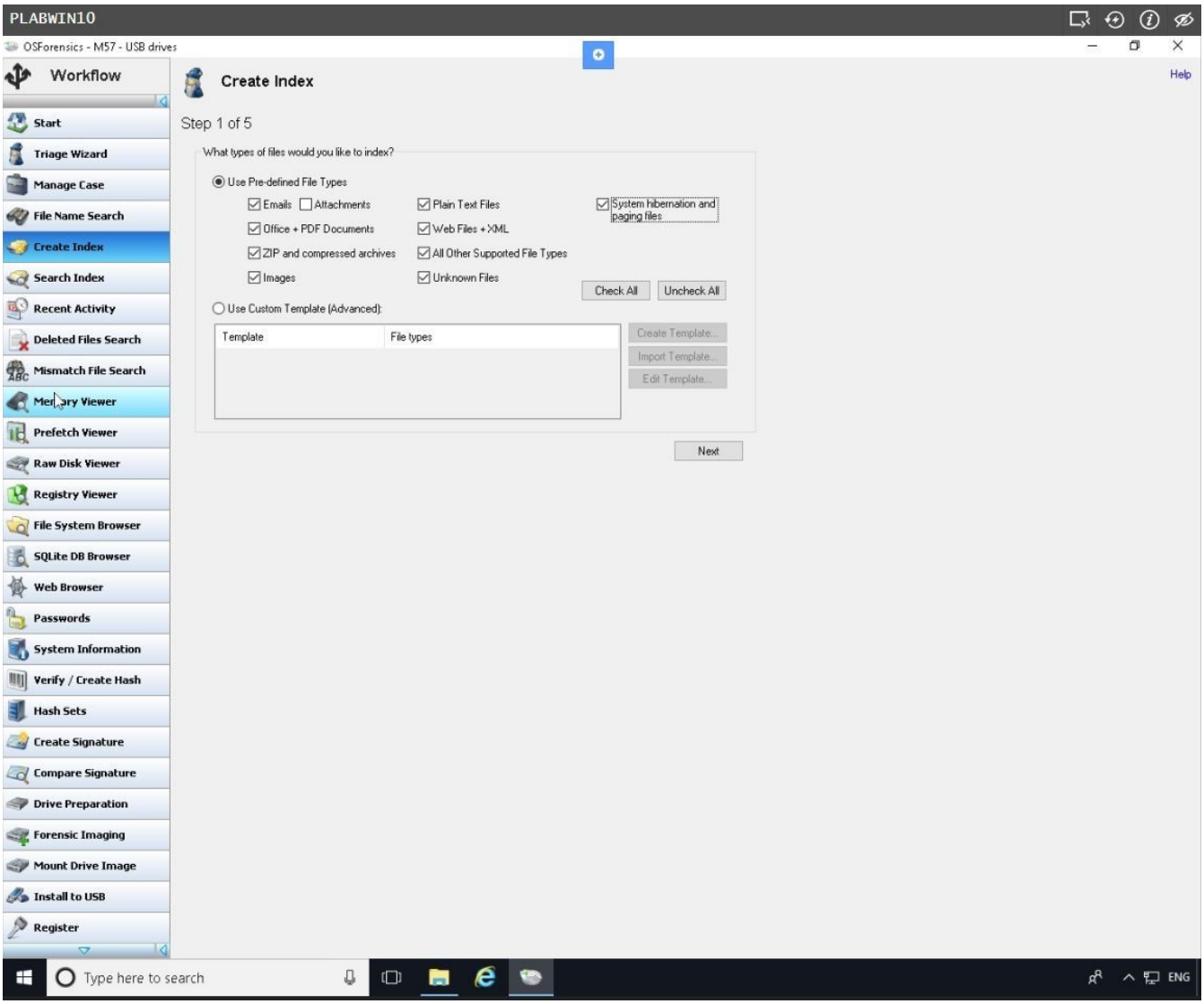
Next, click the **Create Index** button in the left pane to start the **Create Index Wizard**.



Step 2

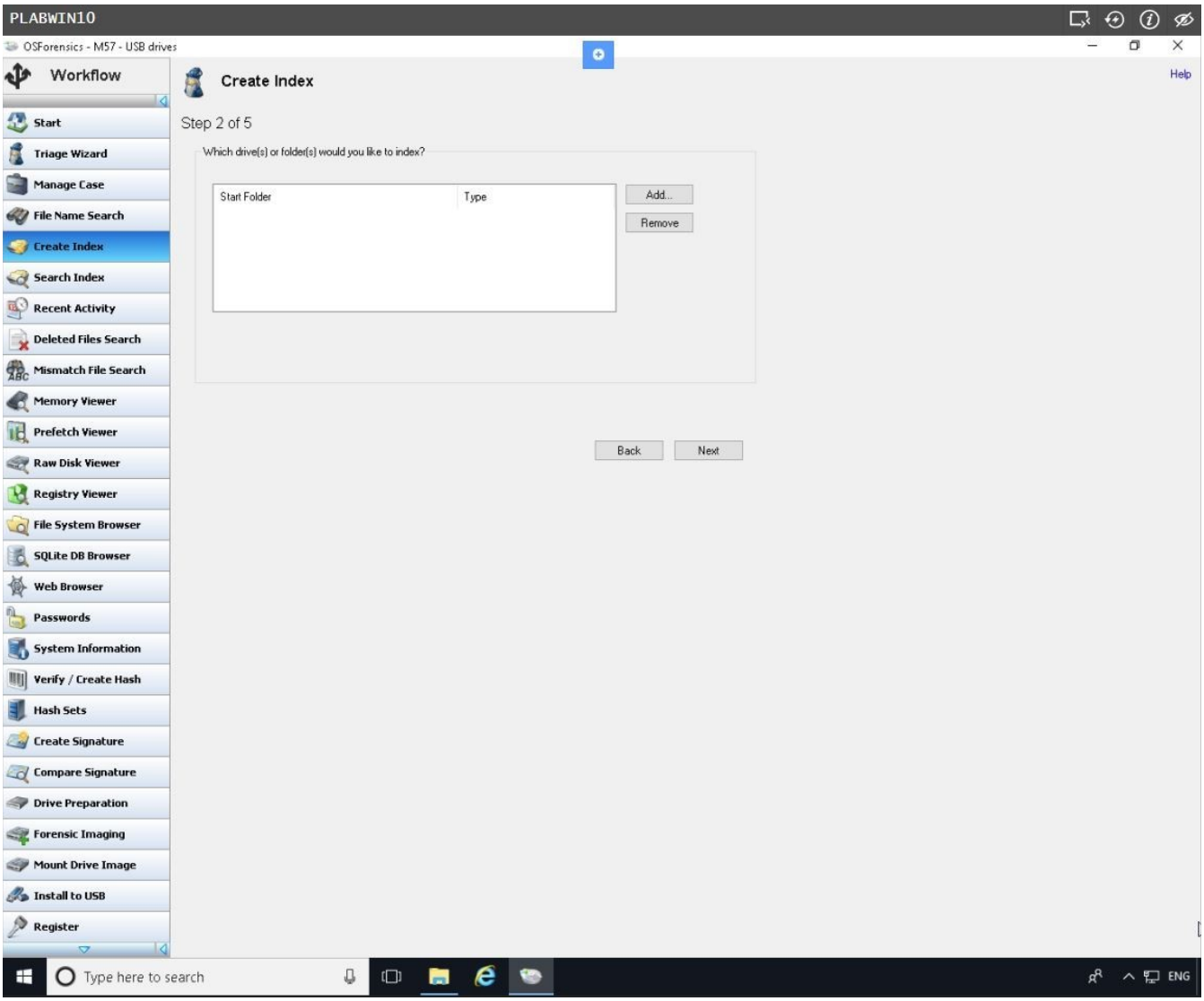
In the **Create Index Step 1 of 5** window, click the **Use Pre-defined File Types** option button, if necessary.

Click all the file types listed and then click **Next**.



Step 3

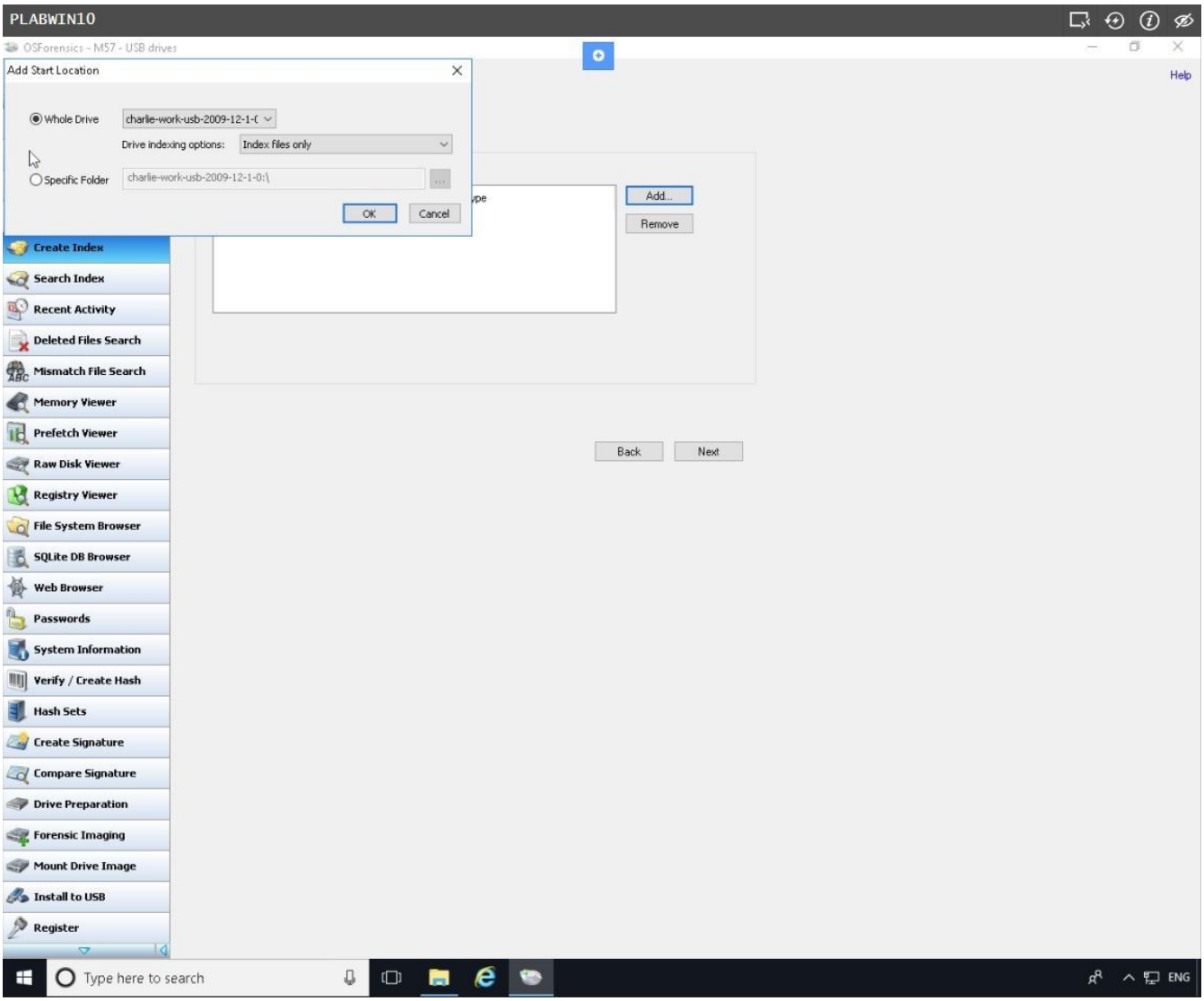
In the **Step 2 of 5** window, click the **Add** button.



Step 4

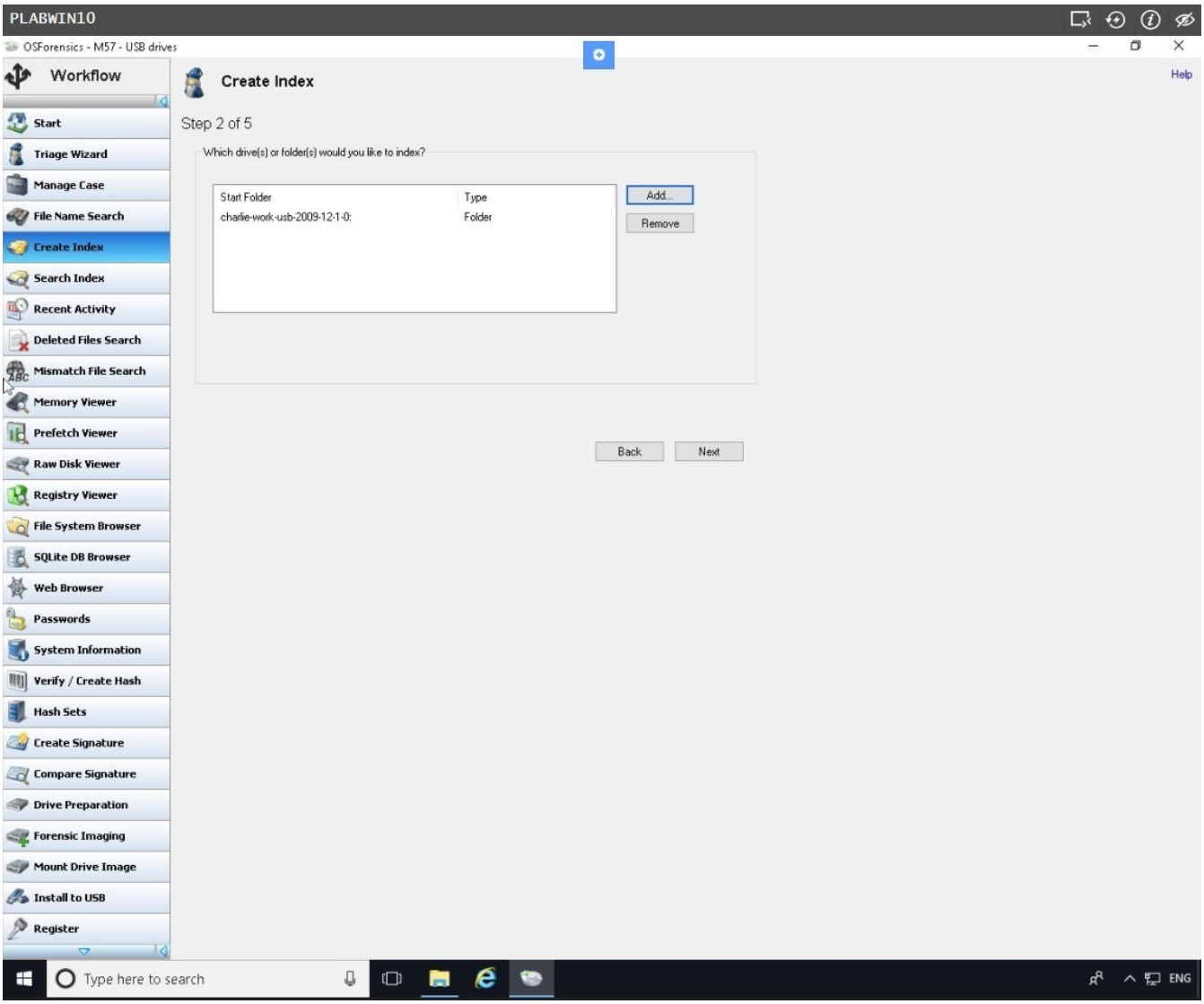
On the **Add Start Location** dialog box, verify that **Whole Drive** option is selected and **charlie-work-usb-2009-12-1-0.E01** is listed.

Click **OK**.



Step 5

Back on the **Step 2 of 5** page, click **Next**.

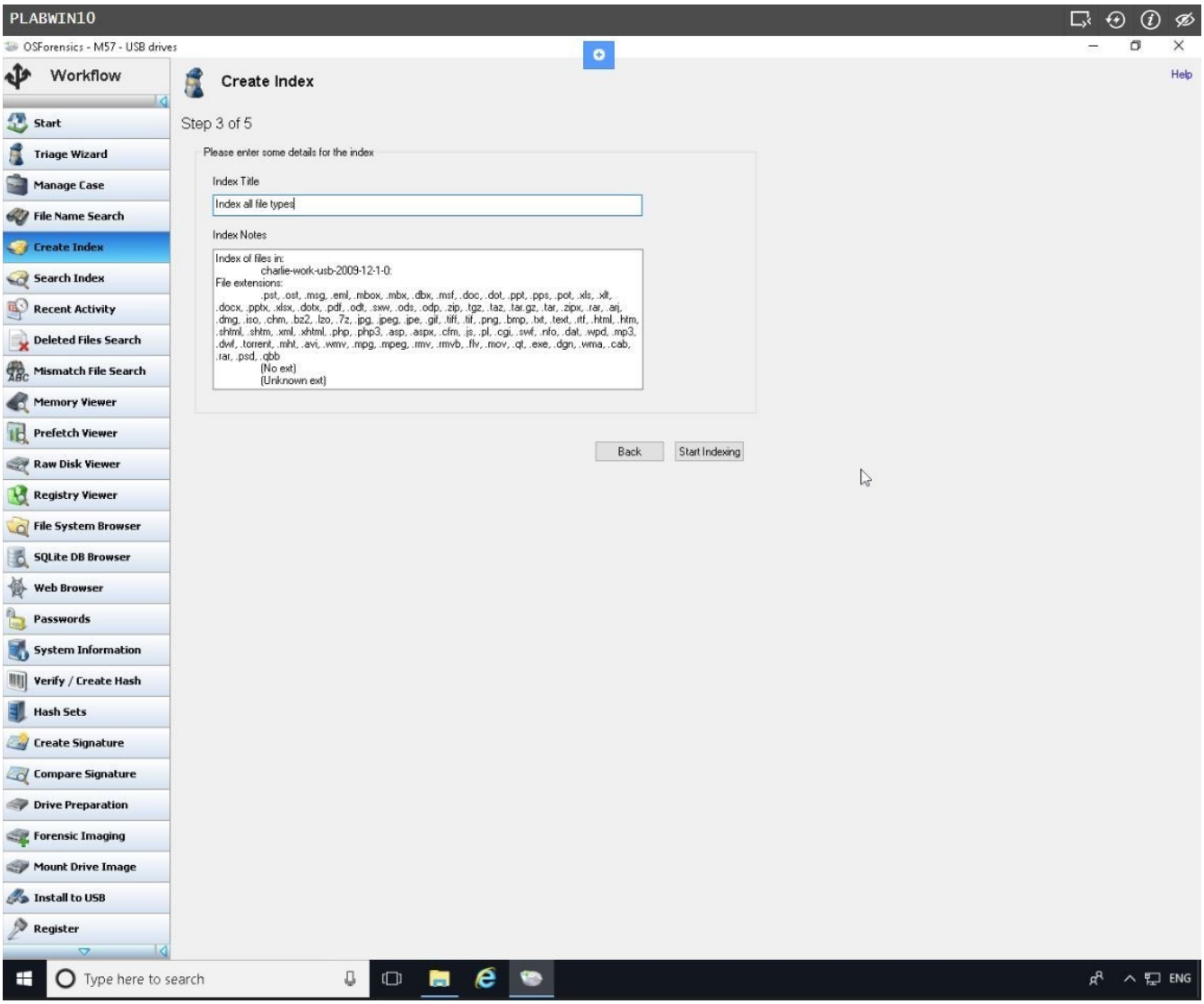


Step 6

In the **Step 3 of 5** window, in the **Index Title** text box, type:

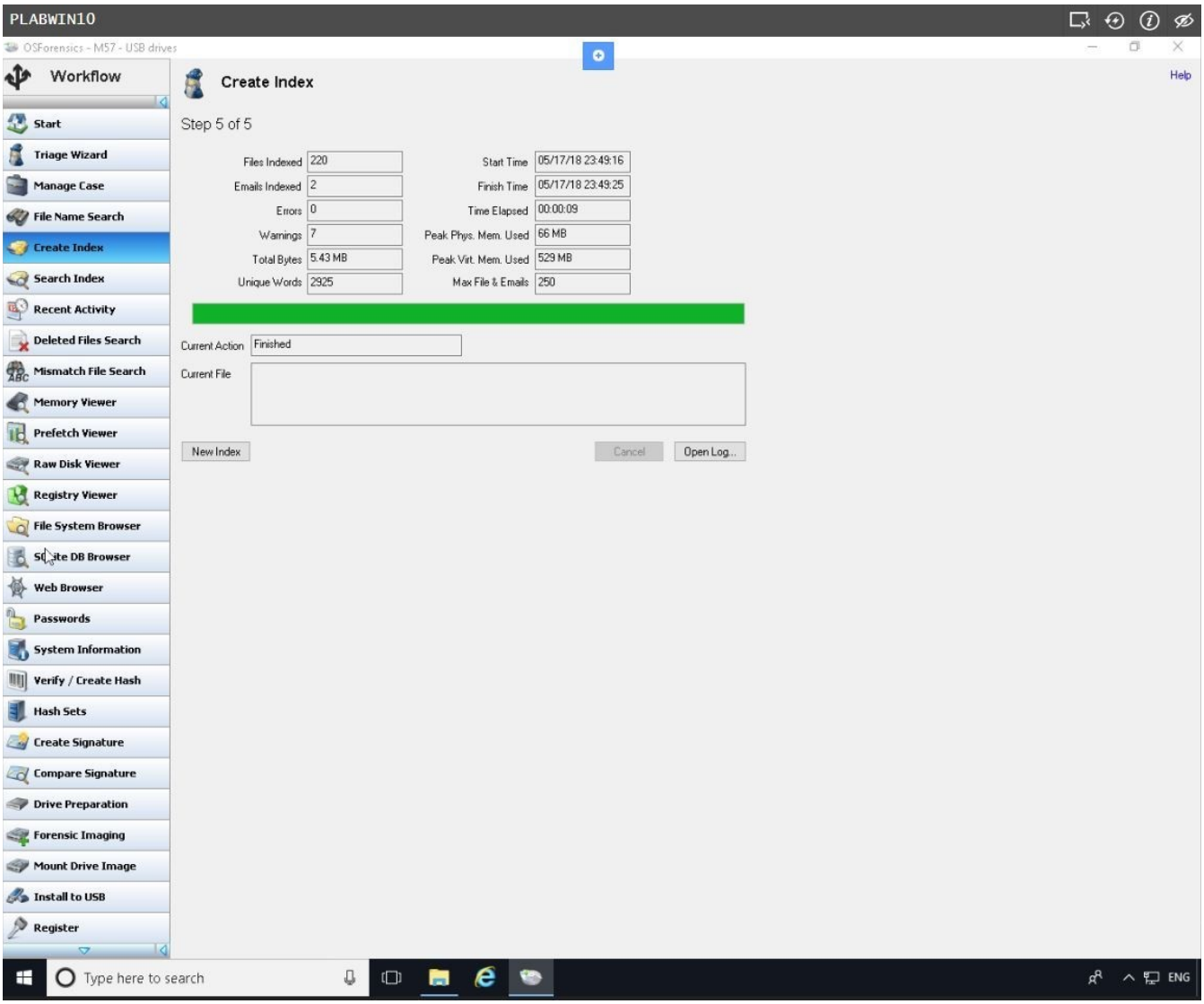
```
Index all file types
```

Click **Start Indexing**.



Step 7

The **Step 4 of 5** window flashes by quickly, and then the **Step 5 of 5** window shows the files processing.

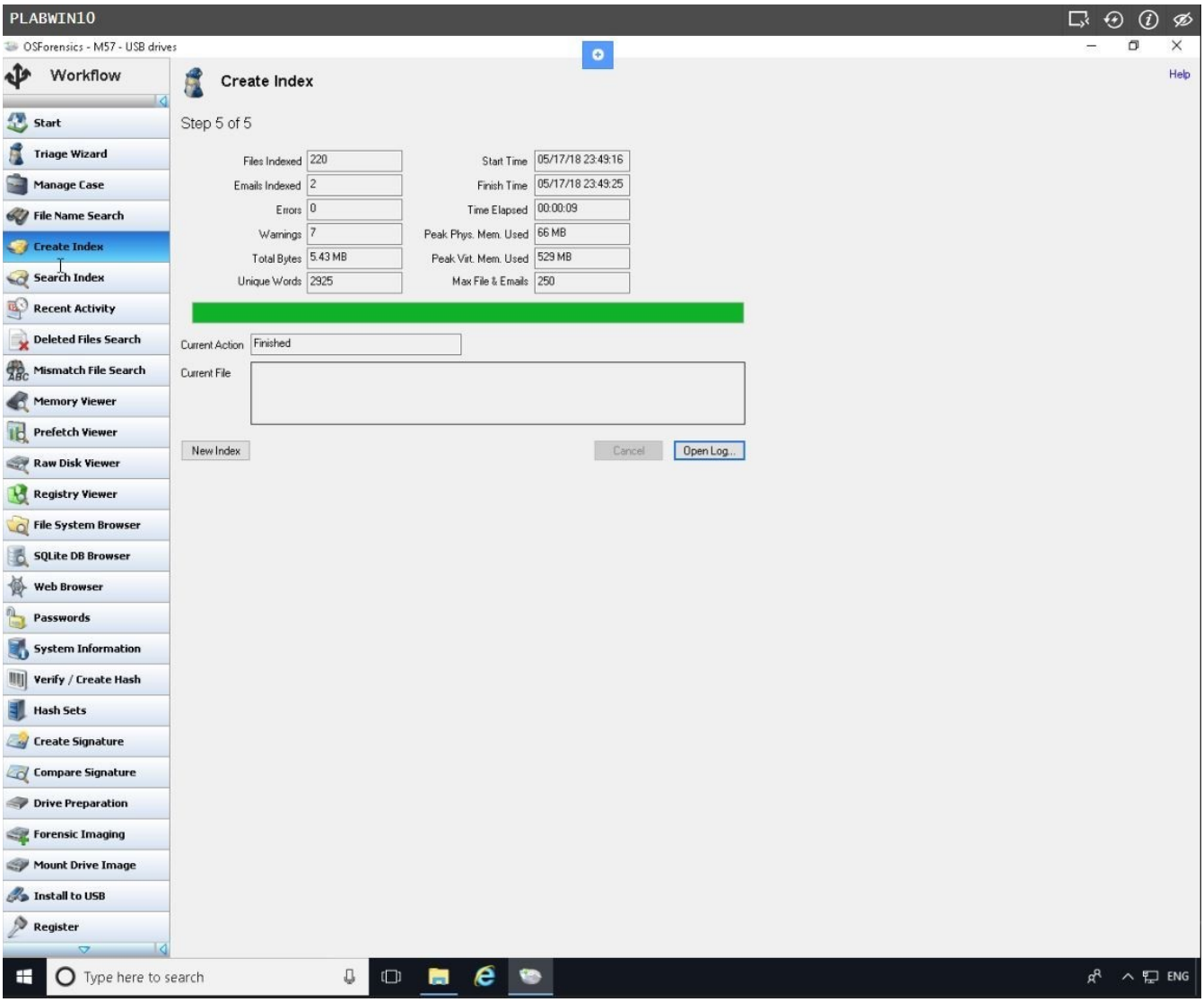


Step 8

When the indexing is finished, if necessary, click **OK** in the message box informing you that some errors might have occurred in the indexing process.

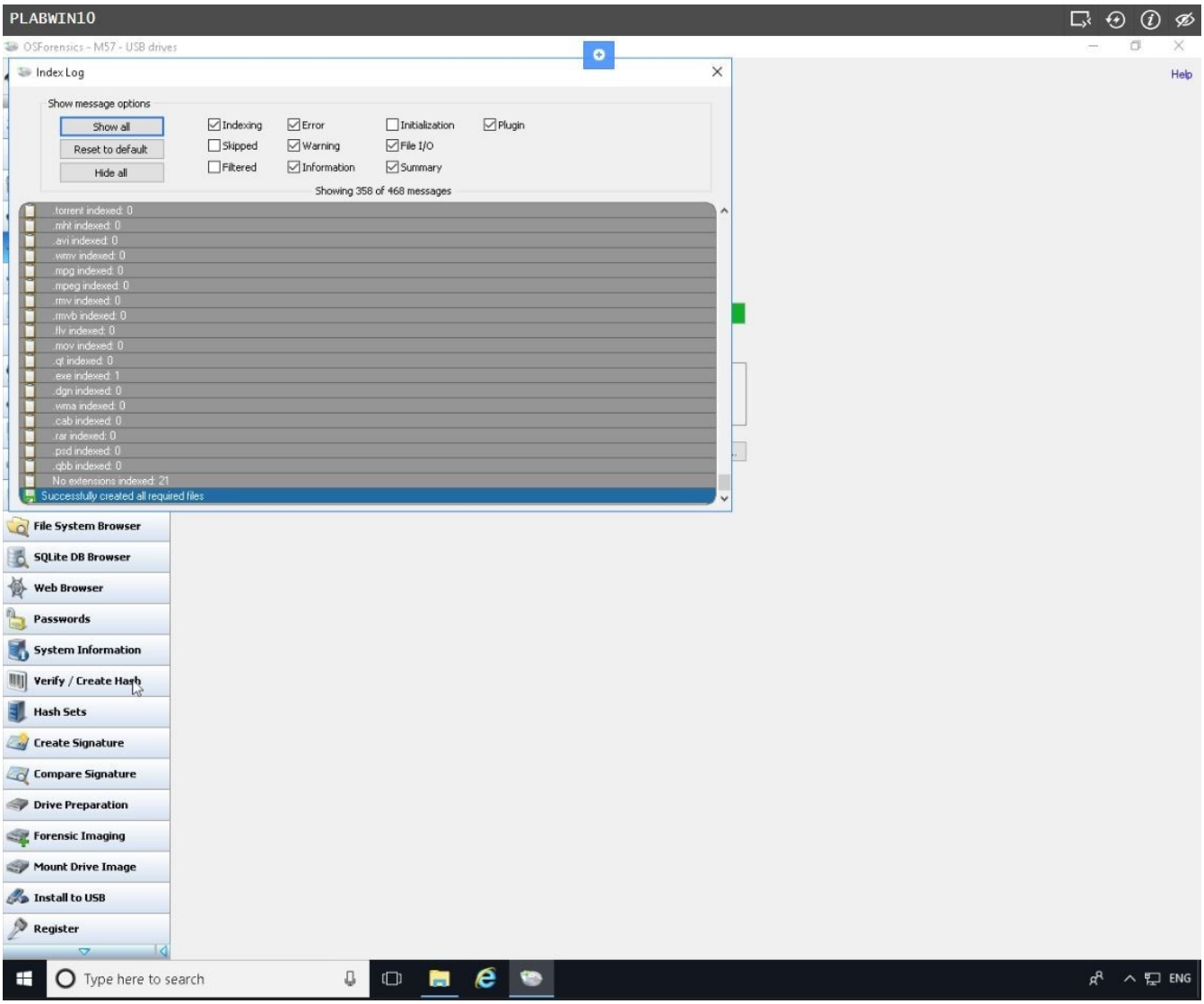
Step 9

Click the **Open Log** button at the lower right of the **Step 5 of 5** window.



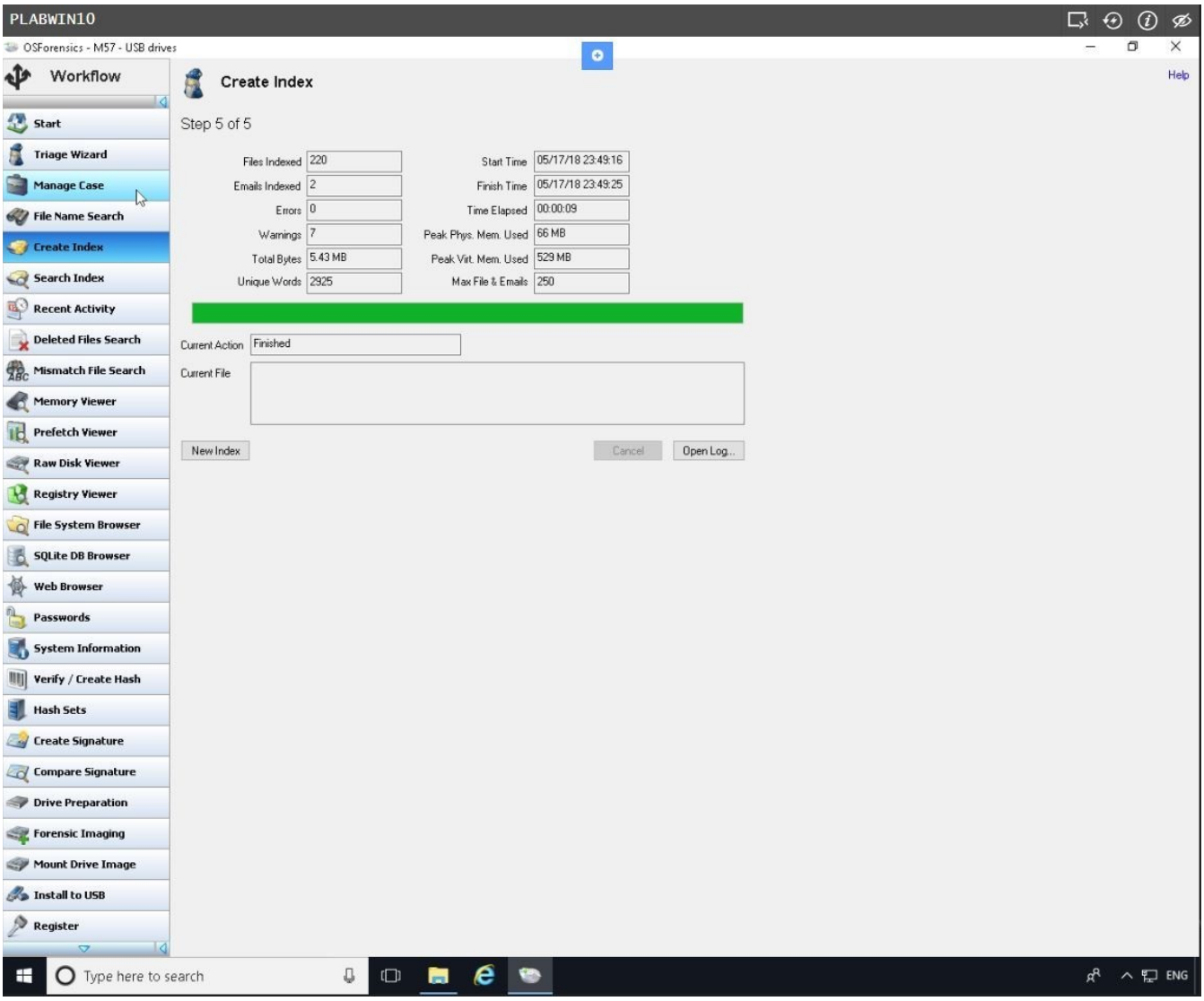
Step 10

The window that opens shows you the files that were indexed, any errors that occurred, and a summary of what was done. After examining the summary, close the window.



Step 11

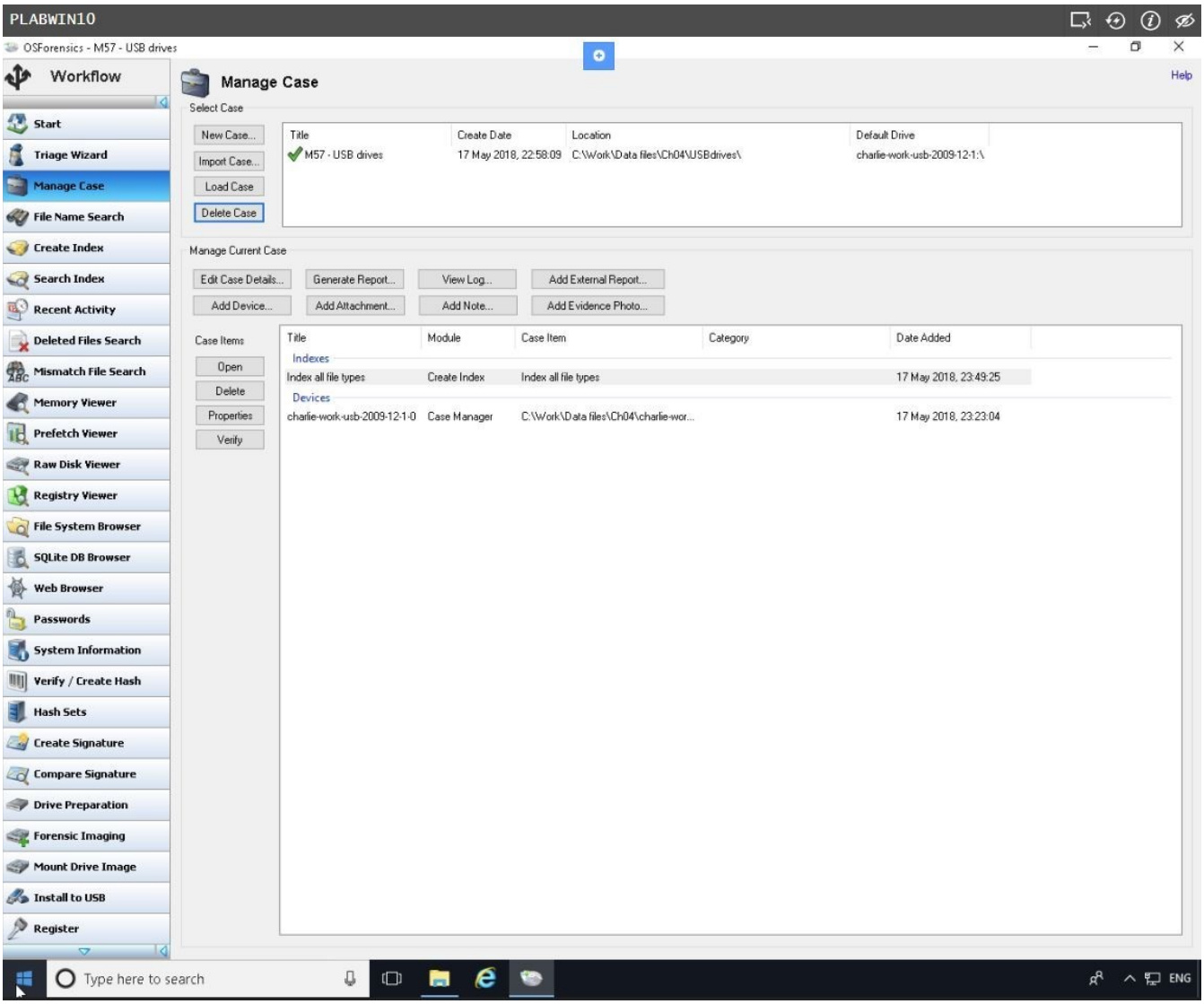
Back on the **Create Index, Step 5 of 5** window, click the **Manage Case** button in the left pane.



Step 12

Notice that the index is now listed in the bottom pane on the right. Scroll to the bottom of the left pane and click the **Close [X]** button.

This activity has given you a chance to see how indexing is done in the OSForensics tool you use throughout the book. You should now be able to create a case, add it to your inventory, scan the files, and perform indexing, which will be useful later for searching.



Leave the devices you have powered on in their current state and proceed to the next exercise.

Hands-On Project 4-3

This chapter introduced the M57 Patents case, which is a hypothetical case created for new investigators to practice on real data. In this project, you examine the USB drive of Terry, the IT person. Your job is to ascertain whether Terry is involved in anything illicit or against company policy.

Step 1

Open **File Explorer** and create a new folder called **WorknChap04nProjects** in your **C: > Work folder**.

Start **OSForensics**. If prompted to allow the program to make changes to your computer, click **OK** or **Yes**. In the **OSForensics** message box, click **Continue Using Trial Version**.

Step 2

Click **Start** in the left pane, if necessary. In the right pane, click **Create Case**.

Step 3

In the New Case dialog box, enter your name in the Investigator text box. In the Case Name text box, type **M57 - Terrys USB drive**. Fill in the contact details and the organization, and then click **Investigate Disk(s) from Another Machine**.

Step 4

Click **Custom Location** for the case folder. Click the **Browse** button on the lower right, navigate to and click your **WorknChap04nProjects** folder, and then click **OK** twice. You should see the **Manage Case** window

Step 5

Click the **Add Device** button to open the "**Select device to add**" dialog box, and then click the **Image File** option button. Click the **Browse** button, navigate to the folder you copied images to, and click **terry-work-usb-2009-12-11.E01**. Click **Open**.

Step 6

In the message box asking which partition to use, leave the default setting Partition 0 - 2.0 GB (WIN95 FAT 32), and then click **OK**. Click **OK** to close the "Select device to add" dialog box.

Step 7

Click the **terry-work-usb-2009-12-11.E01** filename at the lower right, and then click the **Open** button to the left to open the File System Browser window.

Step 8

Click the **File Name Search** icon in the File System Browser window or the left pane of the main window. In the Search String text box, type **kitty***. On the far right, click the **Search** button. Notice that the "kitty porn" isn't on his USB drive.

Step 9

Click the **Create Index** button in the left pane. (Note: You might have to click New Index if the window is showing the results from the index of Charlie's USB drive.) In the Step 1 of 5 window, click the Use **Pre-determined File Types** option button, click all the file types listed, and then click **Next**.

Step 10

In the **Step 2 of 5** window, click Charlie's USB image and click **Remove** to delete it from the list box, if necessary. Click **Add**, click **terry-workusb-2009-12-11.E01**, click **OK**, and then click **Next**.

Step 11

In the **Step 3 of 5** window, type Index all file types in the Index Title text box, and then click **Start Indexing**. When the indexing is finished, which might take up to an hour, click **OK** in the message box.

Step 12

Click the **Open Log** button at the lower right and examine the log. Notice whether any errors were reported and the number of files processed, and then close the log.

Step 13

Click the **Manage Case** button in the left pane. In the lower right pane, double-click **Terrys USB** under the Devices heading, open any text or picture files, and examine them.

Step 14

Scroll to the bottom of the left pane and click the **Exit** button. Write a 1-2 page paper explaining the importance of the files you examined. How might they affect a patent case?

Leave the devices you have powered on in their current state and proceed to the next exercise.

Hands-On Project 4-4

In this project, you will create a file on a USB E: drive present in **PLABWIN10** device. You will then calculate its hash value in **FTK Imager**. Then you change the file and calculate the hash value again to compare the files. You need a Windows computer and a USB drive.

Step 1

Create a folder called **C4Prj04** on your **USB E:** drive, and then start **Notepad**.

Step 2

In a new text file, type:

```
This is a test of hash values. One definition of a
forensic hash is that if the file changes, the hash
value changes.
```

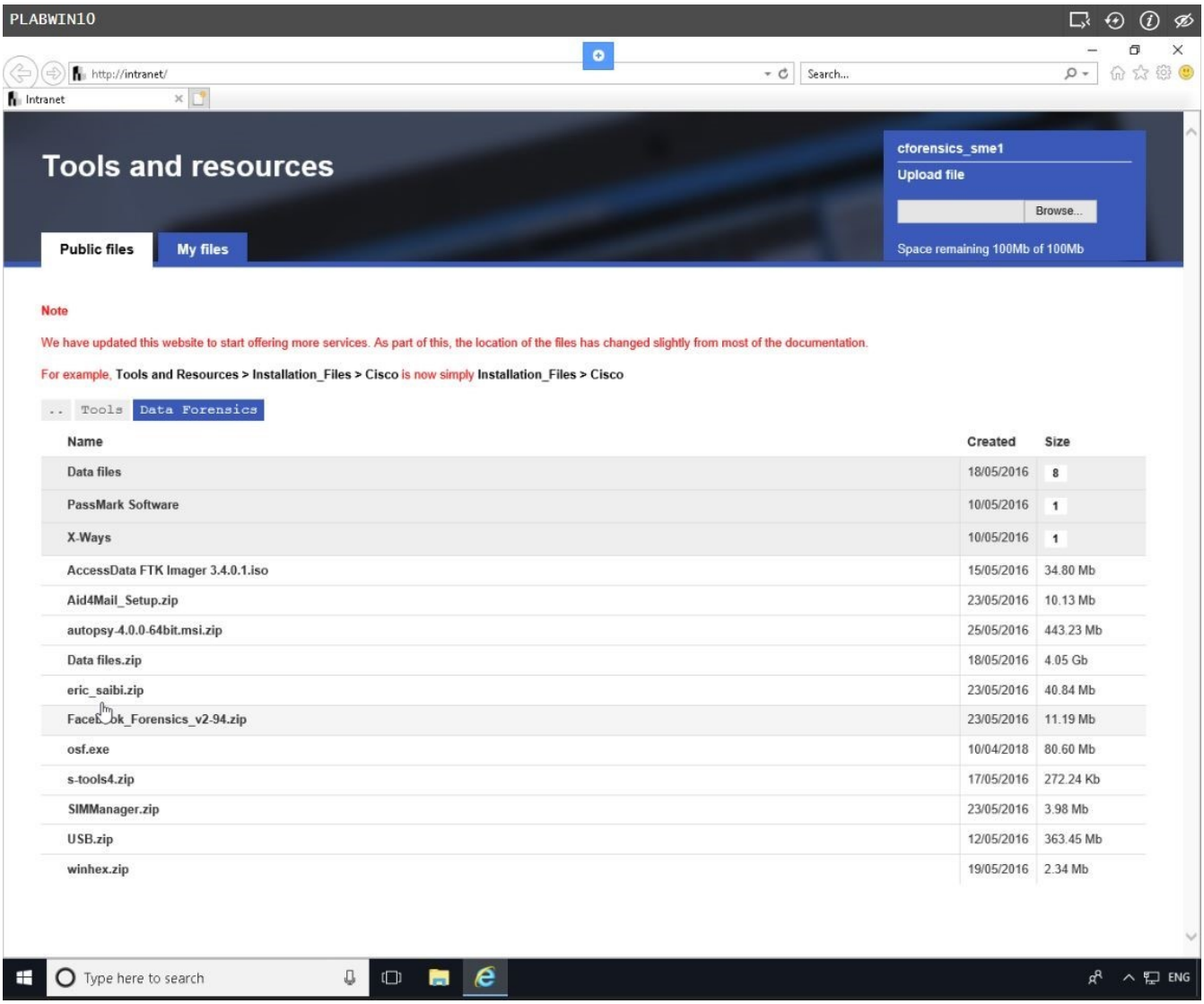
Step 3

Save the file as **hash1** in the **C4Prj04** folder on your **USB E:** drive, and then exit **Notepad**.

Step 4

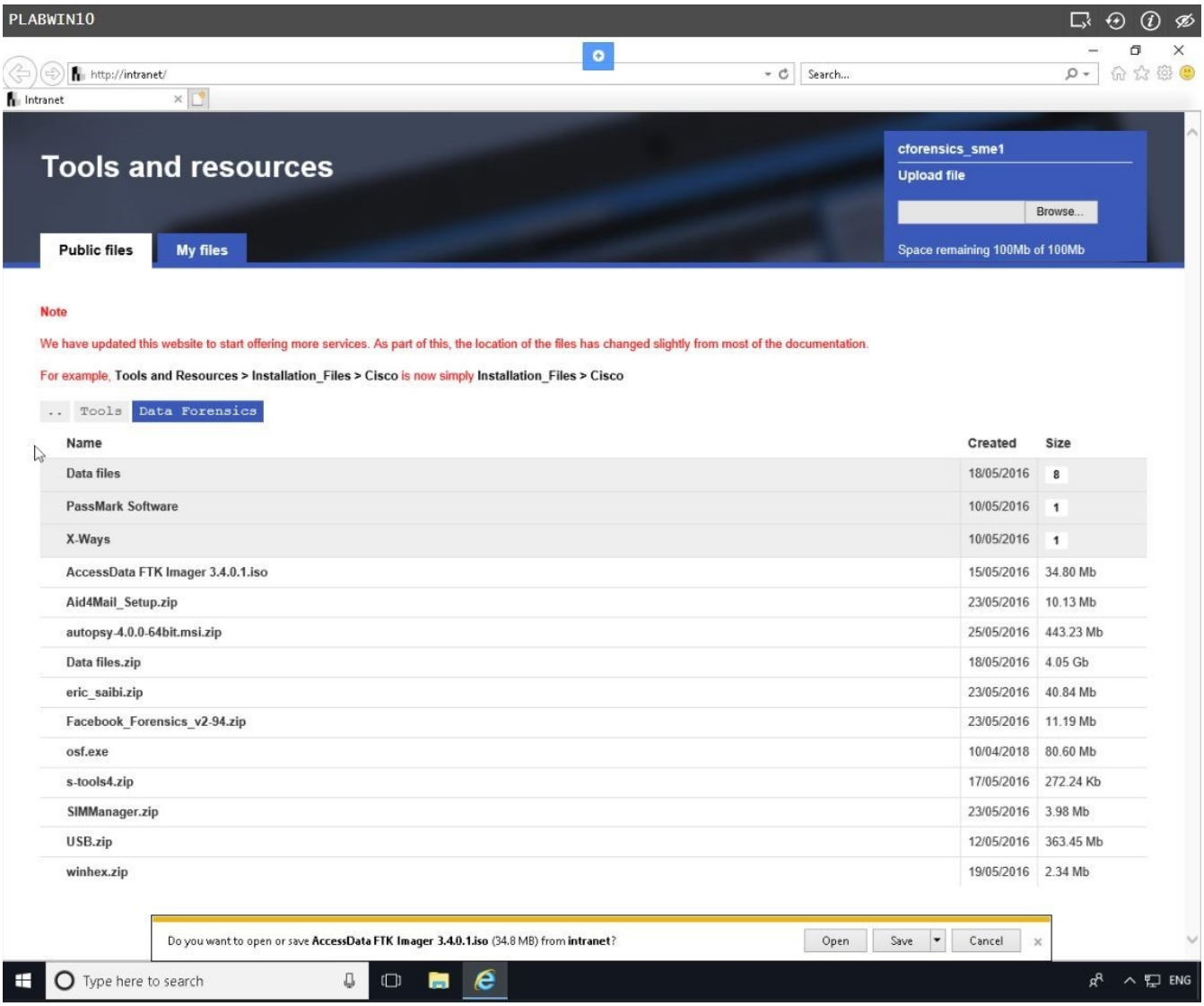
Launch **Internet Explorer**.

On the **Tools and resources** page, navigate to **[..] > Tools > Data Forensics**.



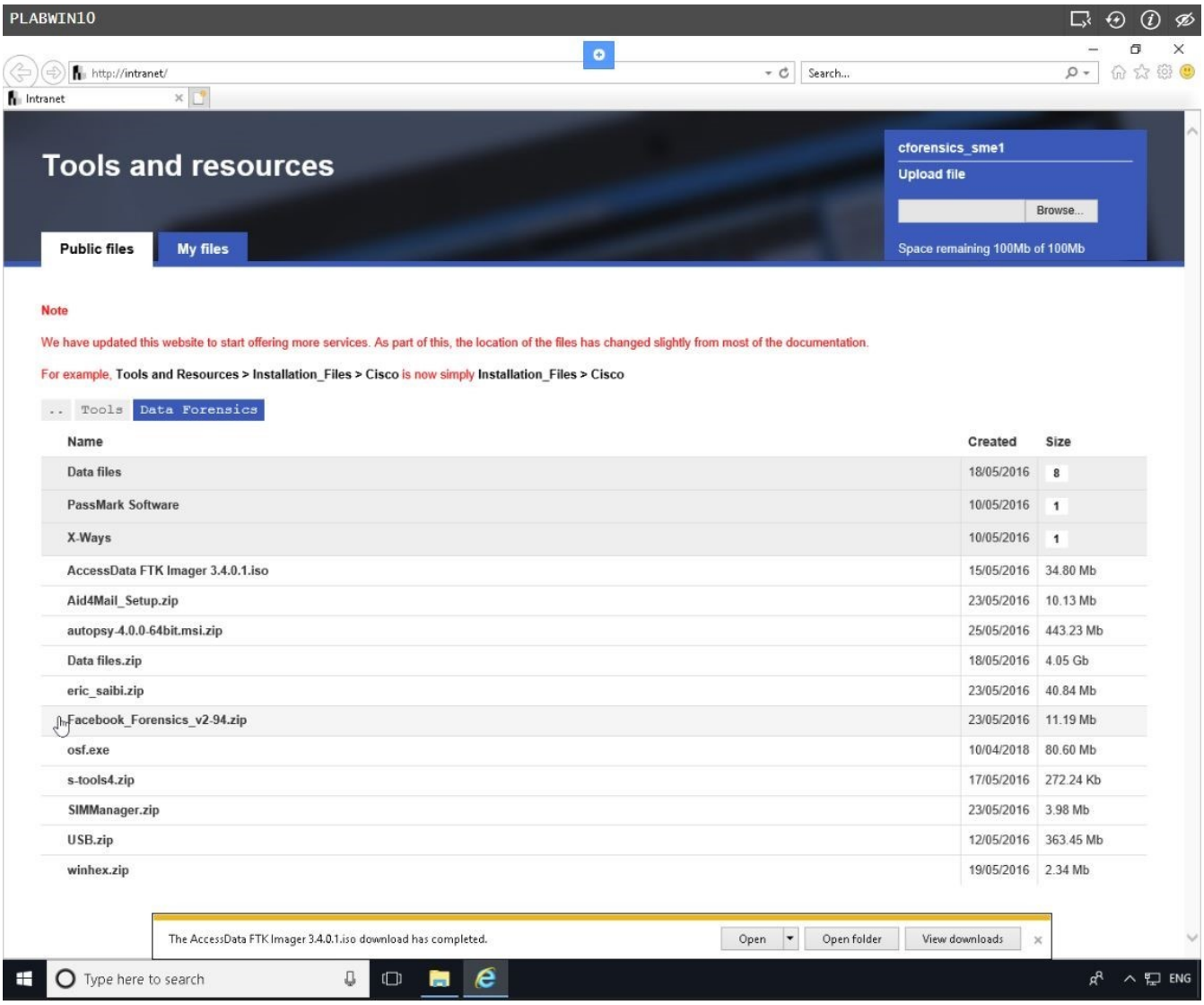
Step 5

Click **AccessData FTK Imager 3.4.0.1.iso** file and save it on the default **Downloads** folder.



Step 6

Click **Open folder** button when download is successfully completed.



Step 7

File Explorer window opens.

Double click **AccessData FTK Imager 3.4.0.1** and open with **Windows Explorer.**

Step 8

The ISO image is mounted as a new DVD image.

Right-click **AccessData FTK Imager 3.4.0.1** and select **Run as administrator**. Click **Yes** in the UAC to continue.

Step 9

The **Welcome to the InstallShield Wizard for AccessData FTK Imager** screen is displayed.

Click **Next**.

Step 10

On the **License Agreement** page, click **I accept the terms in the license agreement** option.

Click **Next**.

Step 11

Accept the default folder path in the **Destination Folder** page by clicking **Next**.

Step 12

Click **Install** when **Ready to Install the Program** page is displayed.

Step 13

Click **Finish** when a successful installation is successfully completed.

Step 14

The **FTK Imager** application opens

Click **File**, **Add Evidence Item** from the menu.

Step 15

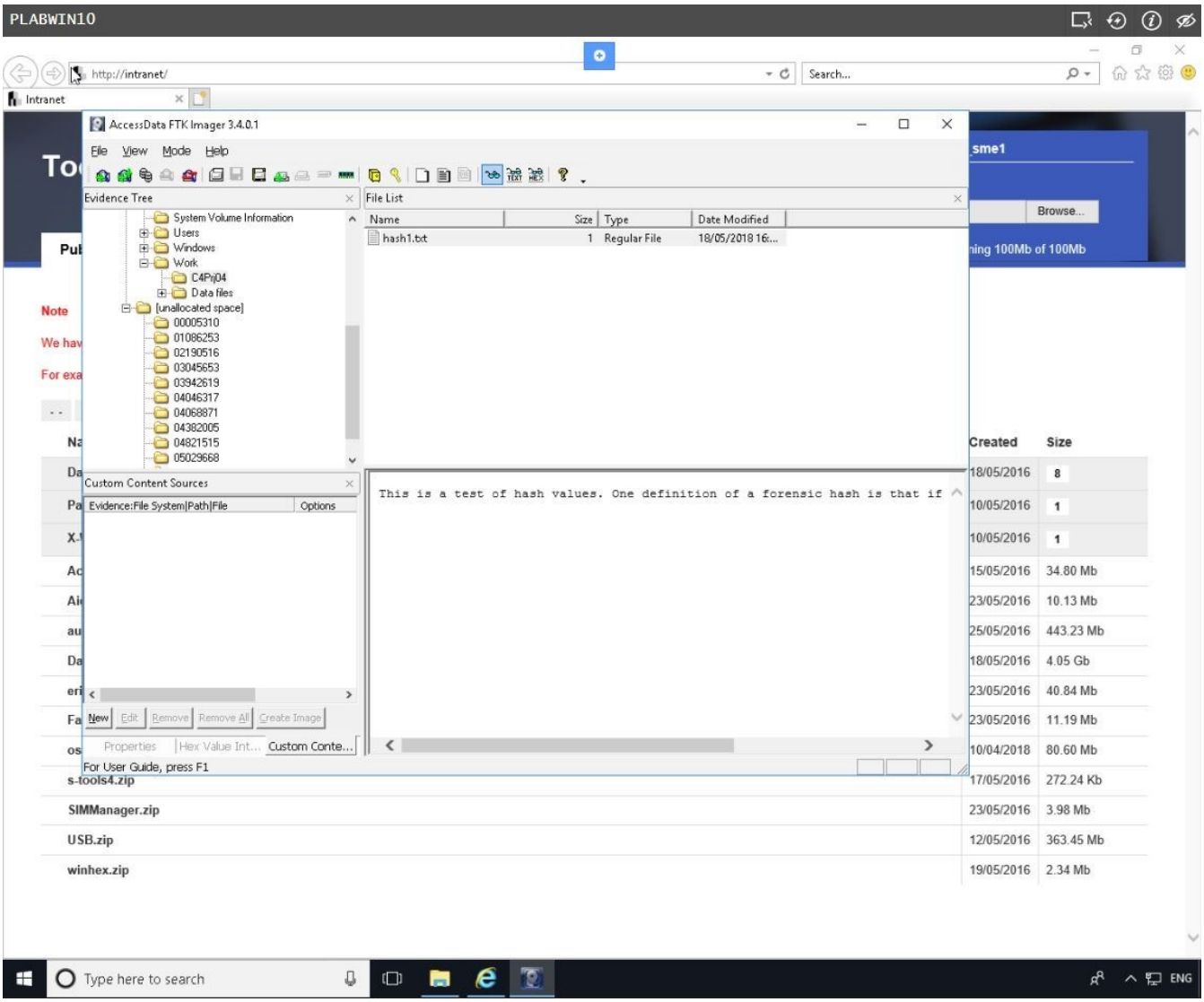
In the **Select Source** dialog box, click the **Logical Drive** option button, and then click **Next**.

Step 16

In the **Select Drive** dialog box, click the **Source Drive Selection** drop-down list, click to select your **E:\ - USB [NTFS]** drive, and then click **Finish**.

Step 17

In the upper-left pane, click to expand your **E:\ > USB [NTFS] > [root]** drive and continue expanding until you can click the **C4Prj04** folder. In the upper-right pane, you should see the **hash1.txt** file you created.

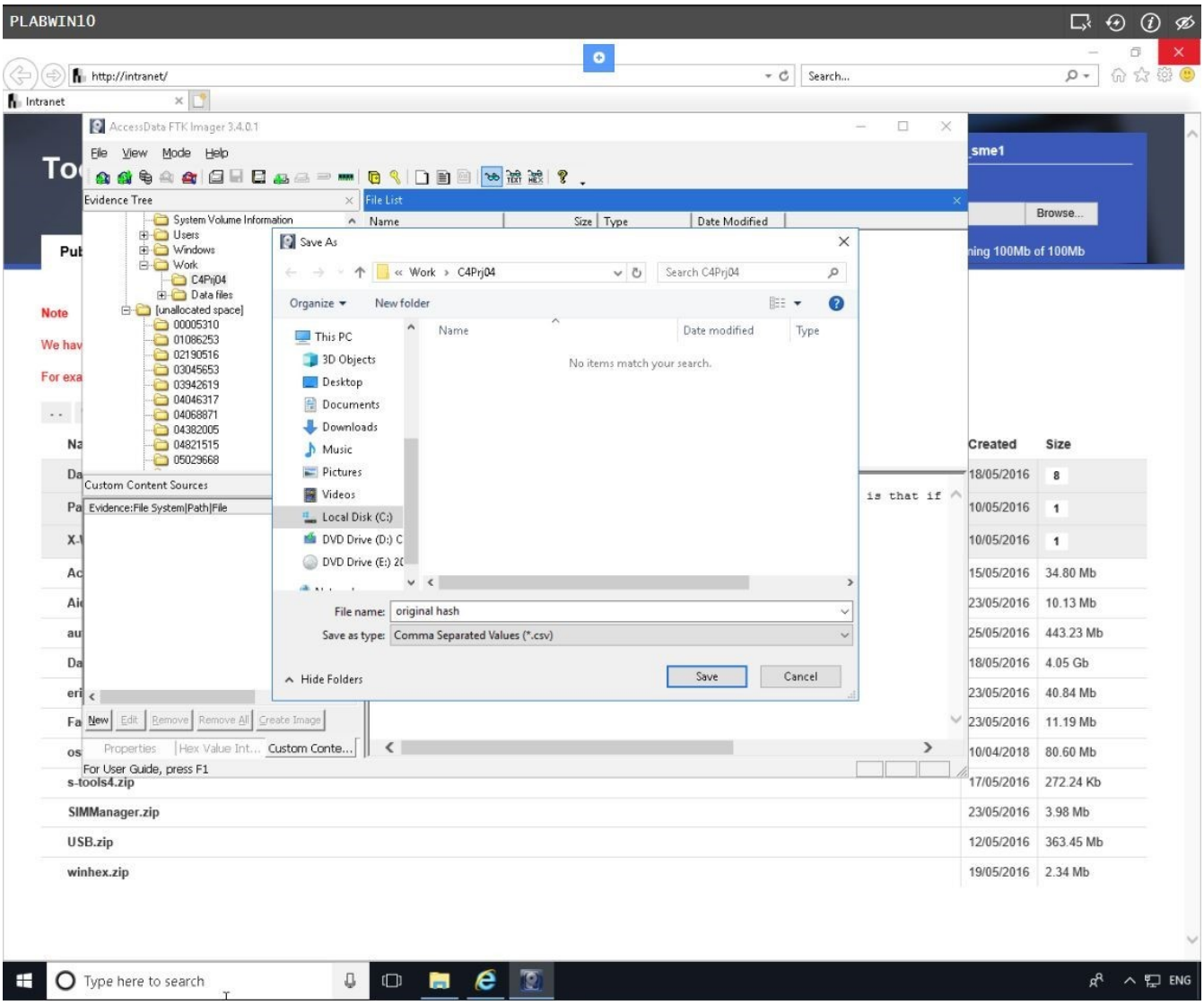


Step 18

Right-click the **hash1.txt** file and click **Export File Hash List.**

Save the file as **original hash** in the **C4Prj04** folder on your **USB E:** drive.

FTK Imager saves it as a **.csv** file.



Step 19

Exit **FTK Imager** and start **Notepad**.

Step 20

Open **hash1.txt** in Notepad. Add one letter to the end of the file, save it, and exit Notepad.

Step 21

Start **FTK** Imager again. Repeat Steps 14 to 19 (**but without starting Notepad**), but this time when you export the file hash list, save the file as **changed hash**.

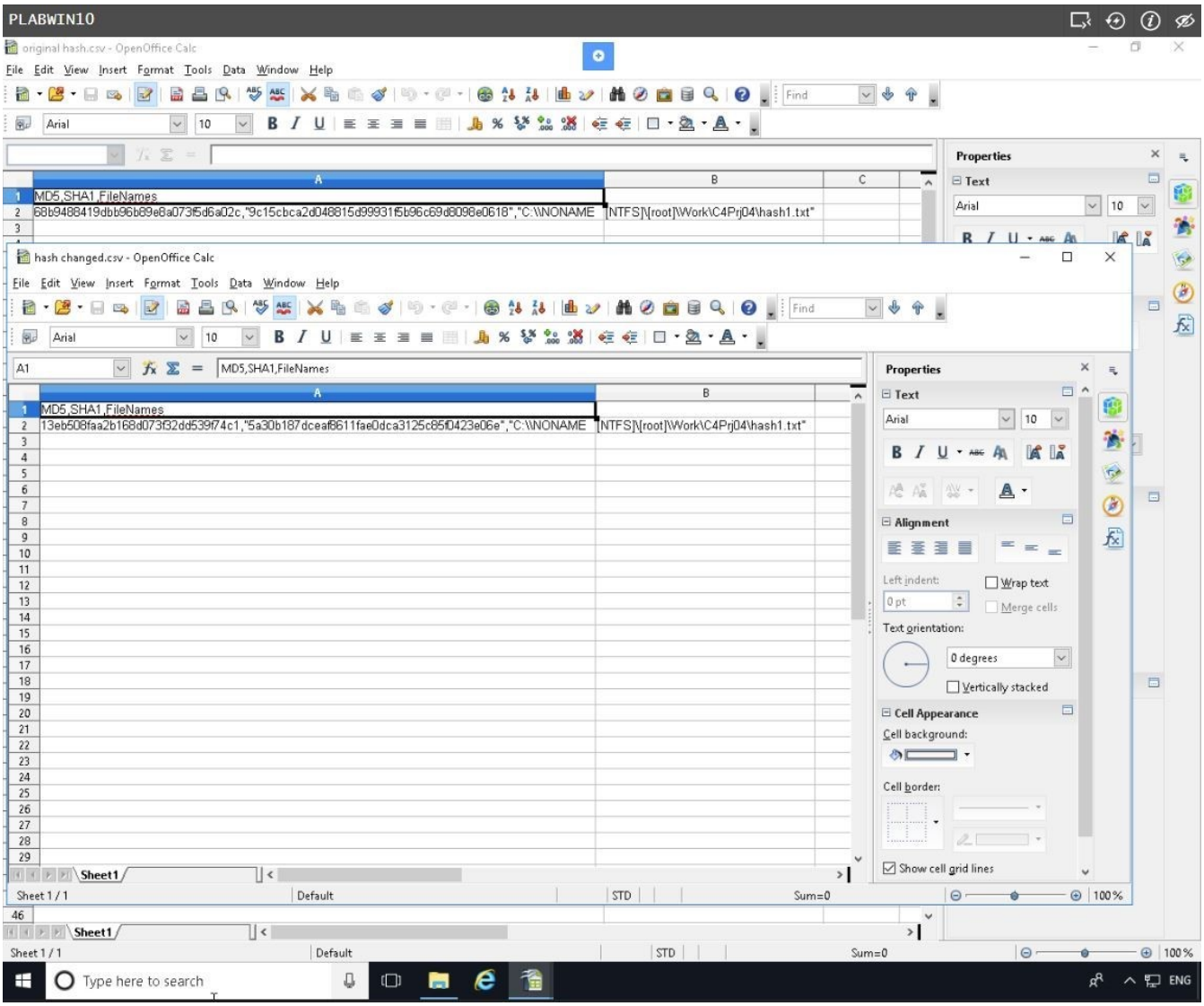
Step 22

Open the **original hash** and **changed hash** files on your USB E: drive using **OpenOffice Calc** (or another spreadsheet program).

On the **Text Import - [filename.csv]** dialog box, click **OK**.

Compare the hash values in both files to see whether they are different, and then exit **OpenOffice Calc**.

Exit **OpenOffice Calc** when finished.



Leave the devices you have powered on in their current state and proceed to the next exercise.

Hands-On Project 4-5

In this project, you create a file on your USB E: drive and calculate its hash values in FTK Imager. Then you change the filename and extension and calculate the hash values again to compare them. You will use the PLABWIN10 computer and the USB E: drive.

Step 1

Create a folder called **C4Prj05** on your **USB E:** drive, and then start **Notepad**.

Step 2

In a new text file, type:

```
This project shows that the file, not the filename,
has to change for the hash value to change.
```

Step 3

Click **File**, **Save As** from the menu, and save the file as **testhash** in the **C4Prj05** folder on your **USB E:** drive. Exit **Notepad** and start **FTK Imager** (clicking **Yes** in the UAC message box, if necessary).

Step 4

Click **File**, **Add Evidence Item** from the menu. In the **Select Source** dialog box, click the **Logical Drive** option button, and then click **Next**.

Step 5

In the **Select Drive** dialog box, click the **Source Drive Selection** list arrow, click to select your **USB E:** drive, and then click **Finish**.

Step 6

In the upper-left pane, click to expand your E**:\ > USB [NTFS] > root** drive and continue expanding until you can click the **C4Prj05** folder. In the upper-right pane, you should see the **testhash** file you created.

Step 7

Right-click **testhash** file and click **Export File Hash List**. Save the file as **original hash value** in the **C4Prj05** folder on your **USB E:** drive. FTK Imager saves it as a .csv file.

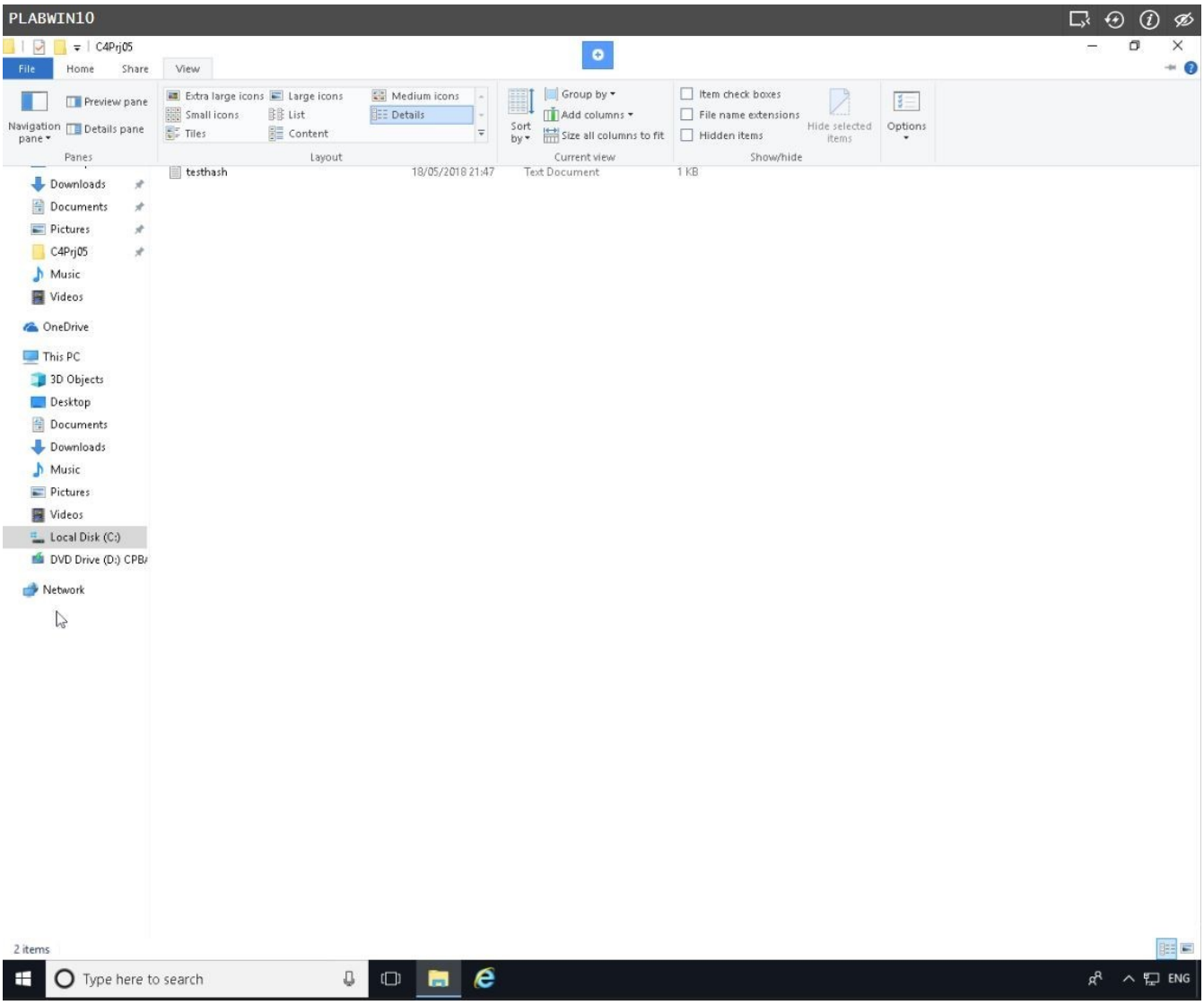
Step 8

Click to select your **E:** drive in the upper-left pane, if necessary, and then click **File**, **Remove Evidence Item** from the menu. Exit **FTK Imager**.

Step 9

Open **File Explorer**. Click **View** menu.

On the ribbon that appears, click **Options** then select **Change folder and search options**.



Step 10

On the **Folder Options** dialog box, click **View** tab.

Under **View** tab in the **Advanced settings** section, clear **Hide extensions for known file types** checkbox.

Click **OK**. Close **File Explorer** window.

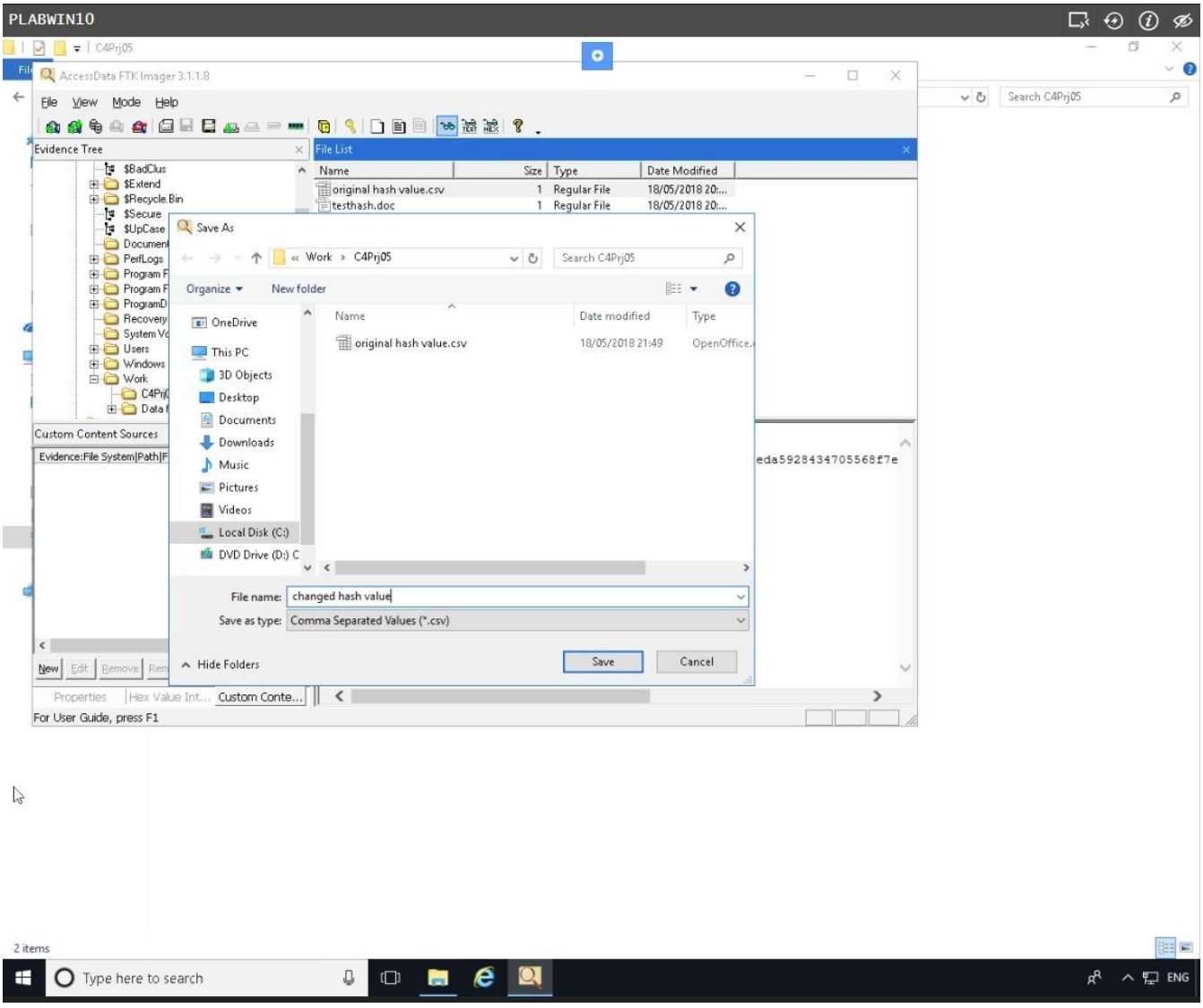
Step 11

Navigate to **USB (E:) > C4Prj05** folder.

Right-click the **testhash.txt** file on your **USB E:** drive and rename it as **testhash.doc**. In the warning message about the change in extension, click **Yes**.

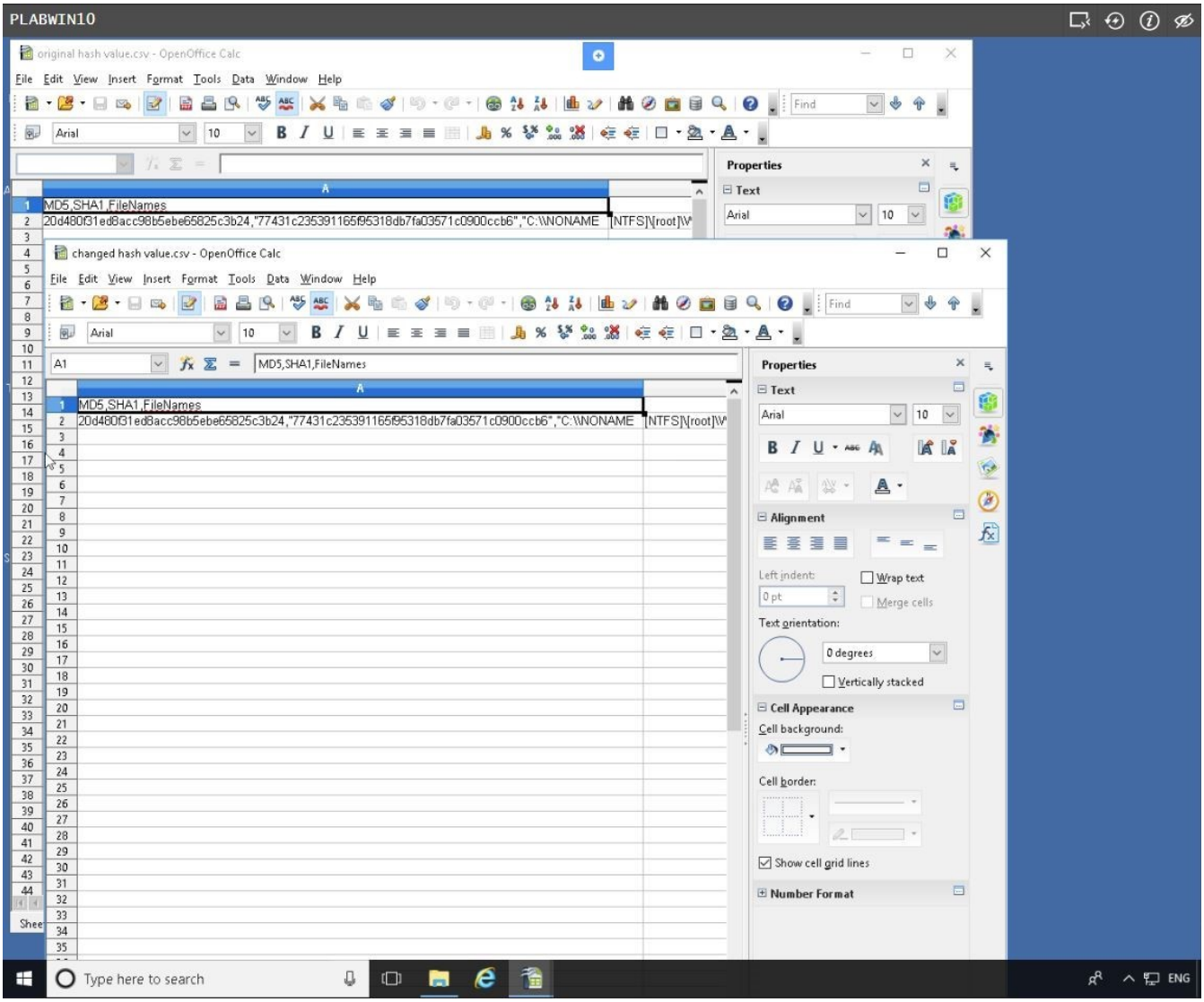
Step 12

Start **FTK Imager**. Follow Steps 4 to 8, but this time when you export the file hash list, save the file as **changed hash value**. Exit **FTK Imager**.



Step 13

Open **original hash value** and **changed hash value** in **OpenOffice Calc** (or another spreadsheet program). Compare the hash values in both files to see whether they are different, and then exit **OpenOffice Calc**.



Summary

- Digital evidence is anything stored or transmitted on electronic or optical media. It’s extremely fragile and easily altered.

- In the private sector, an incident scene is often a place of work, such as a contained office or manufacturing area. Because everything from the computers used to violate a company policy to the surrounding facility is under a controlled authority, investigating and controlling the scene are easier than at a crime scene.
- Companies should publish policies stating that they reserve the right to inspect digital assets at will; otherwise, employees' expectation of privacy prevents an employer from legally conducting an intrusive investigation or covert surveillance. A well-defined company policy states that an employer has the right to examine, inspect, or access any company-owned digital asset.
- Approved procedures must be followed, even in private-sector investigations, because civil cases can easily become criminal cases. If an internal corporate case is turned over to law enforcement because of criminal activity, the corporate investigator must avoid becoming an agent of law enforcement.
- Criminal cases require a correctly executed and well-defined search warrant. A specific crime and location must be spelled out in the warrant. For all criminal investigations in the United States, the Fourth Amendment specifies that a law enforcement officer can search for and seize criminal evidence only with probable cause, which is facts or circumstances that lead a reasonable person to believe a crime has been committed or is about to be committed.
- The plain view doctrine applies when investigators find evidentiary items that aren't specified in a warrant or under probable cause.
- When preparing for a case, describe the nature of the case, identify the type of OS, determine whether you can seize the computer or digital device, and obtain a description of the location.

- If you deal with situations involving hazardous materials often, you might need to get HAZMAT certification or have someone else with this certification collect the evidence.
- Always take pictures or use a video camera to document the scene. Prevent professional curiosity from contaminating evidence by limiting who enters the scene.
- As you collect digital evidence, guard against physically destroying or contaminating it.
- Take precautions to prevent static electricity discharge to electronic devices. If possible, bag or box digital evidence and any hardware you collect from the scene. As you collect hardware, sketch the equipment, including exact markings of where components are located. Tag and number each cable, port, and other connection and record its number and description in a log.
- Selecting a medium for storing digital evidence usually depends on how long you need to keep the evidence. The ideal storage media are CDs, DVD-Rs, DVD-RWs, or offsite storage. You can also use magnetic tape, such as 4-mm DAT and DLT magnetic tapes.
- Forensic hash values are used to verify that data or storage media haven't been altered.
- The two most common hashing algorithms for forensics purposes are currently MD5 and SHA-1. A forensic hash can't be predicted, each file produces a unique hash value, and if the file changes, the hash value must change.
- To analyze digital forensics data, learn to use more than one vendor tool. Vendors offer different methods for recovering data from digital media.
- You must handle all evidence the same way every time you handle it. Apply the same security and accountability controls for evidence in a civil lawsuit

as for evidence from a crime scene to comply with state or federal rules of evidence.

- After you determine that an incident scene has digital data or devices, identify the information or artifacts that can be used as evidence. Next, catalog or document the evidence you find. Your goal is to preserve evidence integrity, which means you must not modify the evidence as you collect and catalog it. An incident scene should be photographed and sketched, and then each item labeled and put in an evidence bag. Collect, preserve, document, analyze, identify, and organize the evidence. Then rebuild evidence or repeat a situation to verify that you get the same results every time.