



Autopsy and iPhone Forensics

Cybersecurity
Digital Forensics Day 2



Class Objectives

By the end of class, you will be able to:




Identify the methods used in smartphone forensics investigations.



Navigate the database and file structure of an iPhone's flash drive.



Locate identifiable evidence on an iPhone in order to establish ownership.



Use Autopsy to view and tag evidence in an iPhone image.




Extract image content for offline viewing in other applications.

In the previous class, we covered the basic principles of digital forensic methodologies and used Autopsy to preserve and document evidence.



Today, we will hone in on mobile forensics and continue the National Gallery investigation, using Autopsy to view and tag evidence from an iPhone image.





Where's the Data?

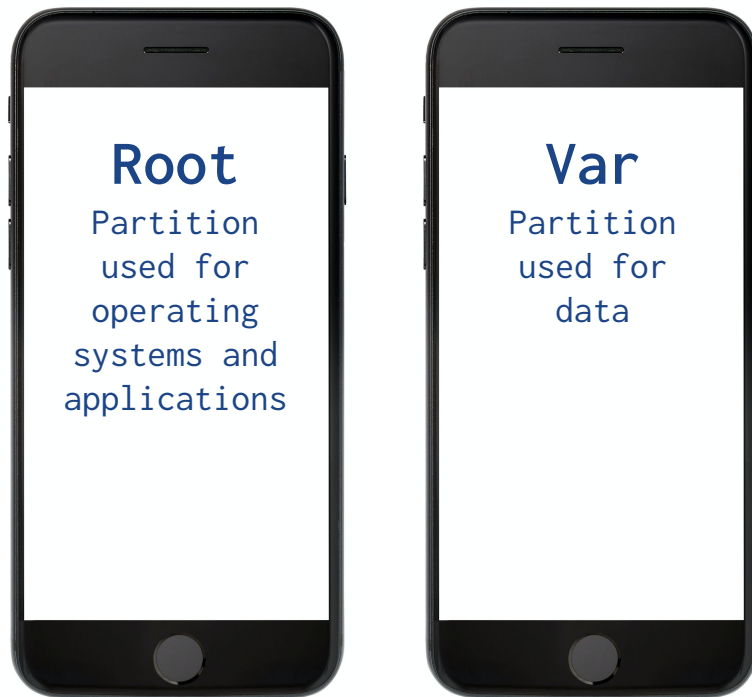
File Systems and Data Storage

Where's the Data? File Systems and Data Storage

It's important to know where data is stored, how to access it, and how to recover it.

iPhones use **flash memory**.

Flash memory contains two disk partitions:



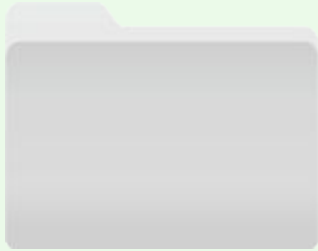
REMEMBER

Data is first imaged using a **bit-level copy**.

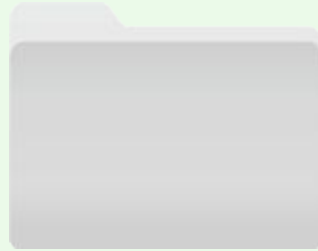
iPhone texts, GPS coordinates, and cell tower locations can all be recovered.

Important Directories, Databases, and Files

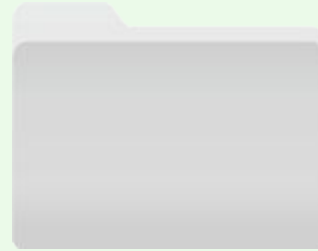
The following directories are worth investigating for evidence:



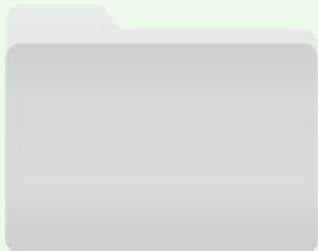
`/mobile`



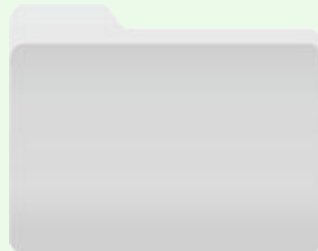
`/Applications`



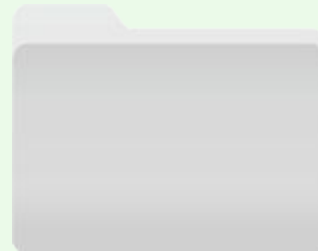
`/Library`



`/root`



`/Logs`



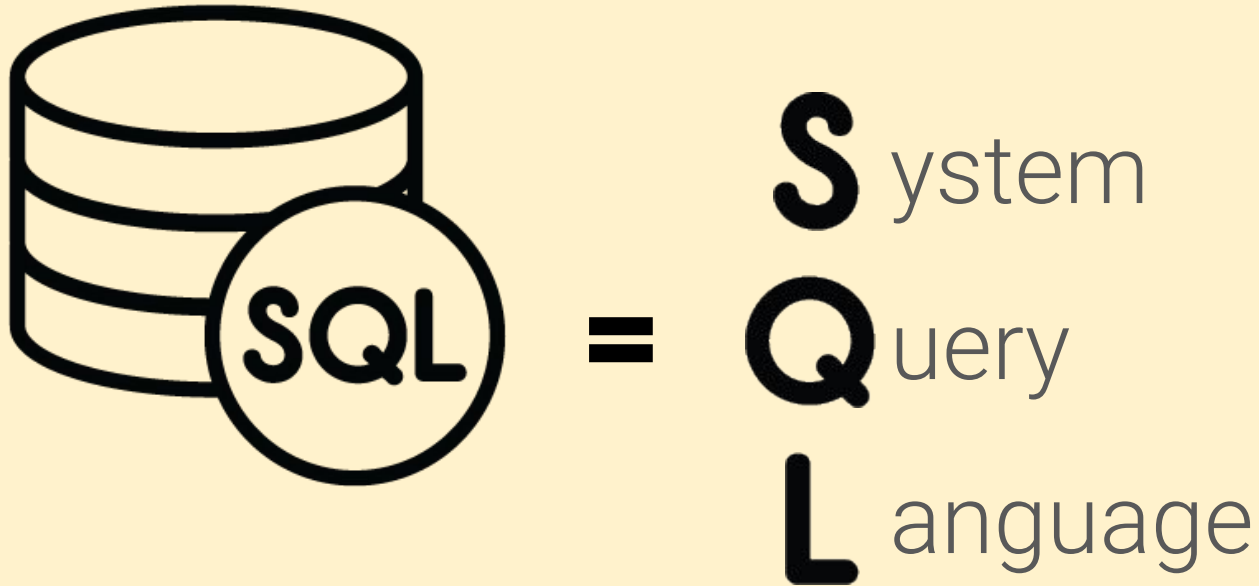
`/logs`



iPhone users store data in
SQL databases and other files.

Important Directories, Databases, and Files

SQL (System Query Language) is a programming language used to read, write, and update database files.



Important Directories, Databases, and Files

NAME	CONTENTS
AddressBook.sqlitedb	Contact info, personal data like name, email address, etc.
AddressBookImages.sqlitedb	Images associated with saved contacts.
Calendar.sqlitedb	Calendar details and events information.
CallHistory.db	Call logs including phone numbers and timestamps.
sms.db	Text and multimedia messages along with timestamps.
voicemail.db	Voicemail messages.
Safari/Bookmarks	Saved URL addresses.
Envelope Index	Email addresses on phone.
consolidated.db	GPS tracking data.
locationd	Google coordinates of locations.

Important Directories, Databases, and Files

iPhone also has data stored in Property Lists (`plist`s).



`plist`s store configuration information, call history, and cache information.



`Maps/History.plist` tracks location searches.



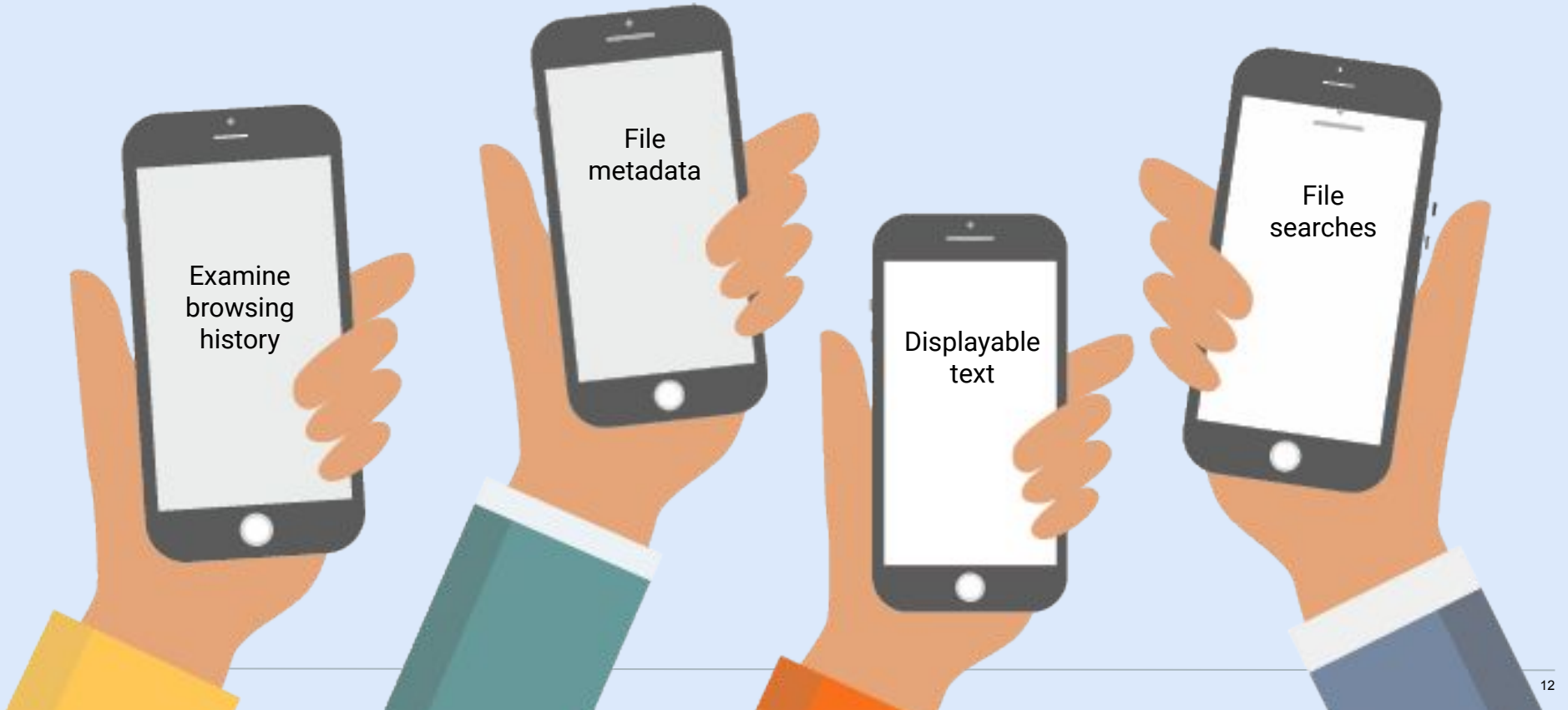
`Map/Bookmarks.plist` contains bookmarks.



`Safari/History` contains internet browsing history.

Demo Introduction

In this demonstration, we will walk through various ways to obtain evidence.





Instructor Demonstration

Evidence Analysis with Autopsy



Activity: Mobile Evidence Analysis

In this activity, you will analyze evidence and document the details of Tracy's iPhone.

Suggested Time:
50 Minutes





Time's Up! Let's Review.

A close-up, high-angle shot of a computer keyboard. The central focus is a large, white, rectangular key with rounded corners. On this key, there is a dark blue icon of a coffee cup with three wavy lines above it representing steam. Below the icon, the word "Break" is printed in a dark blue, serif font. The key is set against a light-colored, textured keyboard surface. Surrounding the main key are other keys, including one with a double quote symbol to the left and one with a dash/slash symbol to the right, all slightly out of focus.

Break

Tagging Evidence

Tagging Evidence

We can use Autopsy to tag evidence.



Evidence tagging is the process of bookmarking evidence to keep critical details organized and easily accessible.



Autopsy includes an evidence-tagging feature that allows investigators to easily locate evidence contained in the program.

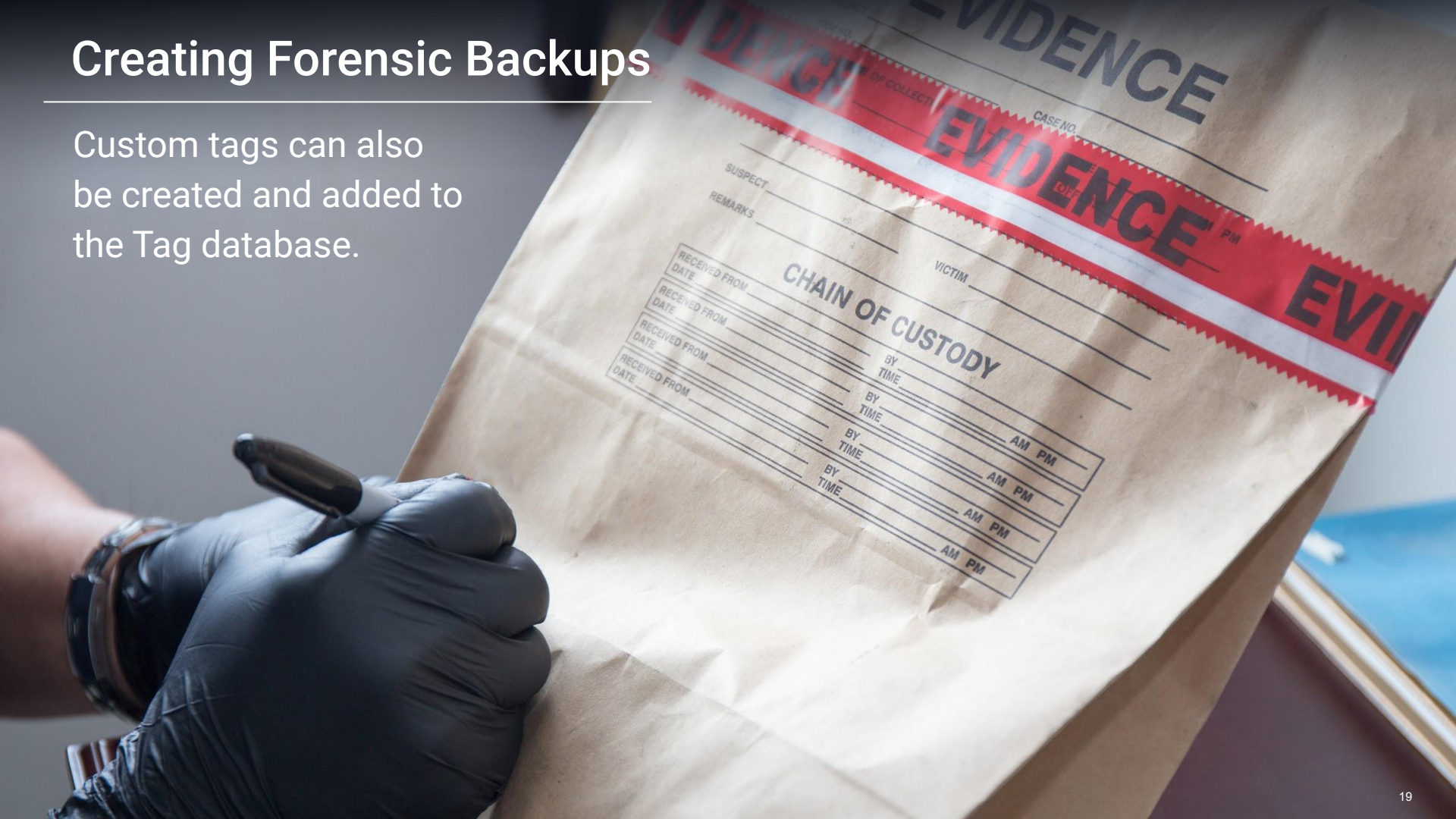


Pre-defined tags include:

- Follow Up
- Notable Item
- Child Exploitation
- Uncategorized
- Non-Pertinent

Creating Forensic Backups

Custom tags can also be created and added to the Tag database.





In the following walkthrough, we'll tag and bookmark the SMS database, which contains sent and received iPhone messages.



Activity: Tagging Evidence

In this activity, you will tag the major databases and files in the iPhone image file.

Suggested Time:
50 Minutes






Time's Up! Let's Review.

Extracting Data for Offline Analysis




Offline viewing refers to the process of viewing files outside of the main program, in this case, Autopsy.


Sometimes investigators use other applications for further offline analysis. This is because:



Not all data types can be rendered in Autopsy.



Other tools can analyze video, photo, and audio files in more depth. E.g., photos may need to be enlarged, audio may need voice recognition, and video may need to be enhanced for facial recognition.



Database information can easily be transferred to spreadsheets or word documents where it can be manipulated into reports.





In the following
walkthrough, we'll extract
files and directories for
offline viewing.



Instructor Demonstration

Offline File Extraction



Activity: Extracting Data for Offline Analysis

In this activity, you will export files for offline examination.

Suggested Time:
20 Minutes





Time's Up! Let's Review.

Wrap-Up

As a forensic investigator, you will work with a team as part of a large collaborative effort.

It's critical to understand how to use tools such as Autopsy and how to export data, allowing other team members to perform offline analysis of evidence.



Wrap-Up

Tagging helps categorize and label evidence that has already been screened.

This eliminates double work and helps other investigative team members continue your work if you become unavailable.

EVIDENCE

Agency _____

Item No. _____ Case No. _____

Date of Collection _____ Time of Collection _____

Collected By _____

Description of Evidence _____

Location of Collection _____

Type of Offense _____

Victim _____

Suspect _____

CHAIN OF CUSTODY

Received From _____ By _____

Date _____ Time _____

Received From _____ By _____

Date _____ Time _____

Received From _____ By _____

Date _____ Time _____

EVIDENCE



Next class, we will continue our investigation by analyzing email messages, SMS messages, and web history, in order to tie Tracy to the case.



Questions?

*The
End*