

How Evolving Everyday Technology is Impacting Civil and Criminal Litigation

Hennepin County Law Library

September 15, 2023

John J. Carney, Esq.

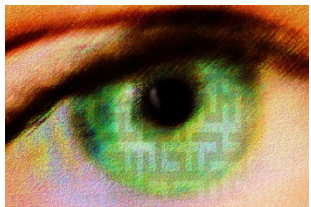
Carney Forensics



Integrated, Holistic Thinking

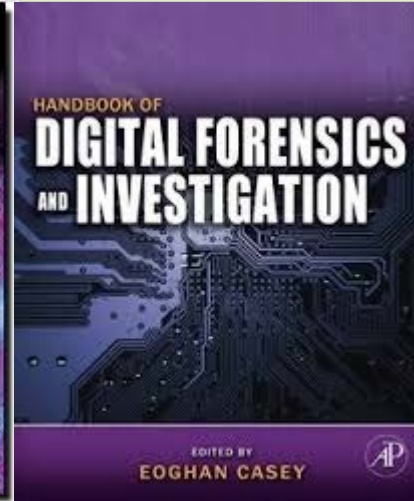
Buckminster Fuller

“Synergy is the only word in our language that means behavior of whole systems unpredicted by the separately observed behaviors of any of the system’s separate parts.”



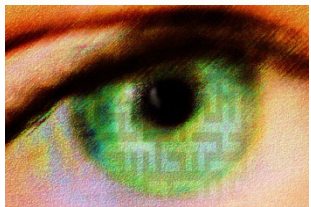
Integrated, Holistic Approach

Mobile
Computer
Cloud
Nav Sat
Cellular
Vehicle
Appliance
Wearable
Speaker

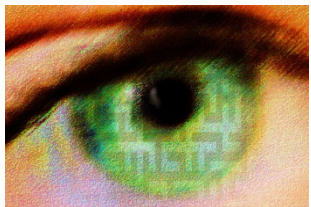
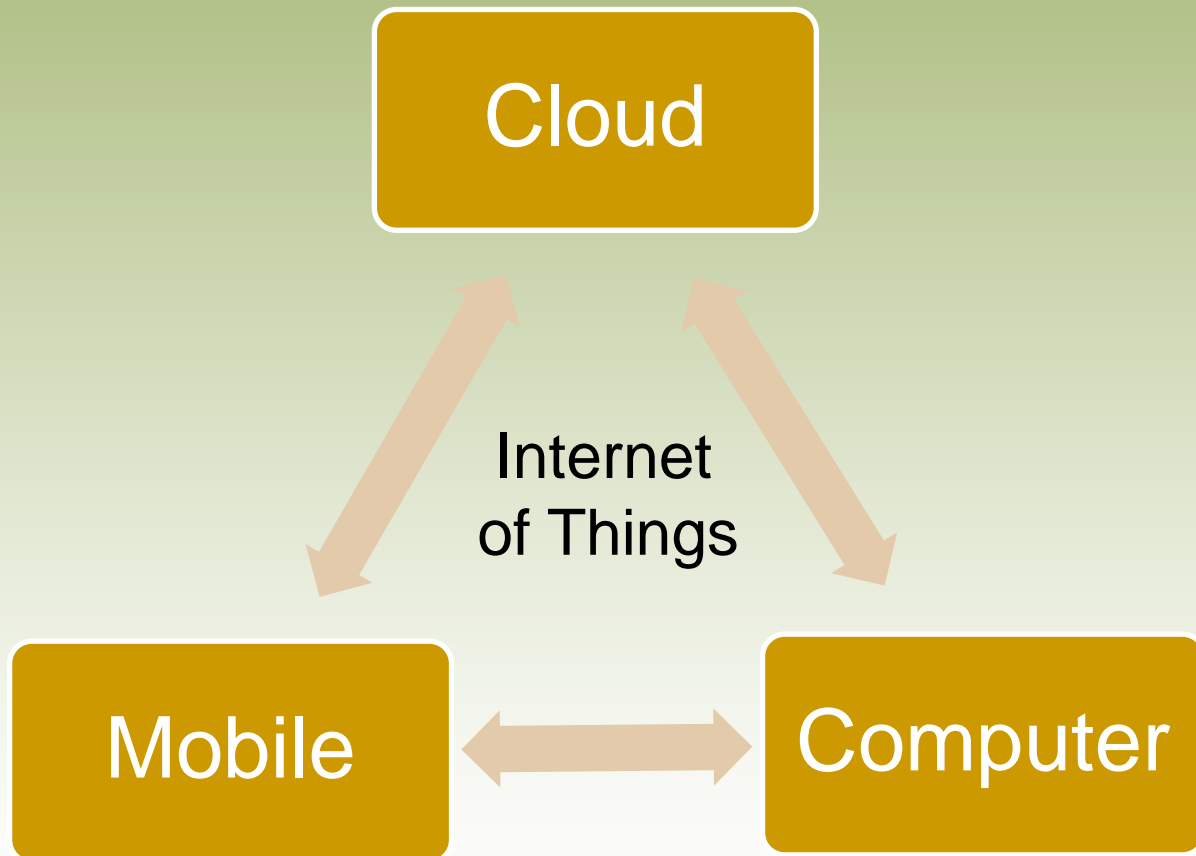


Chapter 20 – “Digital Evidence on Mobile Devices”
“Thinking Outside of the Device”

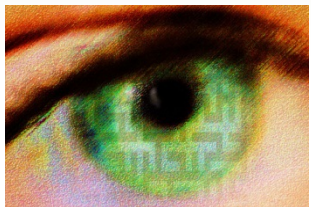
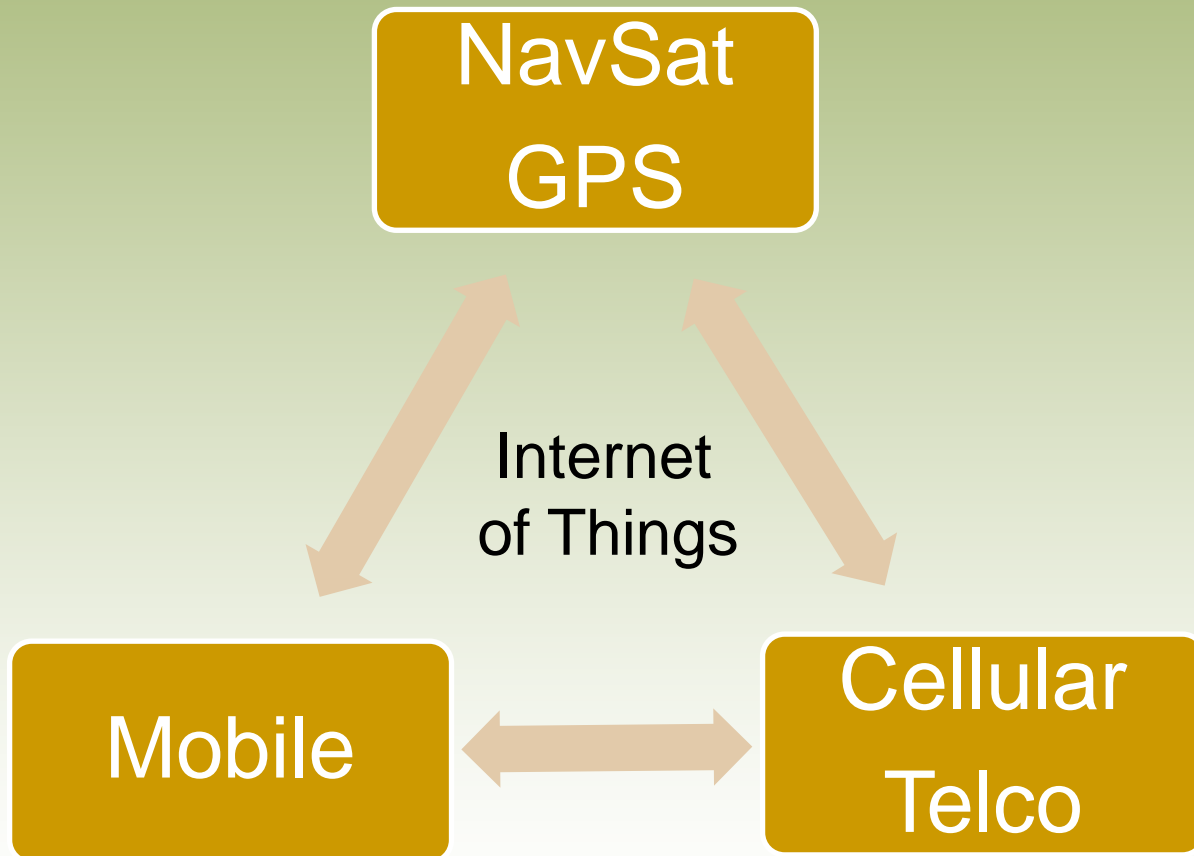
Criminal Cases
Civil Litigation
Investigations



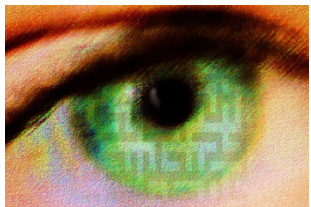
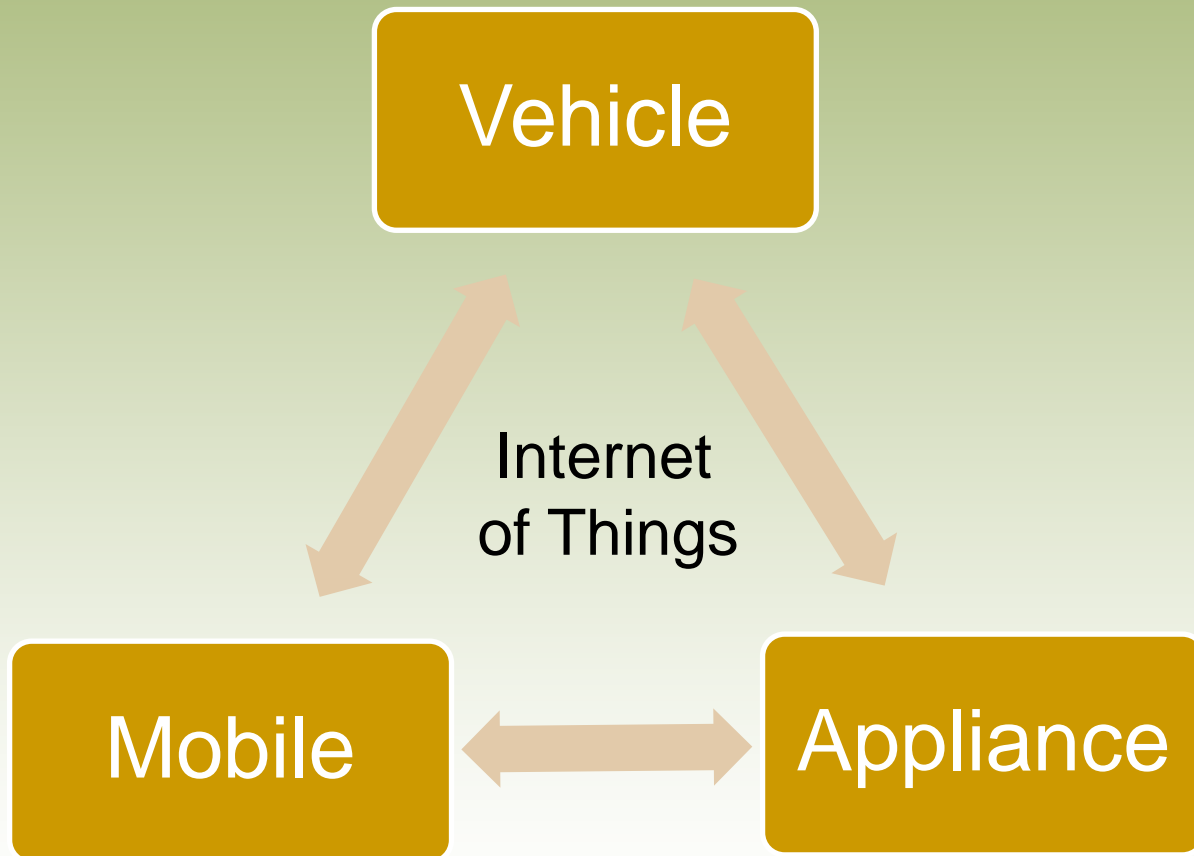
Forensics of Everything



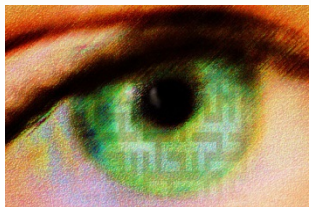
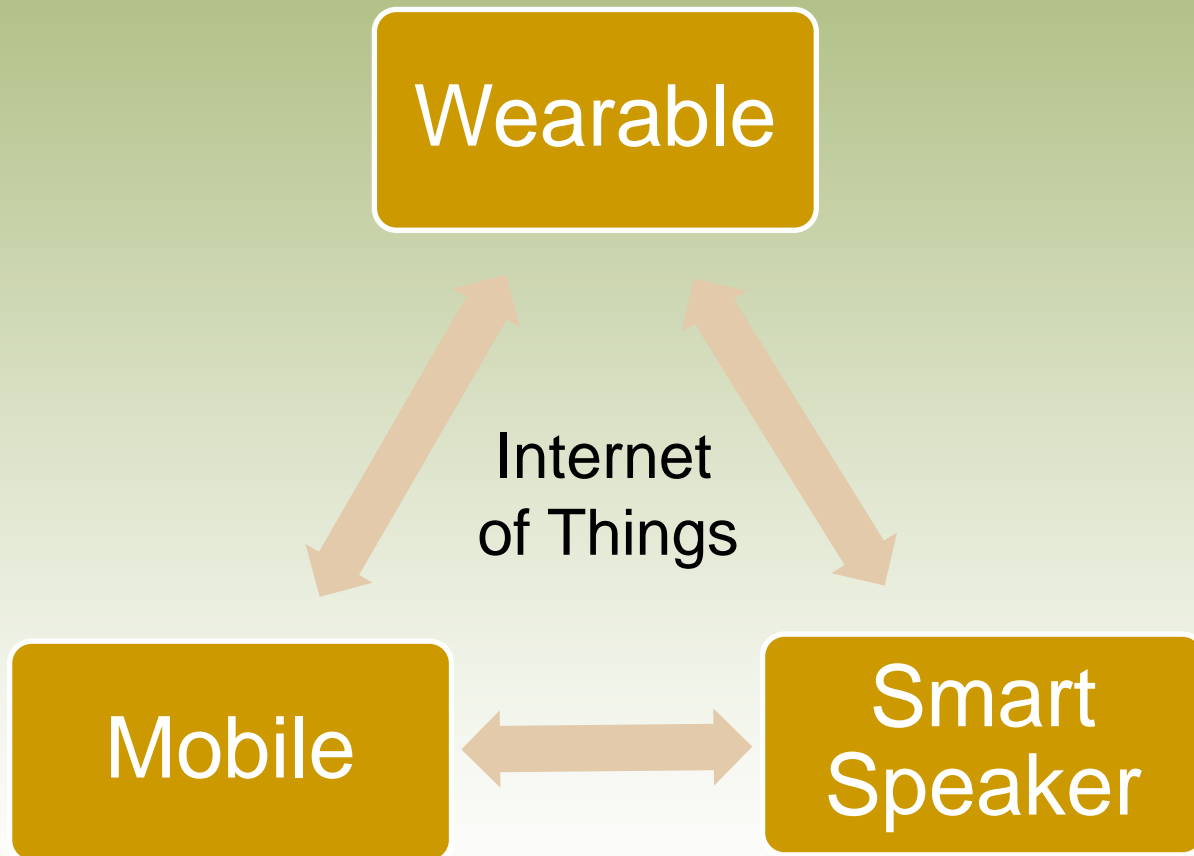
Forensics of Everything



Forensics of Everything



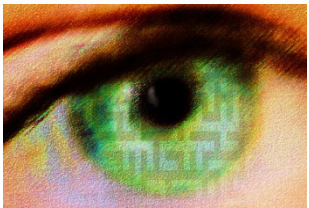
Forensics of Everything



Why Mobile Evidence?

“My day starts and stops with my phone. I am not my phone, but my phone is a **reflection of me**. It does a pretty good job of taking my life and folding it up into a nice little lightweight, pocket-sized summary. It's almost like I am holding a **copy of my brain** in my hands.”

Derek Smith, Louisville Med-School Student (as reported by CNN)

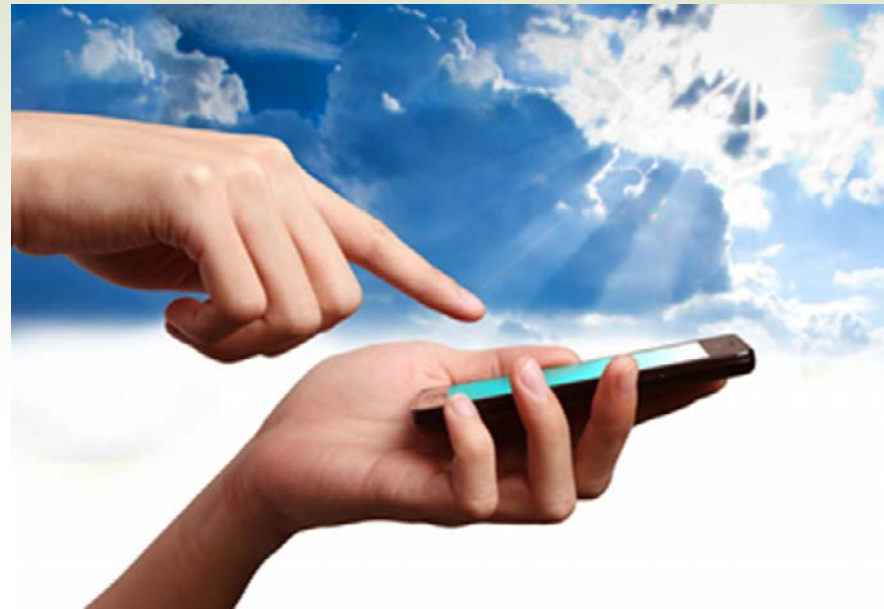
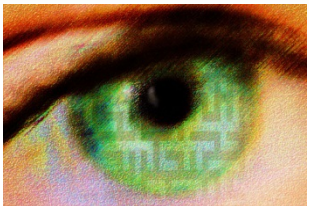


Why Mobile Evidence?

“We must stop kidding ourselves that handhelds don’t hold unique or discoverable information. Look up from your phones and tablets! *They are now the center of our digital lives.*”

Craig Ball, Esq.

Dem Phones, Dem Phones, Dem iPhones
Ball in Your Court



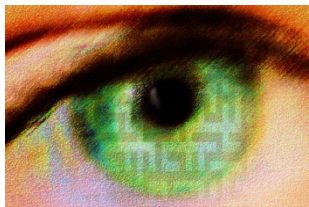
Why Mobile Evidence?

“Phones contain more probative evidence per byte of data than computer hard drives do.”

Gary C. Kessler, Ph.D.

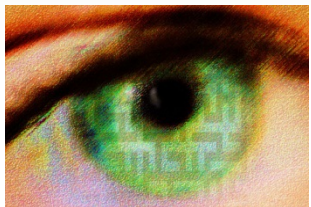
The Year Ahead for Mobile Forensics

Cellebrite's Panel Predictions for 2013



Everyday Technology 2023

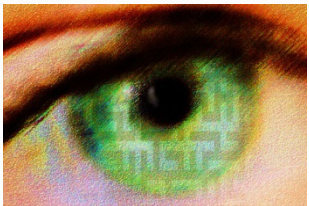
- Apple iPhones
- Androids like Google Pixel, Samsung Galaxy
- Burner Phones
- Tablets like Apple iPad, Microsoft Surface, Amazon Fire



- Older GPS Units (Garmin, Magellan)

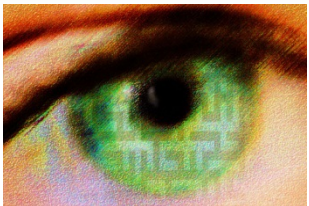
Everyday Technology 2023

- Laptops like Dell, Lenovo, Apple MacBook
- Desktops like Dell, Lenovo, Apple iMac
- Small Form Factors like Apple Mac Mini, Intel NUC
- Google Chromebooks (2022 Was the Year)
 - Low cost laptop replacement
 - Dominant @ K-12 and Colleges



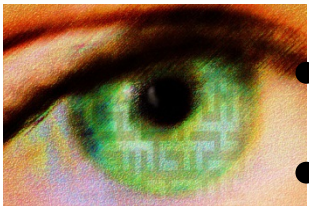
Everyday Technology 2023

- Fitness Trackers (Fitbit)
- Digital Watches (Apple, Garmin, Samsung)
- Smart Speakers (Alexa, Siri, Google Asst.)
- Internet of Things (Nest Thermostats)
- Door Bells (Amazon Ring, Nest Door Cam)
- Vehicles (Infotainment, Telematics)



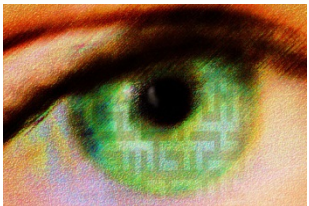
Speed of Technology Innovation

- Underlying Mobile Device Technology
 - Cell Phones
 - Fitness Trackers
 - Digital Watches
- Mobile Device Forensic Artifacts
 - Messaging
 - Activities
 - Device Locations
 - Photograph / Video
 - Browser / Search
 - Pattern of Life
- Artificial Intelligence / Machine Learning
 - Categorization of Messages and Photographs
 - Reverse Image Search



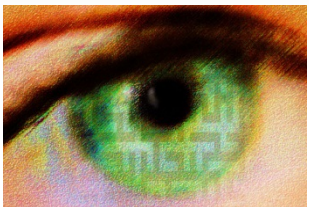
Probative Mobile Artifacts

- Messages and Chat go to communications
- Voice Calls and Mail go to communications
- Activity and Health go to motion, status, and proof of life
- Browsing & Search go to motive & intent
- Photos and Videos go to location and alibi
- Wi-Fi and Bluetooth go to location and alibi
- Device Locations go to alibi & vehicle path



“Pattern of Life” Mobile Artifacts

- Insights into digital behaviors and habits including normal routines in day to day life
 - Power On and Off, Battery Usage
 - Lock Screen and Device Orientation
 - Device Connections using Bluetooth and Wi-Fi to vehicles, watches, fitness trackers, etc.
 - Data Consumption from Wi-Fi and Cellular (4G LTE)
 - Screen Time and Digital Wellbeing Statistics



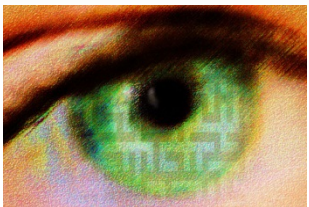
Probative A Must

- Most Probative Device Extraction / Image
- Key to Recovery of Deleted Evidence
- Key to Recovery of Fragments / Traces
- Key to Smoking Guns / Great Outcomes



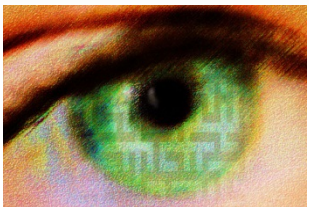
One Tool is Never Enough

- Digital Forensic Tools are Diversified
- Strengths / Weaknesses / Killer Apps
- Cross Validate to Know What to Produce



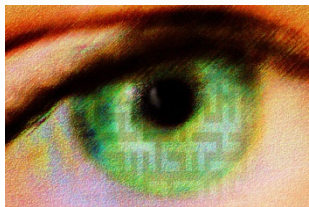
Plan B for Critical Devices

- Smartphone Wiped, Traded @ Verizon Store
- Smartphone is Damaged, Destroyed
- Hard Drive is Replaced, Repurposed, Crashed, or Destroyed
- Fitness Tracker is Damaged



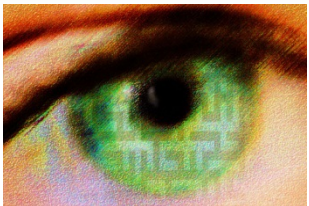
Apple iPhone Forensic Renaissance

- Examine new, probative, iOS full file system extractions
- Replace decades-old, limited iTunes backups
- Recover abundant, deleted evidence
- Recover new iPhone databases to expose “pattern of life” and other new evidence



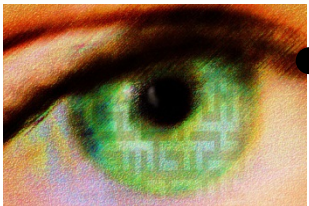
Android Smartphone Forensic Innovations

- Examine new, probative, physical and full file system extractions, instead of limited backups
- Recover, disable, or bypass Android passcodes
- Overcome encryption with new bootloaders
- Overcome security patch levels
- Analyze abundant, deleted evidence and new Android databases to expose new forms of evidence (pattern of life, digital wellbeing, etc.)



Low-Cost Android Burner Smartphones

- Unmarked, Android burners
- Mobile ID tools for make and model
- Or, call Verizon store, Metro PCS, etc.
- Supported phone lists for recovery capabilities
- Bypass or disable forgotten passcodes
- Obtain physical or full file system extractions
- Analyze live and deleted exculpatory evidence



Wearables

Technology Cycles Have Tended to Last Ten Years

Mainframe
Computing
1960s

Mini
Computing
1970s

Personal
Computing
1980s

Desktop Internet
Computing
1990s

Mobile Internet
Computing
2000s

Wearable /
Everywhere
Computing
2014+



Others?

Wearable / Fitness Apps

endomondo



Wearables – Digital Watches

- Limited to no support for some models using mobile device forensic tools
- Access Apple watch evidence synced through to to paired iPhone
- Perform “live” extractions of watches
- Use digital watch vendor software tools like Garmin’s Basecamp to recover GPS and date/time stamp evidence



Wearables: Fitbit Forensics

- Activity Tracker over 10 Million Users
- Access Online with Forensic Collection or Examine Mobile App Paired to Tracker
- Personal Activity Metrics
 - Walk, Run, Swim, Sleep
 - Date & Time Stamps, Distance, Duration
 - Steps, Speed, Pace,
- Locations
 - Position
 - Journeys
 - Date & Time Stamps



Wearables: Fitbit Forensics

Fitbit Dashboard Heart Rate



Wearables: Fitbit Forensics

Fitbit Dashboard Steps



Wearables: Fitbit Forensics

Fitbit Activity Log

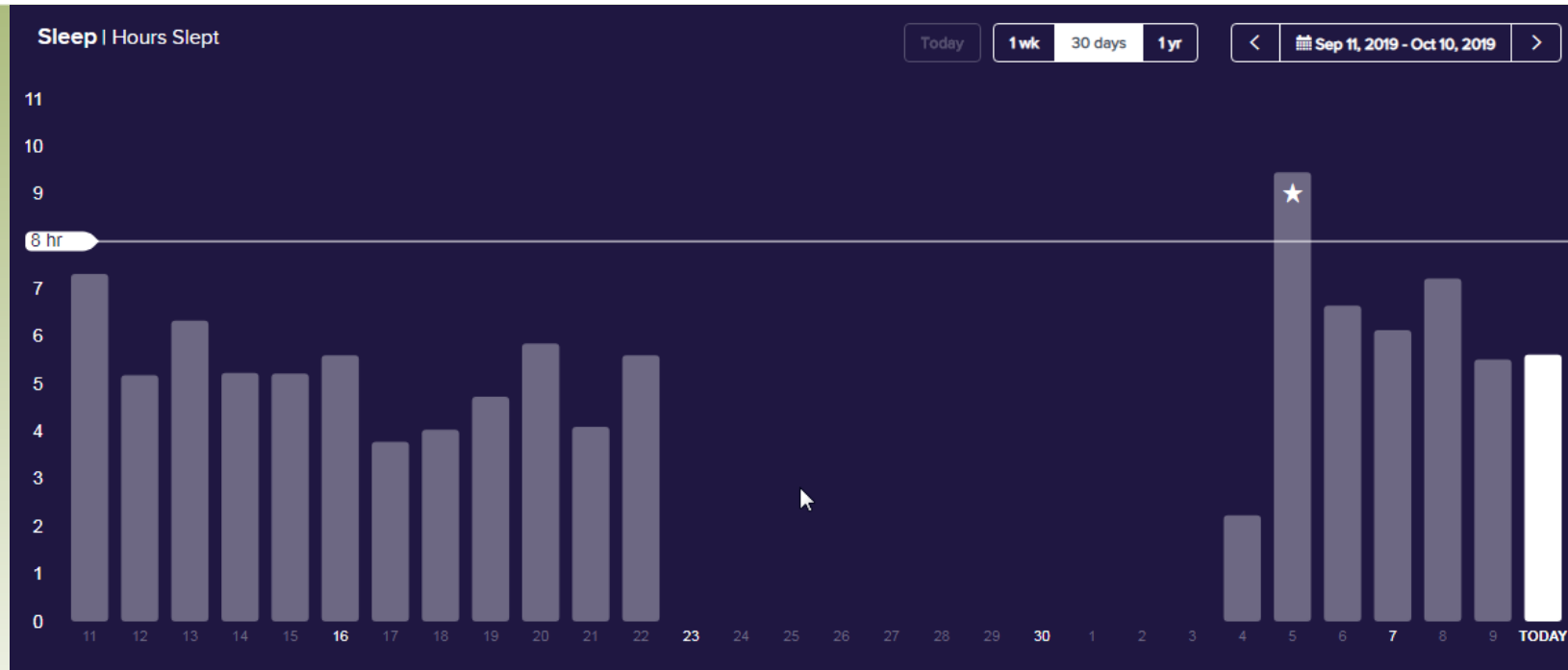


Activity History

Date	Activity	Steps	Distance	Duration	Calories	
Oct 8, 5:54PM	Outdoor Bike	N/A	N/A	26:27	240 cal	View Details
Sep 22, 10:58AM	Walk	1,631	N/A	17:04	136 cal	View Details
Sep 18, 6:18PM	Outdoor Bike	N/A	N/A	54:37	530 cal	View Details
Sep 10, 10:02PM	Outdoor Bike	N/A	N/A	26:27	92 cal	View Details
Aug 18, 4:13PM	Outdoor Bike	N/A	N/A	15:22	90 cal	View Details
Aug 18, 3:35PM	Outdoor Bike	N/A	N/A	18:46	102 cal	View Details
Aug 17, 8:33AM	Walk	2,063	N/A	30:43	259 cal	View Details
Jul 29, 6:42PM	Sport	2,039	N/A	43:31	416 cal	View Details
Jul 27, 10:24AM	Sport	1,386	N/A	24:45	239 cal	View Details

Wearables: Fitbit Forensics

Fitbit Sleep Log



This Week		6 hrs 7 mins avg
Today	Thu 12 am - Thu 6 am	5 hrs 37 mins
Wed	Wed 12 am - Wed 6 am	5 hrs 31 mins
Tue	Mon 11 pm - Tue 7 am	7 hrs 13 mins
Mon	Sun 11 pm - Mon 5 am	6 hrs 8 mins
Week of Sep 30th		6 hrs 7 mins avg
10/06/2019	Sun 3 am - Sun 6 am	3 hrs 14 mins
10/06/2019	Sat 10 pm - Sun 1 am	3 hrs 25 mins
10/05/2019	Fri 11 pm - Sat 9 am	9 hrs 27 mins



Log Sleep

SLEEP START


SLEEP END


Wearables: Fitbit Forensics


DEVICES
View All Your Devices


 Charge 2
View Device Settings 


SETTINGS


 Personal Info


 Notifications

 Privacy

 Data Export

 Manage Account Access

 Applications

 Help

[Logout](#)

Your Fitbit Data

Export your Fitbit data in Microsoft Excel or CSV format, which can be opened in any spreadsheet application.

Time Period

You can export up to 31 days of data.

- This Week
- This Month
- Last Week
- Last Month
- Custom

Include Data

- Body
- Foods
- Activities
- Sleep

File Format

Microsoft Excel

Download

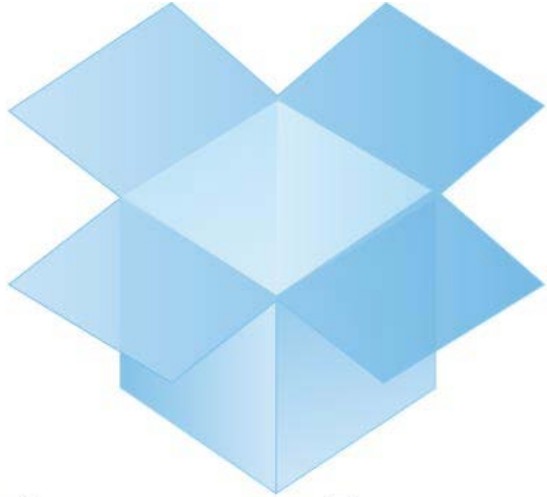
Fitbit Data Export

Export Your Account Archive

Export your Fitbit data for the lifetime of your account. This data includes your account profile, social posts, wellness programs, body and activity records, nutrition, and sleep. [Learn More](#)

You will receive a verification email to confirm export of your account data. After verification, most archives are available for download within 30 minutes. Please note that it could take several days to generate an archive if you have a large amount of data on Fitbit.

The Cloud



Dropbox



EVERNOTE



iCloud



OneDrive



Google Cloud

The Cloud

- Photographs / Videos
- Contacts
- Email / Documents
- Messages
- Activity / Health
- GPS Locations
- Phone Backups



Google Cloud



iCloud



iPhone Personal Navigation Apps

- Apple Maps
- Google Maps
- Waze – Social GPS
- Garmin USA
- Magellan RoadMate
- Navigon North America
- TomTom
- CoPilot Live
- MotionX GPS Drive
- MapQuest
- Scout by TeleNav
- Bing Maps



Android Personal Navigation Apps

- Google Maps
- Waze – Social GPS Maps
- Wisepilot
- Navigon North America
- CoPilot Live
- MapQuest
- Scout by TeleNav
- GPS Navigation by Sygic
- iGO My Way
- BackCountry Navigator
- MapFactor
- OsmAnd+ Maps & Navigation

Waze

- 48MM Users, +2x Y/Y
- 1B+ Miles Driven per Month w/ Waze Open

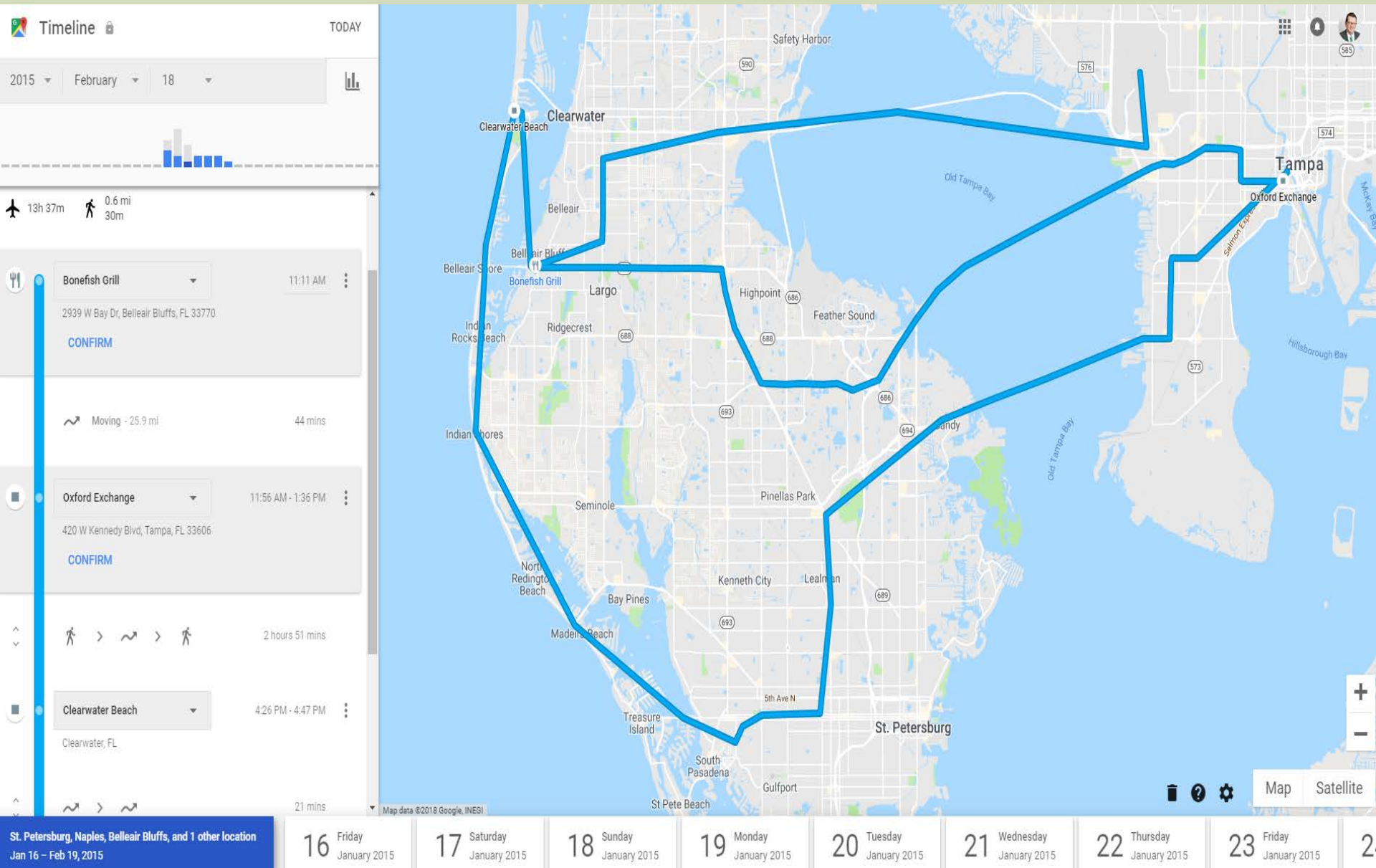


Examine Cloud for GPS Locations

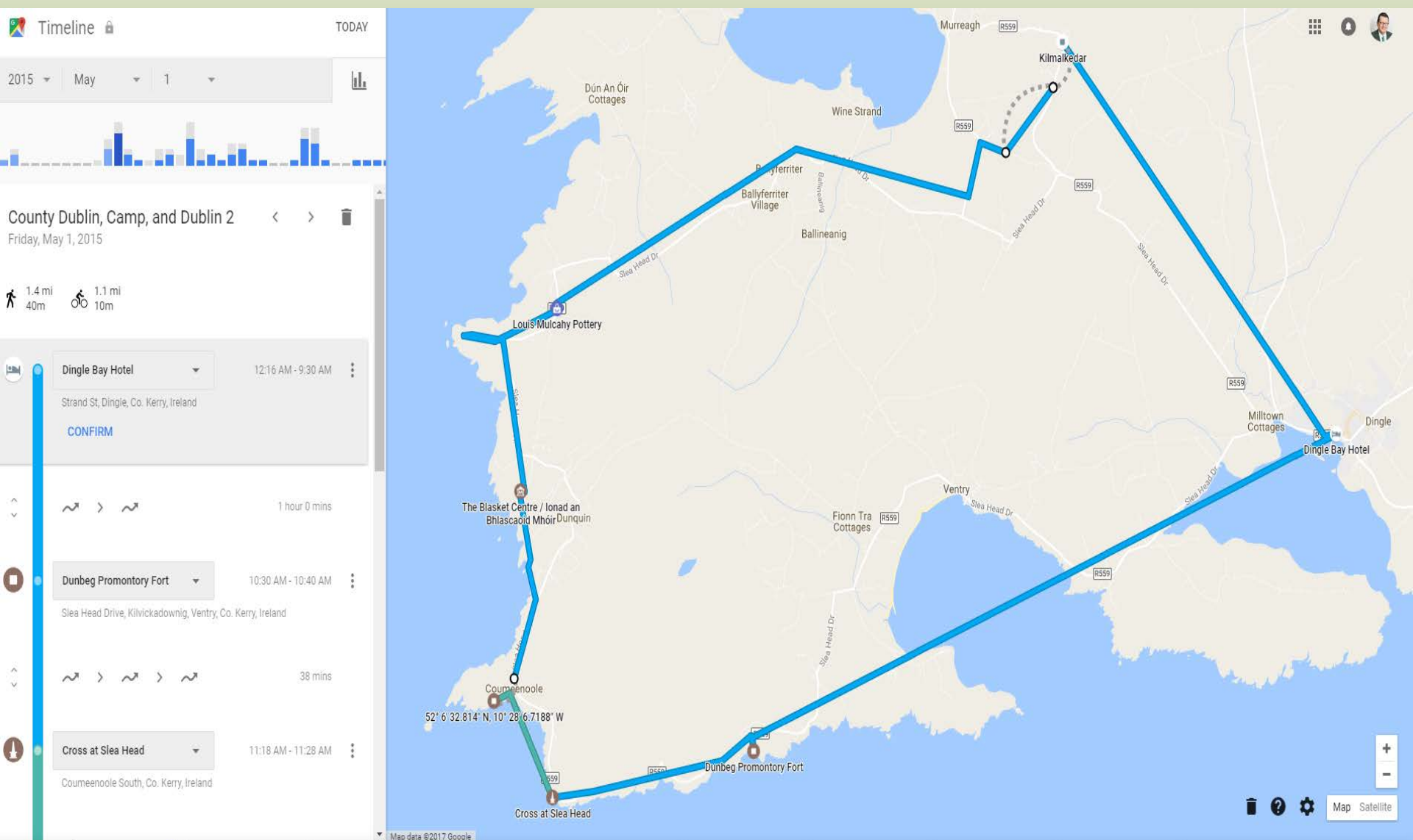
- Apple iCloud Photos and Photo Stream
 - GPS locations in photo EXIF data
- Google Timeline Tracked from Mobile Device (aka Google Location History)
 - Passive GPS locations tracked every few minutes for years
 - More GPS locations are sampled when moving
 - GPS location time stamps are precise to second
 - Google shows compelling GPS location maps



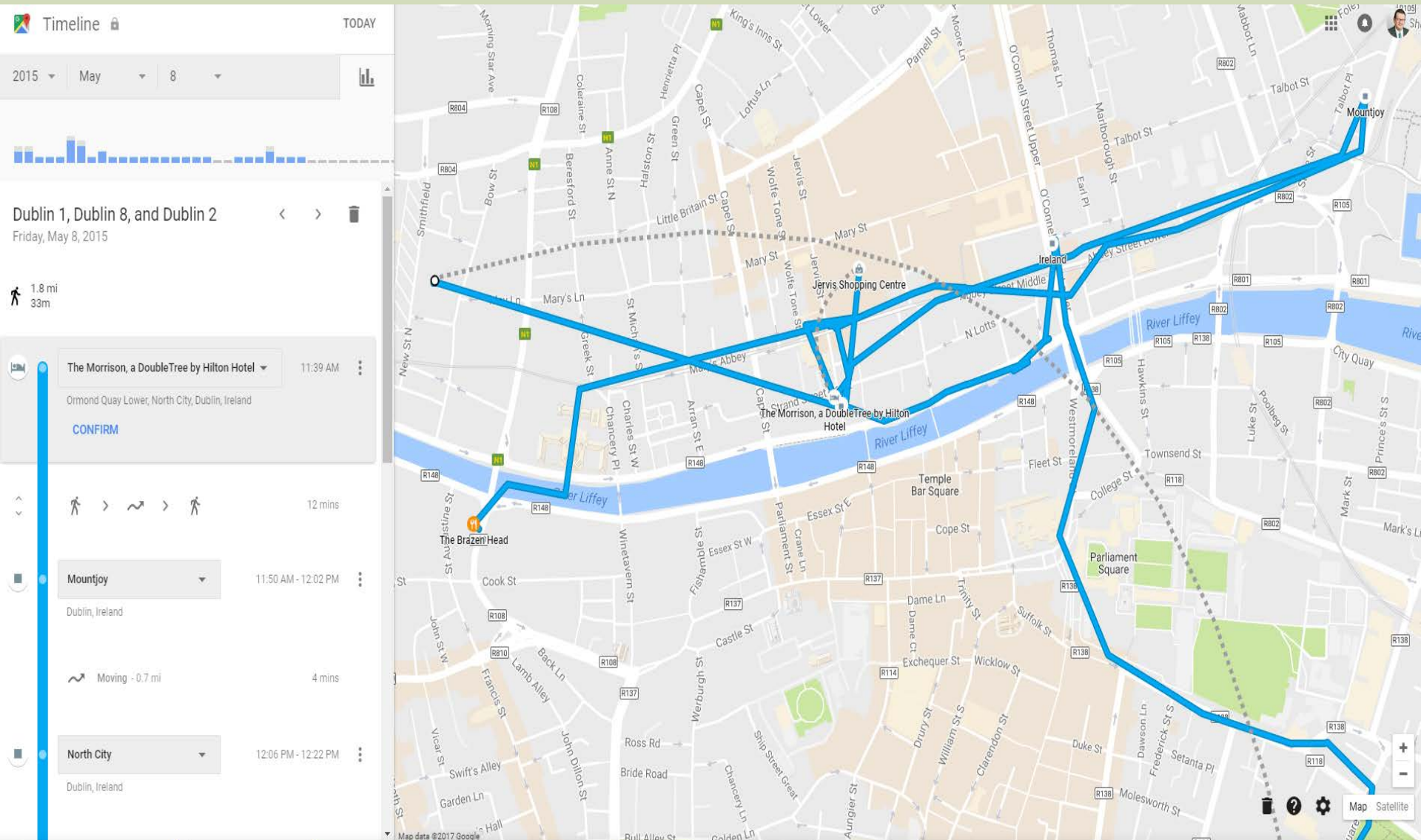
Google Timeline: Tampa Bay 2015



Google Location History: Ireland 2015



Google Location History: Ireland 2015



Dublin 1, Dublin 8, and Dublin 2
May 7 - 11, 2015

07 Thursday
May 2015

08 Friday
May 2015

09 Saturday
May 2015

10 Sunday
May 2015

11 Monday
May 2015

Beyond the Black Box



Beyond the Black Box

- Infotainment System

- Advanced technology in vehicle for user interaction
- Seamlessly & safely integrates access to digital life
- Facilitates voice & data communications while we travel



- Telematics System

- Embedded in vehicle
- Integration of telecommunications and information
- Connects infotainment system to
 - Vehicle's infrastructure (v2i)
 - Sensors that detect other vehicles on the road (v2v)

Recoverable Device Evidence

- Mobile Devices Connected to Vehicle

- Smart Phones
- Media Players
- USB Drives
- SD Cards
- Wireless Access Points



- Bluetooth Connections – when and where
- Wi-Fi Connections – “ “ “
- USB Connections – “ “ “
- SD Card Connections – “ “ “

Vehicle System Forensics

- Recoverable User Evidence

- Contact Lists (Phone Books)
- Text Messages
- Call Logs
- E-mails
- Photographs
- Movies / Videos
- Music / Audio
- Games
- Social Media Feeds
- Installed Apps



Recoverable Navigation Evidence

- Track Logs or Navigation History
- Track Points or GPS Locations
- Recent Destinations
- Favorite Locations or Waypoints
- Favorite Routes



“Your Car is Spying on You”

■ **“We had a Ford Explorer ... we pulled the system out, and we recovered 70 phones that had been connected to it. All of their call logs, their contacts and their SMS.”**

Berla iVe Founder and CEO, The Forensic Lunch podcast, 2015

■ **The kit can discover “when and where a vehicle’s lights are turned on, and which doors are opened and closed at specific locations.”**

Sam Biddle, The Intercept_, May 3, 2021



Vehicle System Forensics

- Recoverable Vehicle Evidence
 - Serial Number
 - Original VIN Number
- Recoverable Vehicle Event Evidence
 - Headlights On and Off
 - Doors Identified for Open and Close
 - Gear Changes for Park and Drive
 - Odometer Readings
 - Velocity Logs
 - GPS Time Synchs
 - System Reboots



Automotive Vehicle Support

- Over 5,200 Models Back to 2008
- Non-destructive Acquisition
- Acquire Evidence via Logical and Physical Extractions
- Recover Deleted Data
Using Three VSF Tools
- Map Geo-coded Data
- Search and Filter Data
- Revealing Reports for
Digital Forensic Investigations



Smart Speakers

Technology Cycles Have Tended to Last Ten Years

Mainframe
Computing
1960s



Mini
Computing
1970s



Personal
Computing
1980s



Desktop Internet
Computing
1990s



Mobile Internet
Computing
2000s



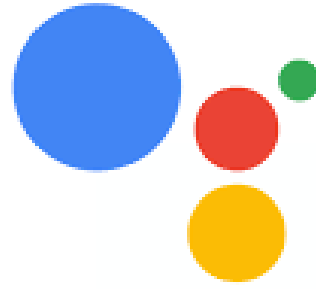
Wearable /
Everywhere
Computing
2014+



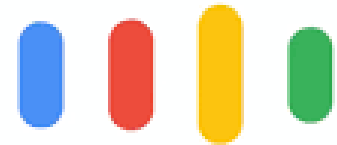
Others?

Smart Speaker Apps

amazon



Google



ASSISTANT

alexa



Cortana



Google Home

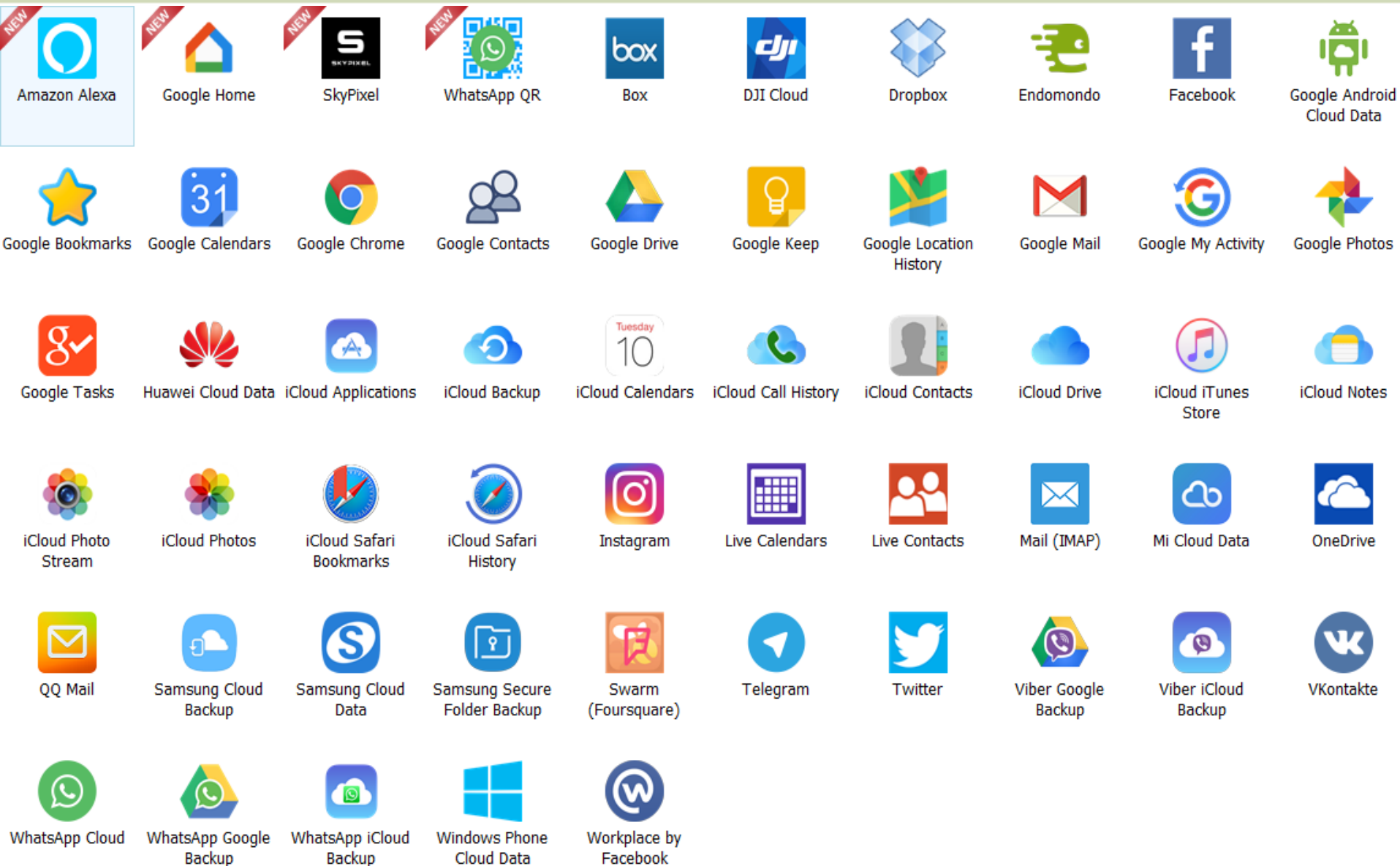


Smart Speaker: Amazon Alexa

- Tens of Millions of Echo Devices Sold
- Alexa Works w/ 20,000 Smart Home Devices
- Over 50,000 “Skills” Available for Integration
 - Thermostat, Fitbit, Pandora, TED Talks
 - Sleep Sounds, NY Times, Famous Quotes, UPS
- Alexa Data Stored in Primarily in Cloud
 - Echo Dot has only Wi-Fi Connections
 - Mobile Apps have Limited Data
 - What Evidence is Recoverable?



Smart Speaker: Amazon Alexa



Smart Speaker: Amazon Alexa










Services



Amazon Alexa -



Categories

-  Activity
-  Contacts
-  Messages
-  Voice records
-  Player history
-  Reminders and alarms
-  Skills
-  Lists
-  Other

Date range

1/ 1/2000



10/22/2018



Apply for all services

Smart Speaker: Amazon Alexa

Extraction finished!

Data is successfully extracted from the Cloud

Extraction ID: 0F6F7FB310FA4FEEBE816332A383DCF0

Account owner: John Carney

Cloud services



Amazon Alexa -



Extraction summary



Activity - 749



Contacts - 472



Messages - 1



Voice records - 748



Player history - 0



Reminders and alarms - 0



Skills - 13



Lists - 2



Other - 74

Exhibit – Facebook Messenger

Oxygen Forensic Suite 2012 Analyst

Main View Tools Service Help

All devices > Brooklyn maniac > Patrick Payge's Galaxy Mini - 12.01.2012 14:41:50 [355558040626556] > Messengers > Facebook Messenger

Search Export Print Show viewer Reset Filters Help

Object information

Facebook Messenger

Object details:
Source table: threads
Source File: threads_db
ID: 12
Remote Party: Madonna Stevens
Sender: Patrick Payge
Text: What about going to the cinema?
Source: mobile
Time stamp (UTC): 06.12.2011 13:00:47
Coordinates: 55.7549378075;37.64529469

Maps

Coordinates (55,7549378075;37,64529469)

Source files (3)
[prefs_db](#)
[threads_db](#)
[users_db](#)

Application files (17) User data (48)

ID	Remote Party	Sender	Text	Source	Time stamp (UTC)	Coordinates	Category
4	Alain Pascua	N/A	N/A	N/A	N/A	N/A	Account (1)
5	Alain Pascua	Patrick Payge	Hi alain	mobile	06.12.2011 12:39:50	N/A	Activity (4)
6	Alain Pascua	Patrick Payge	How are you?	mobile	06.12.2011 12:41:07	N/A	Contacts (12)
7	Alain Pascua	Patrick Payge	This is the view from my window	mobile	06.12.2011 12:43:09	55.7503175;37.6451264	Messages (31)
8	Madonna Stevens	N/A	N/A	N/A	N/A	N/A	
9	Madonna Stevens	Patrick Payge	What's up?	web	26.09.2011 6:04:28	N/A	
10	Madonna Stevens	Patrick Payge	Meet as usual	mobile	07.11.2011 11:25:04	N/A	
11	Madonna Stevens	Patrick Payge	How is your business?	mobile	06.12.2011 12:45:11	55.75042915;37.64787765	
12	Madonna Stevens	Patrick Payge	What about going to the cinema?	mobile	06.12.2011 13:00:47	55.7549378075;37.64529469	
13	Patrick Payge	N/A	N/A	N/A	N/A	N/A	
14	Patrick Payge	Patrick Payge	Holla friend!	mobile	23.11.2011 8:44:57	N/A	
15	Patrick Payge	Patrick Payge	A nice evening out there	mobile	25.11.2011 12:33:09	55.655489328757;37.744223...	
16	Patrick Payge	Patrick Payge	Are you kidding?!	mobile	25.11.2011 12:34:07	N/A	
17	Patrick Payge	Patrick Payge	No i am seruos	mobile	06.12.2011 12:51:08	55.7503175;37.6451264	
18	Patrick Payge	Patrick Payge	Are you ok	mobile	06.12.2011 12:59:36	N/A	
19	Patrick Payge	Patrick Payge	Here is my new phone	mobile	06.12.2011 13:00:15	55.7549378075;37.64529469	
20	Tel Burdeos	N/A	N/A	N/A	N/A	N/A	
21	Tel Burdeos	Patrick Payge	Hey how are you girl?	mobile	06.12.2011 13:02:55	55.7549378075;37.64529469	
22	Kikosu Umaru	N/A	N/A	N/A	N/A	N/A	
23	Kikosu Umaru	Kikosu Umaru	Hope you are doing well! Have smth new for you. Call me!	web	16.09.2011 7:23:30	N/A	
24	Kikosu Umaru	Patrick Payge	I lost my phone cant call	mobile	06.12.2011 12:44:09	55.7503175;37.6451264	
25	Kikosu Umaru	Patrick Payge	Hey guys	mobile	06.12.2011 13:05:23	55.7549378075;37.64529469	
26	Kikosu Umaru	Kikosu Umaru	too bad my dear	web	09.12.2011 9:21:59	N/A	
27	Kikosu Umaru	Kikosu Umaru	what are you doing this weekend?	web	09.12.2011 9:22:17	N/A	
28	Kikosu Umaru	Patrick Payge	Very busy	mobile	09.12.2011 9:42:27	55.7503175;37.6451264	
29	Kikosu Umaru	Patrick Payge	My keyboard	mobile	09.12.2011 9:45:13	55.7503175;37.6451264	
30	Kikosu Umaru	Patrick Payge	my home	mobile	09.12.2011 9:46:27	55.7503175;37.6451264	

Details:

ID: 12
Remote Party: Madonna Stevens
Sender: Patrick Payge
Text: What about going to the cinema?
Source: mobile
Time stamp (UTC): 06.12.2011 13:00:47
Coordinates: 55.7549378075;37.64529469

Analyst version: 4.1.0.427 Patrick Payge's Galaxy Mini Total: 31 Filtered: 31

Exhibit – Foursquare App

Oxygen Forensic Suite 2011 Analyst

Main View Tools Service Help

All devices ▸ Unassigned devices ▸ New device (iPhone 3GS) - 25.05.2011 1:07:08 [012156002672455] ▸ Foursquare

Search Export Print Reset Filters Help

Object information

Foursquare

Object details:
First name: Galina
Venue name: The Hard Rock Cafe Times Square
Coordinates: 40.756659;-73.986421
Time stamp (UTC): 14.05.2011 0:07:39
Full name: Galina
User profile: https://foursquare.com/user/...
Mayor: No

Application information (43) Application files (10) Application log (19) User data (2787)

First name	Venue name	Coordinates	Time stamp (UTC)	Lat	Category
Galina	Шоколадница@Домодедово	55.413944;37.902258	13.05.2011 6:20:42		Account (1)
Galina	The Hard Rock Cafe Times Square	40.756659;-73.986421	14.05.2011 0:07:39		Contacts (494)
Galina	toy R us	40.756689;-73.986265	14.05.2011 0:11:37		Friends (4)
Galina	Hard Rock Cafe Orlando	28.4737181569987;-81.4675283432007	15.05.2011 3:07:46		Other (490)
Galina	Hard Rock Live Orlando	28.473773;-81.468224	15.05.2011 3:09:36		Check-ins (110)
Galina	Universal Studios Florida	28.474915891274;-81.4667558670044	15.05.2011 3:11:31		Owner (57)
Galina	Hard Rock Hotel	28.4727002333333;-81.46646095	15.05.2011 3:16:22		Friends (8)
Galina	Lagoon Pool @ Loews Royal Pacific R...	28.4676391;-81.4671354	15.05.2011 17:10:52		Other (45)
Galina	Loews Royal Pacific Resort	28.4684932360669;-81.4671206474304	15.05.2011 17:12:38		Top places (10)
Galina	CEIC Digital Investigations Conferen...	28.467238;-81.465719	15.05.2011 17:24:26		Shouts (3)
Galina	Loews Royal Pacific Resort	28.4684932360669;-81.4671206474304	15.05.2011 17:26:59		Owner (2)
		28.46568;-81.467409	15.05.2011 17:27:39		Friends (1)
		28.467238;-81.465719	15.05.2011 17:28:28		Tips (436)
		28.467238;-81.465719	15.05.2011 17:31:50		Owner (7)
		28.3712239380494;-81.5150409936905	15.05.2011 21:44:09		Other (429)
		28.3713513802273;-81.5159046649933	15.05.2011 21:44:35		Venues (1732)
		28.371869;-81.516859	15.05.2011 21:48:29		Categories (1487)
		28.467238;-81.465719	16.05.2011 13:22:00		Photos (73)
		28.467238;-81.465719	16.05.2011 13:41:31		Other (172)
		28.467238;-81.465719	16.05.2011 16:41:45		Google analytics (session) (1)
		28.4684932360669;-81.4671206474304	16.05.2011 16:46:45		
		28.469302;-81.467556	16.05.2011 16:50:41		
		28.467238;-81.465719	16.05.2011 16:51:20		
		28.467238;-81.465719	16.05.2011 17:55:59		
		28.467238;-81.465719	16.05.2011 20:36:15		
		28.467238;-81.465719	17.05.2011 17:23:38		
		28.467238;-81.465719	17.05.2011 17:27:58		

Google maps

http://maps.goo... 40.756659, -73.986421

Web Images Videos Maps

Google maps

Satellite Traffic

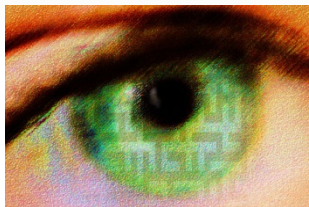
Map data ©2011 Google

GPS Evidence



Verizon Wireless Text Message Log

Network Element Name	Switch	MDN	Msg Send Date	Msg Deliver Date	Message	Originating Adc	Destination Address	Message Direction
GoldenValley_MR85	M	612	8/30/2014 11:41:11 AM	8/30/2014 11:41:20 AM	1	612	612	3
GoldenValley_MR85	M	612	8/30/2014 11:54:49 AM	8/30/2014 11:54:49 AM	16	612	90008	4
GoldenValley_MR85	M	612	8/30/2014 11:54:49 AM	8/30/2014 11:54:55 AM	1	612	612	3
GoldenValley_MR85	M	612	8/30/2014 11:55:12 AM	8/30/2014 11:55:13 AM	1	612	612	4
GoldenValley_MR85	M	612	#2 8/30/2014 11:55:12 AM	8/30/2014 11:55:13 AM	16	612	90008	4
GoldenValley_MR85	M	612	8/30/2014 11:57:39 AM	8/30/2014 11:57:39 AM	16	612	90008	4
GoldenValley_MR85	M	612	8/30/2014 11:57:39 AM	8/30/2014 11:57:40 AM	1	612	612	Sent 4
GoldenValley_MR85	M	612	8/30/2014 11:57:54 AM	8/30/2014 11:57:54 AM	16	612	90008	4
GoldenValley_MR85	M	612	8/30/2014 11:57:54 AM	#3 8/30/2014 11:57:58 AM	1	612	612	Received 3
GoldenValley_MR85	M	612	8/30/2014 11:54:18 AM	8/30/2014 11:54:19 AM	1	612	612	4
GoldenValley_MR85	M	612	8/30/2014 11:54:18 AM	8/30/2014 11:54:19 AM	16	612	90008	4
GoldenValley_MR85	M	612	8/30/2014 11:56:41 AM	8/30/2014 11:56:47 AM	1	612	612	3
GoldenValley_MR85	M	612	8/30/2014 11:56:41 AM	8/30/2014 11:56:41 AM	16	612	90008	4
GoldenValley_MR85	M	612	#1 8/30/2014 11:54:03 AM	8/30/2014 11:54:03 AM	16	612	90008	4
GoldenValley_MR85	M	612	8/30/2014 11:54:03 AM	8/30/2014 11:54:08 AM	1	612	612	3
GoldenValley_MR85	M	612	8/30/2014 11:57:11 AM	8/30/2014 11:57:12 AM	1	612	612	Sent 4
GoldenValley_MR85	M	612	8/30/2014 11:57:11 AM	8/30/2014 11:57:12 AM	16	612	90008	4
GoldenValley_MR85	M	612	8/30/2014 12:00:21 PM	8/30/2014 12:00:22 PM	16	612	90008	4
GoldenValley_MR85	M	612	8/30/2014 12:08:05 PM	8/30/2014 12:08:06 PM	1	612	612	3
GoldenValley_MR85	M	612	8/30/2014 12:08:05 PM	8/30/2014 12:08:05 PM	16	612	90008	4



GPS Evidence

UFED Physical Analyzer 4.2.1.7

File View Tools Extract Python Plug-ins Report Help

Welcome × Extraction Summary ×

Extraction Summary

Extraction Info

	Garmin_Nuvi 1300 <small>Garmin</small>
Extraction start date/time	3/24/2015 6:05:50 PM
Extraction end date/time	3/24/2015 6:11:50 PM
Unit Version	4.1.2.8 PSP 1
Selected Manufacturer	Garmin
Selected Device Name	Nuvi 1300
Connection Type	Cable No. 80
Is encrypted	False
Extraction Type	File system
Extraction ID	B9B68BB4-69C8-45BD-8740-F8A0C79CEA43

Image Hash Information

Hashes have been calculated for this project, but no reference data is available.

Device Info

Detected model	nuvi 1300
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Device Content

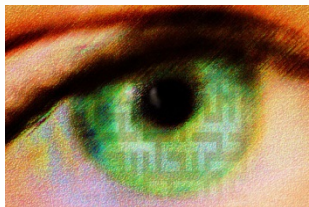
Phone Data

Device Locations	49130 (1207)
-------------------------	--------------

Garmin GPS unit contained 318 journeys with 49,130 device locations.

Data Files

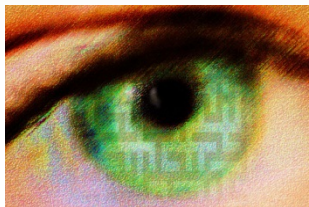
Databases	Images	Text
4 (0)	12 (0)	15 (0)



Correlated Message & GPS Evidence

Locations (43)

#	Name	Time	Latitude	Longitude
1		8/30/2014 11:57:12 AM(UTC-5)	46.673725	-96.420178
2		8/30/2014 11:57:15 AM(UTC-5)	46.67396	-96.420363
3	Text message sent	8/30/2014 11:57:16 AM(UTC-5)	46.673959	-96.420332
4	@ 11:57:11AM	8/30/2014 11:57:17 AM(UTC-5)	46.673956	-96.42018
5		8/30/2014 11:57:18 AM(UTC-5)	46.673897	-96.420179
6		8/30/2014 11:57:19 AM(UTC-5)	46.673937	-96.420179
7		8/30/2014 11:57:20 AM(UTC-5)	46.673956	-96.42018
8		8/30/2014 11:57:21 AM(UTC-5)	46.673956	-96.42018
9		8/30/2014 11:57:22 AM(UTC-5)	46.673956	-96.42018
10		8/30/2014 11:57:23 AM(UTC-5)	46.673956	-96.42018
11		8/30/2014 11:57:24 AM(UTC-5)	46.673956	-96.42018
12		8/30/2014 11:57:33 AM(UTC-5)	46.675805	-96.42018
13	Text message sent	8/30/2014 11:57:36 AM(UTC-5)	46.676166	-96.42018
14	@ 11:57:39AM	8/30/2014 11:57:37 AM(UTC-5)	46.67626	-96.42018
15		8/30/2014 11:57:38 AM(UTC-5)	46.67634	-96.42018
16		8/30/2014 11:57:39 AM(UTC-5)	46.676407	-96.42018
17		8/30/2014 11:57:40 AM(UTC-5)	46.676534	-96.419905
18		8/30/2014 11:57:41 AM(UTC-5)	46.676561	-96.419755
19		8/30/2014 11:57:49 AM(UTC-5)	46.676838	-96.418179
20		8/30/2014 11:57:54 AM(UTC-5)	46.676896	-96.417581
21		8/30/2014 11:58:00 AM(UTC-5)	46.676956	-96.416806
22		8/30/2014 11:58:02 AM(UTC-5)	46.676815	-96.415275
23	Text message received	8/30/2014 11:58:03 AM(UTC-5)	46.676531	-96.413828
24	@ 11:57:58AM	8/30/2014 11:58:04 AM(UTC-5)	46.676531	-96.413828
25		8/30/2014 11:58:18 AM(UTC-5)	46.676531	-96.413828
26		8/30/2014 11:58:19 AM(UTC-5)	46.676347	-96.413053
27		8/30/2014 11:58:20 AM(UTC-5)	46.676341	-96.413029
28		8/30/2014 11:58:29 AM(UTC-5)	46.676625	-96.413054
29		8/30/2014 11:58:30 AM(UTC-5)	46.67664	-96.413113
30		8/30/2014 11:58:31 AM(UTC-5)	46.676658	-96.413184
31		8/30/2014 11:58:32 AM(UTC-5)	46.67668	-96.413271
32		8/30/2014 11:58:49 AM(UTC-5)	46.678126	-96.417461
33		8/30/2014 11:58:50 AM(UTC-5)	46.678268	-96.417713
34		8/30/2014 11:58:51 AM(UTC-5)	46.678434	-96.417967
35		8/30/2014 11:58:59 AM(UTC-5)	46.679626	-96.419388
36		8/30/2014 11:59:06 AM(UTC-5)	46.679879	-96.420222
37		8/30/2014 11:59:12 AM(UTC-5)	46.679871	-96.420278
38		8/30/2014 11:59:13 AM(UTC-5)	46.679936	-96.420222
39		8/30/2014 11:59:14 AM(UTC-5)	46.67989	-96.420222
40		8/30/2014 11:59:15 AM(UTC-5)	46.679856	-96.420222
41		8/30/2014 11:59:16 AM(UTC-5)	46.679834	-96.420222
42		8/30/2014 11:59:17 AM(UTC-5)	46.679834	-96.420222
43		8/30/2014 11:59:28 AM(UTC-5)	46.67971	-96.420222



Visualizing Message & GPS Evidence



Visualizing Message & GPS Evidence



Visualizing Message & GPS Evidence



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