# THE CIDER PRESS:
## EXTRACTING FORENSIC ARTIFACTS FROM APPLE CONTINUITY

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# WHO THE HECK ARE WE?

HEATHER MAHALIK

- SANS SENIOR INSTRUCTOR AND AUTHOR
- DIRECTOR OF FORENSIC ENGINEERING, MANTECH CARD
- SMARTPHONE NERD

SARAH EDWARDS

- SANS CERTIFIED INSTRUCTOR AND AUTHOR
- MOBILE FORENSICS ENGINEER AT PARSONS CORPORATION
- MAC NERD

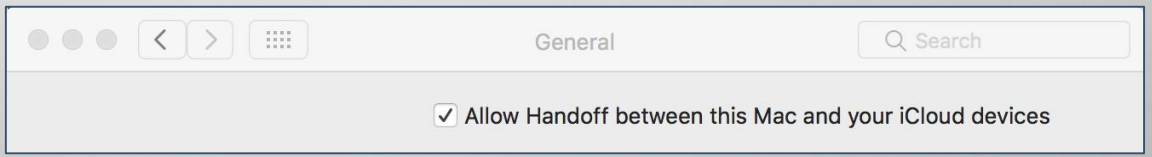
# WHAT IS CONTINUITY?

- “SEAMLESS” INTERACTION BETWEEN ALL APPLE DEVICES:
  - MACS
  - IPHONE
  - IPAD
  - APPLE WATCH

- SOFTWARE REQUIREMENTS:
  - WI-FI & BLUETOOTH ON
  - SIGNED IN ON ALL DEVICES WITH ICLOUD ACCOUNT
  - “HANDOFF” SET TO ON

- HARDWARE REQUIREMENTS:
  - MACOS 10.10+ (MACBOOK EARLY 2015)
  - IOS 8+ (IPHONE 5+)
  - WATCHOS3 - (SERIES 1+)



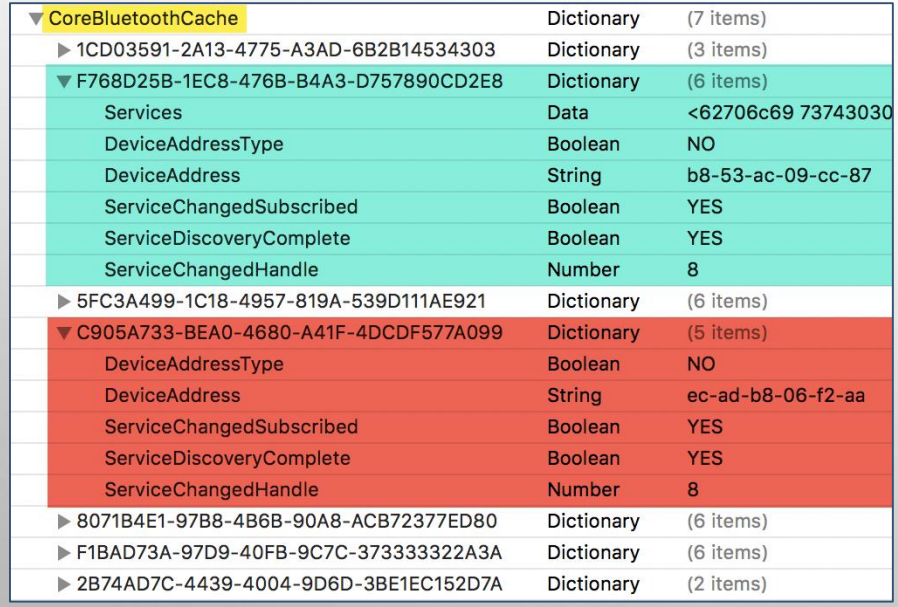


# THE METHOD TO OUR MADNESS

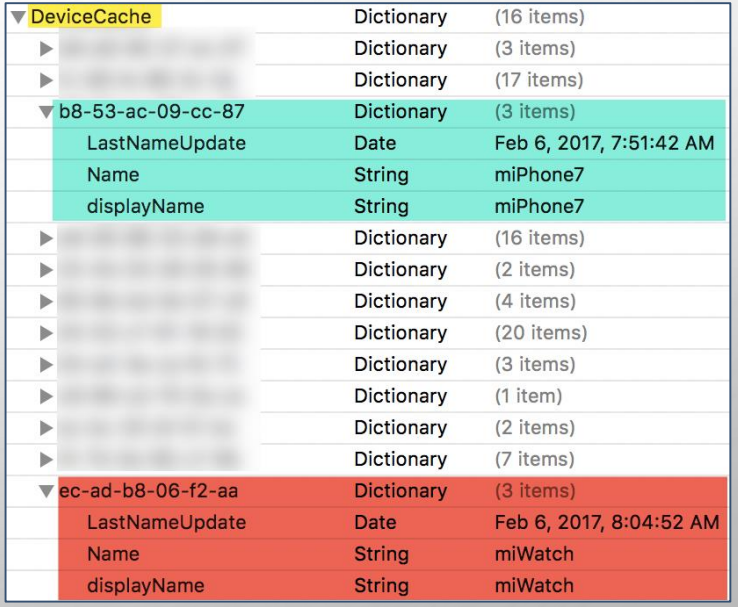
- IPHONE 7 IOS 10.3.2
- JAILBROKEN IPHONE 7 IOS 10.1.1
- APPLE WATCH OS 3.1.3
- APPLE WATCH 2 OS 3.1
- MACBOOK PRO X 2 (10.12.3 & 10.12.5)

# CONNECTED DEVICES - BLUETOOTH IDENTIFIERS - MAC

- /LIBRARY/PREFERENCES/COM.APPLE.BLUETOOTH.PLIST
- MATCH GUID -> GET MAC ADDRESS -> ASSOCIATE WITH DEVICE



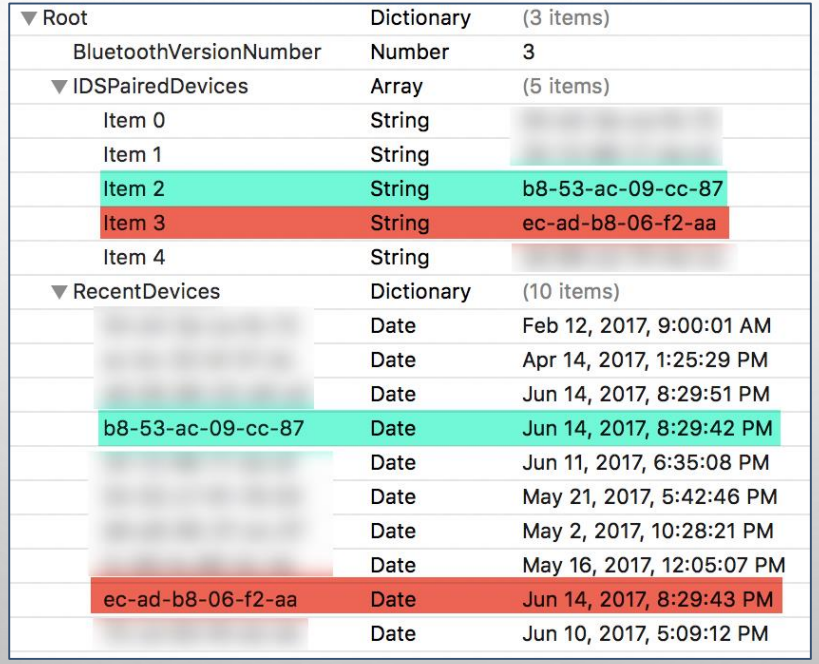
| | | |
|---|---|---|
| ▼ CoreBluetoothCache | Dictionary | (7 items) |
| ▶ 1CD03591-2A13-4775-A3AD-6B2B14534303 | Dictionary | (3 items) |
| ▼ F768D25B-1EC8-476B-B4A3-D757890CD2E8 | Dictionary | (6 items) |
| Services | Data | <62706c69 73743030 |
| DeviceAddressType | Boolean | NO |
| DeviceAddress | String | b8-53-ac-09-cc-87 |
| ServiceChangedSubscribed | Boolean | YES |
| ServiceDiscoveryComplete | Boolean | YES |
| ServiceChangedHandle | Number | 8 |
| ▶ 5FC3A499-1C18-4957-819A-539D111AE921 | Dictionary | (6 items) |
| ▼ C905A733-BEA0-4680-A41F-4DCDF577A099 | Dictionary | (5 items) |
| DeviceAddressType | Boolean | NO |
| DeviceAddress | String | ec-ad-b8-06-f2-aa |
| ServiceChangedSubscribed | Boolean | YES |
| ServiceDiscoveryComplete | Boolean | YES |
| ServiceChangedHandle | Number | 8 |
| ▶ 8071B4E1-97B8-4B6B-90A8-ACB72377ED80 | Dictionary | (6 items) |
| ▶ F1BAD73A-97D9-40FB-9C7C-373333322A3A | Dictionary | (6 items) |
| ▶ 2B74AD7C-4439-4004-9D6D-3BE1EC152D7A | Dictionary | (2 items) |



| | | |
|---|---|---|
| ▼ DeviceCache | Dictionary | (16 items) |
| ▶ [redacted] | Dictionary | (3 items) |
| ▶ [redacted] | Dictionary | (17 items) |
| ▼ b8-53-ac-09-cc-87 | Dictionary | (3 items) |
| LastNameUpdate | Date | Feb 6, 2017, 7:51:42 AM |
| Name | String | miPhone7 |
| displayName | String | miPhone7 |
| ▶ [redacted] | Dictionary | (16 items) |
| ▶ [redacted] | Dictionary | (2 items) |
| ▶ [redacted] | Dictionary | (4 items) |
| ▶ [redacted] | Dictionary | (20 items) |
| ▶ [redacted] | Dictionary | (3 items) |
| ▶ [redacted] | Dictionary | (1 item) |
| ▶ [redacted] | Dictionary | (2 items) |
| ▶ [redacted] | Dictionary | (7 items) |
| ▼ ec-ad-b8-06-f2-aa | Dictionary | (3 items) |
| LastNameUpdate | Date | Feb 6, 2017, 8:04:52 AM |
| Name | String | miWatch |
| displayName | String | miWatch |

# CONNECTED DEVICES - BLUETOOTH IDENTIFIERS - MAC

- ~/LIBRARY/PREFERENCES/BYHOST/COM.APPLE.BLUETOOTH.<HW_UUID>.PLIST
- ASSOCIATE WITH A SPECIFIC USER



| | | |
|---|---|---|
| ▼ Root | Dictionary | (3 items) |
| BluetoothVersionNumber | Number | 3 |
| ▼ IDSPairedDevices | Array | (5 items) |
| Item 0 | String | [redacted] |
| Item 1 | String | [redacted] |
| Item 2 | String | b8-53-ac-09-cc-87 |
| Item 3 | String | ec-ad-b8-06-f2-aa |
| Item 4 | String | [redacted] |
| ▼ RecentDevices | Dictionary | (10 items) |
| [redacted] | Date | Feb 12, 2017, 9:00:01 AM |
| [redacted] | Date | Apr 14, 2017, 1:25:29 PM |
| [redacted] | Date | Jun 14, 2017, 8:29:51 PM |
| b8-53-ac-09-cc-87 | Date | Jun 14, 2017, 8:29:42 PM |
| [redacted] | Date | Jun 11, 2017, 6:35:08 PM |
| [redacted] | Date | May 21, 2017, 5:42:46 PM |
| [redacted] | Date | May 2, 2017, 10:28:21 PM |
| [redacted] | Date | May 16, 2017, 12:05:07 PM |
| ec-ad-b8-06-f2-aa | Date | Jun 14, 2017, 8:29:43 PM |
| [redacted] | Date | Jun 10, 2017, 5:09:12 PM |

# CONNECTED DEVICES - BLUETOOTH IDENTIFIERS - IOS

- /LIBRARY/MOBLEBLUETOOTH/COM.APPLE.MOBILEBLUETOOTH.LEDEVICES.PAIRED.DB

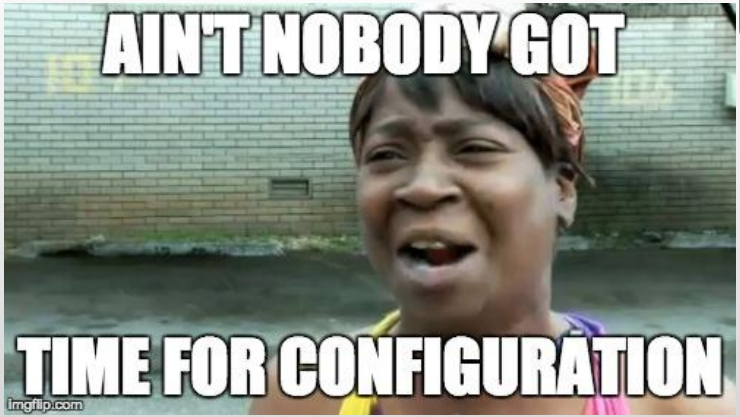
| Uuid | Name | Address | ResolvedAddress |
|---|---|---|---|
| 0ADB2DD6-9BFF-423F-9168-E6D2C015BF22 | iPad | Public 80:D6:05:77:50:03 | Public 80:D6:05:77:50:03 |
| 97FE0DEF-3A2B-4283-A03B-D15A2106A0B2 | Heather's MacBook Pro | Public 80:E6:50:26:42:FF | Public 80:E6:50:26:42:FF |
| 532E3D99-F21D-4091-87D6-FD2202B3BBD5 | Heather's Apple Watch | Random 7A:65:D5:6D:DC:8A | Public C0:CE:CD:E0:10:BA |

# BONJOUR – ZERO CONFIGURATION NETWORKING

## "I JUST WANT ACCESS TO A THING, I DON'T WANT TO CONFIGURE ANYTHING!"

PUBLICATION:
"Hey ya'll! I can do AirDrop!"

DISCOVERY:
"I have no friends. Who can I AirDrop with?"

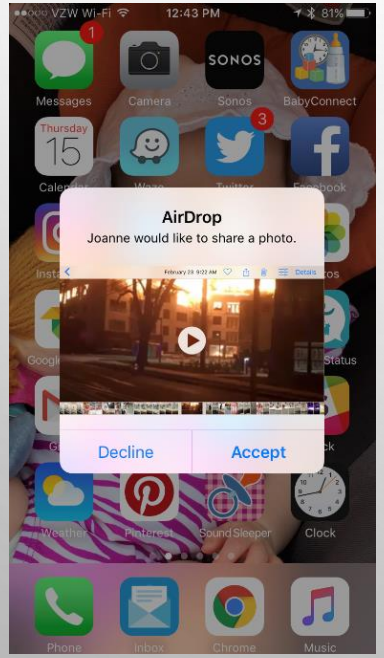


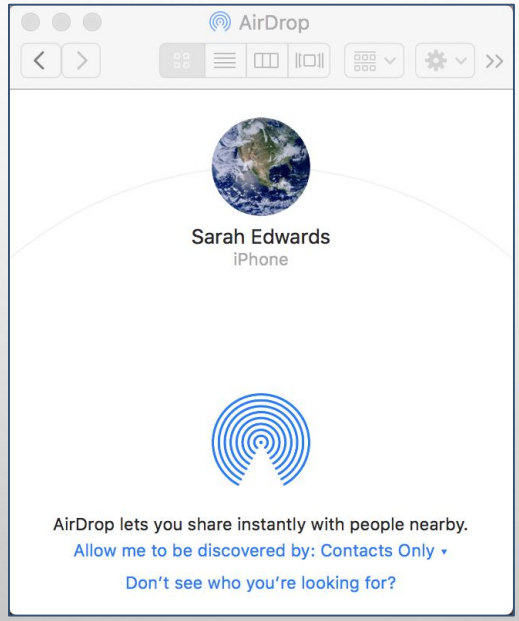

RESOLUTION: "I can be your friend, lets AirDrop!"

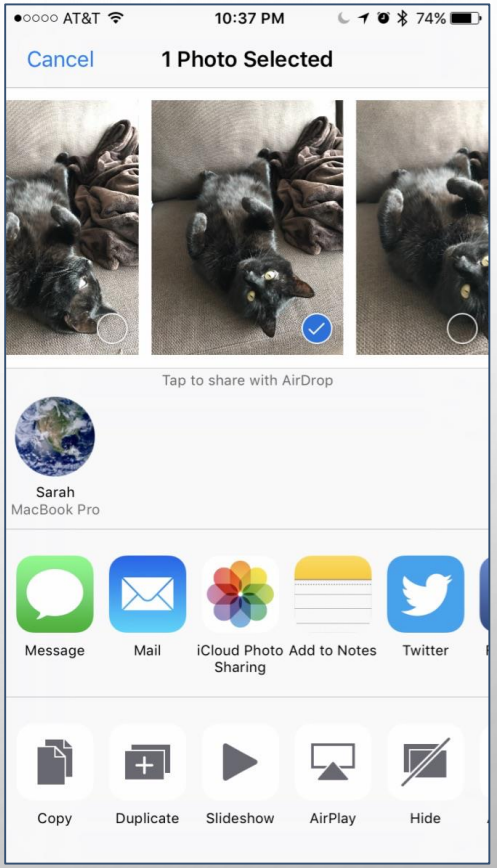
RESOLUTION: "Excellent, I'm gonna drop it like its hot!"

# AIRDROP

- SHARE FILES ACROSS DEVICES, WITHOUT THE NEED TO BE ON THE SAME NETWORK!

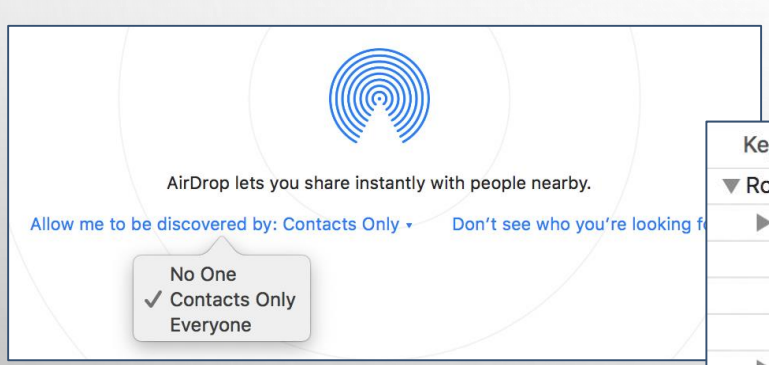


# MAC AIRDROP ID & DISCOVERABLE MODE

- MAC: ~/LIBRARY/PREFERENCES/BYHOST/COM.APPLE.SHARINGD.<HOST_UUID>.PLIST
- MAC: ~/LIBRARY/PREFERENCES/COM.APPLE.SHARINGD.PLIST - “DISCOVERABLEMODE”
- IOS: ~/LIBRARY/PREFERENCES/COM.APPLE.SHARINGD.PLIST

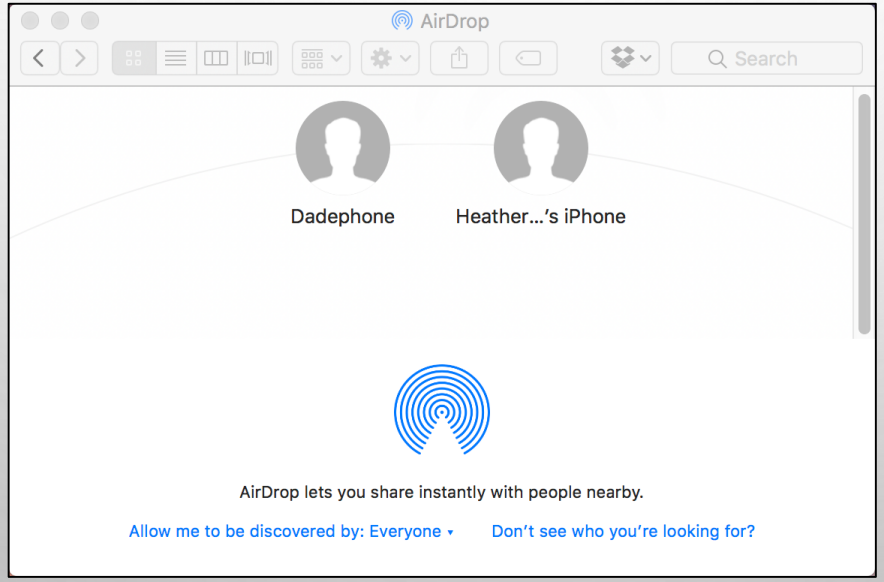



| Key | Type | Value |
|---|---|---|
| Root | Dictionary | (2 items) |
| AirDropID | String | 6E732744D084 |
| StreamID | String | 41AFCDB030C8 |

| Key | | |
|---|---|---|
| Root | | |
| AutoUnlockSugges | | |
| AutoUnlockWatchCurrentlyInList | Boolean | YES |
| AutoUnlockWatchExistedInUnlockList | Boolean | YES |
| AutoUnlockPresentedBluetoothError | Boolean | NO |
| EncryptionKeyRequests | Dictionary | (4 items) |
| AutoUnlockPeerRetries | Dictionary | (1 item) |
| AutoUnlockSetupRetryVersion | Number | 1 |
| AutoUnlockLastSeenWatchDate | Date | Feb 6, 2017, 7:48:21 AM |
| DiscoverableMode | String | Contacts Only |
| AutoUnlockPresentedWiFiError | Boolean | NO |

# AIRDROP - DISCOVERY OF DEVICES (NO TRANSFER) - MAC UNIFIED LOGS

- JUST OPENING THE FINDER “AIRDROP” WINDOW
- TWO DEVICES FOUND:
  - DADEPHONE
  - HEATHER MAHALIK’S IPHONE



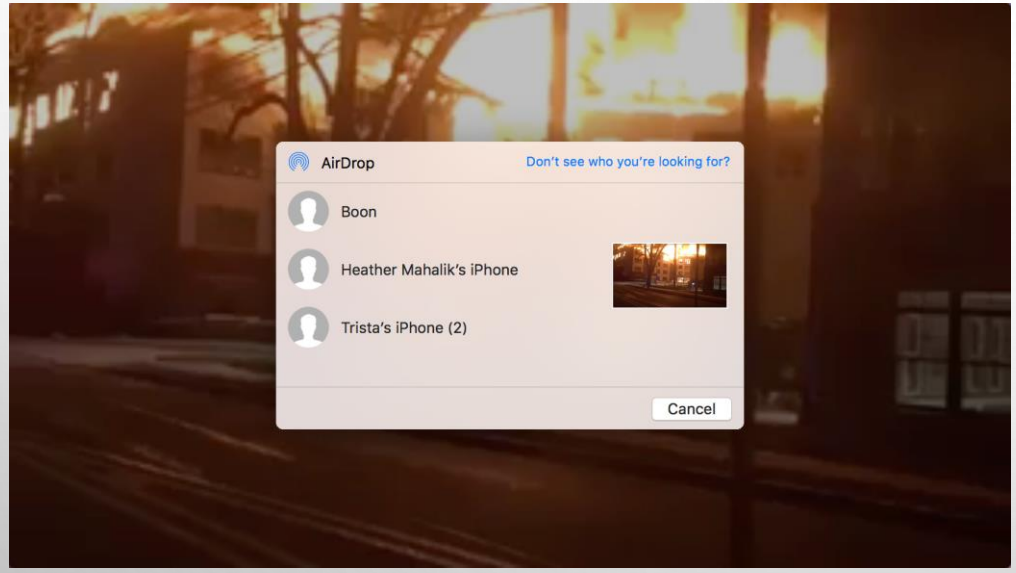
# AIRDROP - DISCOVERY OF DEVICES (NO TRANSFER) - MAC UNIFIED LOGS

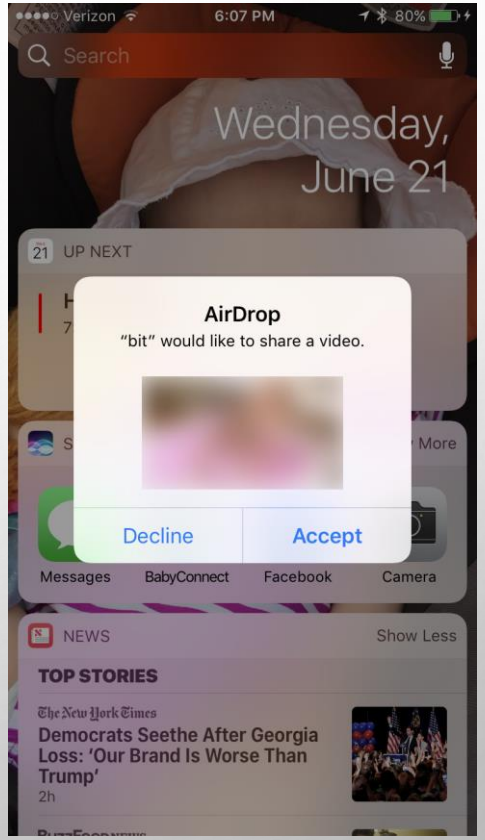
```
SHARINGD: [COM.APPLE.SHARING.AIRDROP] AIRDROP SERVER INITIALIZED
SHARINGD: [COM.APPLE.SHARING.AIRDROP] FINDER ENTERED AIRDROP
SHARINGD: [COM.APPLE.SHARING.AIRDROP] BTLE SCANNING STARTED
SHARINGD: [COM.APPLE.SHARING.AIRDROP] SCANNING MODE CONTACTS ONLY
MDNSRESPONDER: [COM.APPLE.MDNSRESPONDER.ALLINFO]  66:
  DNSSERVICECREATECONNECTION START PID[359](SHARINGD)
MDNSRESPONDER: (AWDL_D2D) AWDLD2D AWDLD2DSTARTBROWSINGFORKEY: '_AIRDROP'
  BROWSING SERVICE STARTED
SHARINGD: [COM.APPLE.SHARING.AIRDROP] BONJOUR DISCOVERY STARTED
SHARINGD: [COM.APPLE.SHARING.AIRDROP] BTLE SCANNER POWERED ON
FINDER: (SHARING) [COM.APPLE.SHARING.BROWSER] SFBROWSERCALLBACK (NODE =
  <SFNODE 0X6000000EF880>{DOMAIN = AIRDROP})
SHARINGD: [COM.APPLE.SHARING.NETWORKING.FUNCTIONAL] COM.APPLE.SHARINGD
  NO AIRDROP PEOPLE DISCOVERED AFTER 8 SECONDS
```

# AIRDROP - DISCOVERY OF DEVICES (NO TRANSFER) - MAC UNIFIED LOGS

```
SHARINGD: [COM.APPLE.SHARING.AIRDROP] BONJOUR DISCOVERED ED2AB55F0119 OVER AWDL0 IN 9217 MS
MDNSRESPONDER: [COM.APPLE.MDNSRESPONDER.ALLINFO]  66: DNSSERVICEQUERYRECORD(104100, 12,
  ED2AB55F0119._AIRDROP._TCP.LOCAL., TXT) START PID[359](SHARINGD)
SHARINGD: [COM.APPLE.SHARING.AIRDROP] BONJOUR RESOLVED ED2AB55F0119 OVER AWDL0
MDNSRESPONDER: (AWDL_D2D) AWDLD2D AWDLD2DSTARTBROWSINGFORKEY: 'DADEPHONE' BROWSING SERVICE
  STARTED
SHARINGD: [COM.APPLE.SHARING.AIRDROP] DISCOVERED VERIFIABLE IDENTITY OF ED2AB55F0119 IN 5202 MS
SHARINGD: [COM.APPLE.SHARING.AIRDROP] BONJOUR DISCOVERED 771DAA6859EF OVER AWDL0 IN 14655 MS
MDNSRESPONDER: [COM.APPLE.MDNSRESPONDER.ALLINFO]  66: DNSSERVICEQUERYRECORD(104100, 12,
  771DAA6859EF._AIRDROP._TCP.LOCAL., TXT) START PID[359](SHARINGD)
MDNSRESPONDER: (AWDL_D2D) AWDLD2D AWDLD2DSTOPBROWSINGFORKEY: 'HEATHER-MAHALIKS-IPHONE' BROWSING
  SERVICE STOPPED
FINDER: (SHARING) [COM.APPLE.SHARING.BROWSER] (
    "<SFNODE 0X6080002F8800>{DADEPHONE, ID = ED2AB55F0119, USER = IPHONE, ICON = 972674}",
    "<SFNODE 0X6080006FFD00>{HEATHER MAHALIK\U2019S IPHONE, ID = 771DAA6859EF, USER = (NULL),
  ICON = 972674}"
)
```

# AIRDROP - FILE TRANSFER TO IPHONE FROM MAC



# AIRDROP - FILE TRANSFER (IPHONE TO MAC) - MAC UNIFIED LOGS

```
SHARINGD: [COM.APPLE.SHARING.AIRDROP] AIRDROP SERVER ENABLED ON PORT 8770
SHARINGD: [COM.APPLE.SHARING.AIRDROP] NEW AIRDROP CONNECTION
SHARINGD: (CFNETWORK) TCP CONN 0X7FBCC300B9E0 STARTED
SHARINGD: (CFNETWORK) TCP CONN 0X7FBCC300B9E0 STARTING SSL NEGOTIATION
SHARINGD: (CFNETWORK) TCP CONN 0X7FBCC300B9E0 SSL HANDSHAKE DONE
SHARINGD: [COM.APPLE.SHARING.AIRDROP] AIRDROP RECEIVED DISCOVERY REQUEST
SHARINGD: [COM.APPLE.SHARING.AIRDROP] AIRDROP SERVER TRANSACTION BEGIN (1)
SHARINGD: [COM.APPLE.SHARING.AIRDROP] AIRDROP RECEIVED ASK REQUEST
SHARINGD: [COM.APPLE.SHARING.AIRDROP] POSTING <NSUSERNOTIFICATION:0X7FBCC3411B00> { TITLE:
  "AIRDROP" INFORMATIVETEXT: "RECEIVING VIDEO FROM “MIPHONE7”" ACTIONBUTTONTITLE: "(NULL)"
  OTHERBUTTONTITLE: "CANCEL" IDENTIFIER: 177E31AF-C280-449F-8B44-C05045F3242C } TO
  <_NSCONCRETEUSERNOTIFICATIONCENTER: 0X7FBCC0C1D510>
SHARINGD: [COM.APPLE.SHARING.AIRDROP] AIRDROP RECEIVED UPLOAD REQUEST
SHARINGD: [COM.APPLE.SHARING.AIRDROP] AIRDROP IS USING ADAPTIVE COMPRESSION
SHARINGD: [COM.APPLE.SHARING.DAEMON] SFOPERATIONCALLBACK (<0X7FBCC3090D10>{KIND = RECEIVER},
  EVENT = PROGRESS, RESULTS = 0X7FBCC347EC80)
SHARINGD: [COM.APPLE.SHARING.AIRDROP] AIRDROP SERVER TRANSACTION END (0)
SHARINGD: [COM.APPLE.SHARING.AIRDROP] CONNECTION FROM ED2AB55F0119 CLOSED
FINDER: (SHARING) SFOPERATIONCALLBACK (<PRIVATE>, EVENT = FINISHED, RESULTS = <PRIVATE>)
```

# AIRDROP - FILE TRANSFER (TO) - DIRECTORY / PERMISSIONS / TIMESTAMPS

- FILES GET DOWNLOADED TO DEFAULT DOWNLOADS DIRECTORY (~/DOWNLOADS)
- AIRDROP TRANSFER KEEPS SOME ORIGINAL DEVICE ACCESS/MODIFY TIMESTAMPS
- PERMISSIONS MAY SHOW “ACCESS_BPF” AS OWNERSHIP GROUP

```
bit:Downloads oompa$ stat -x IMG_1442.MOV
  File: "IMG_1442.MOV"
  Size: 91427908     FileType: Regular File
  Mode: (0644/-rw-r--r--)         Uid: (  501/   oompa)  Gid: (  501/access_bpf)
Device: 1,4   Inode: 17196622    Links: 1
Access: Thu Jun 15 18:03:37 2017
Modify: Thu Jun 15 18:03:37 2017
Change: Sun Jun 18 16:35:13 2017
```

# AIRDROP - FILE TRANSFER (TO) - EXTENDED ATTRIBUTES / SPOTLIGHT

- COM.APPLE.METADATA:KMDITEMWHEREFROMS - SHOWS WHO/HOSTNAME WHERE IT CAME FROM (IE: SARAH EDWARDS, 'MIPHONE7')
- COM.APPLE.QUARANTINE - MAY SHOW IT CAME FROM 'SHARINGD' PROCESS, DATE AIRDROPPED, QUARANTINE GUID. IF VIDEO IS VIEWED, THIS MAY BE UPDATED (IE: VIEWER LIKE QUICKTIME PLAYER)

```
bit:Downloads oompa$ xattr -xl IMG_1442.MOV
com.apple.metadata:kMDItemWhereFroms:
00000000  62 70 6C 69 73 74 30 30 A2 01 02 5D 53 61 72 61  |bplist00...]Sara|
00000010  68 20 45 64 77 61 72 64 73 58 6D 69 50 68 6F 6E  |h EdwardsXmiPhon|
00000020  65 37 08 0B 19 00 00 00 00 00 00 01 01 00 00 00  |e7..............|
00000030  00 00 00 00 03 00 00 00 00 00 00 00 00 00 00 00  |................|
00000040  00 00 00 00 22                                   |....".|
00000045
com.apple.metadata:kMDLabel_r6hlhm73c2owhai3h2gch525la:
00000000  F2 6E C6 FD 59 BB 0B 5A 71 F3 CD 29 4D 1E 39 57  |.n..Y..Zq..)M.9W|
00000190  4E 5B 72 DF 23 4C CA 44 58 50 F3 6C BB D0 2B 56  |N[r.#L.DXP.l..+V|
000001A0  02 00 AF 56 F3 DA D6 17 84                      |...V.....|
000001a9
com.apple.quarantine:
00000000  30 30 38 31 3B 35 39 34 36 65 62 33 66 3B 73 68  |0081;5946eb3f;sh|
00000010  61 72 69 6E 67 64 3B 44 46 33 30 34 36 44 34 2D  |aringd;DF3046D4-|
00000020  33 46 35 39 2D 34 41 35 46 2D 41 33 36 43 2D 37  |3F59-4A5F-A36C-7|
00000030  31 41 46 30 37 39 39 37 41 42 37                 |1AF07997AB7|
0000003b
```

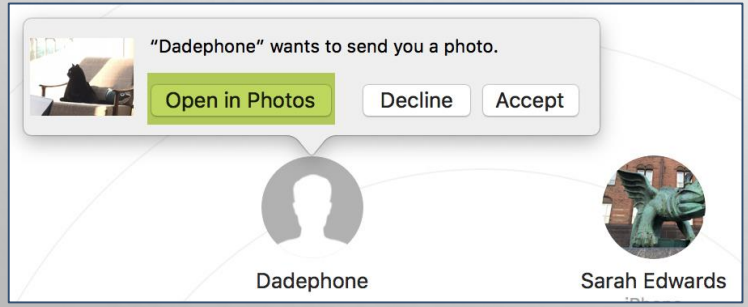
# AIRDROP - FILE TRANSFER (TO) - QUARANTINE DATABASE

- ~/LIBRARY/PREFERENCES/COM.APPLE.LAUNCHSERVICES.QUARANTINEEVENTSV2
  - GUID SHOWN IN QUARANTINE EXTENDED ATTRIBUTE
  - WHEN IT WAS AIRDROPPED (MAC EPOCH)
  - WHERE IT CAME FROM (SHARINGD)
  - WHO SENT IT (SARAH EDWARDS)

| | LSQuarantineEventIdentifier | LSQuarantineTimeStamp | LSQuarantineAgentBundleIdentifier | LSQuarantineAgentName | LSQuarantineDataURLString | LSQuarantineSenderName | LSQuarantineSenderAddress | LSQuarantineTypeNumber |
|---|---|---|---|---|---|---|---|---|
| 1 | 1728DFEE-BBDD-4AB7-... | 519425134.856411 | com.apple.iChat | iChat | *NULL* | *NULL* | *NULL* | 3 |
| 2 | 61BF37FA-B8D7-4E46-... | 519498761.0 | com.google.Chrome | Google Chrome.app | https://github-productio... | *NULL* | *NULL* | 0 |
| 3 | 23B510BB-D128-4552-... | 519510843.197536 | *NULL* | sharingd | *NULL* | Sarah Edwards | *NULL* | 6 |
| 4 | 9A72A23D-225B-4858-... | 519510912.485851 | *NULL* | sharingd | *NULL* | Sarah Edwards | *NULL* | 6 |
| 5 | DF3046D4-3F59-4A5F... | 519512767.901828 | *NULL* | sharingd | *NULL* | Sarah Edwards | *NULL* | 6 |

# AIRDROP - FILE TRANSFER (TO) - ~/LIBRARY/CACHES/CLEANUP AT STARTUP/

- UNKNOWN USERS, AIRDROP SET TO “EVERYONE”
- ‘ACCEPT’:
  - DEFAULT DOWNLOADS DIRECTORY
- ‘OPEN IN PHOTOS’:
  - ‘CLEANUP AT STARTUP/’




```
bit:Cleanup At Startup oompa$ pwd
/Users/oompa/Library/Caches/Cleanup At Startup
bit:Cleanup At Startup oompa$ ls -laR
total 16
drwx------@   5 oompa  staff   170 Jun 18 19:11 .
drwx------+ 102 oompa  staff  3468 Jun 18 19:07 ..
-rw-r--r--@   1 oompa  staff  6148 Jun 18 19:11 .DS_Store
drwxr-xr-x    3 oompa  staff   102 Jun 18 19:11 5453CE6C-E443-4E02-AA50-2C6C839D6747
drwxr-xr-x    5 oompa  staff   170 Jun 18 19:07 C6FA490C-D1CA-4DCC-886B-C9C83DC4B30E

./5453CE6C-E443-4E02-AA50-2C6C839D6747:
total 1232
drwxr-xr-x  3 oompa  staff          102 Jun 18 19:11 .
drwx------@ 5 oompa  staff          170 Jun 18 19:11 ..
-rw-r--r--@ 1 oompa  access_bpf  629552 Jun 11 18:12 IMG_0005.JPG

./C6FA490C-D1CA-4DCC-886B-C9C83DC4B30E:
total 2024
drwxr-xr-x  5 oompa  staff          170 Jun 18 19:07 .
drwx------@ 5 oompa  staff          170 Jun 18 19:11 ..
-rw-r--r--@ 1 oompa  access_bpf  100105 Jun 11 17:44 IMG_0001.PNG
-rw-r--r--@ 1 oompa  access_bpf   86919 Jun 11 17:48 IMG_0002.PNG
-rw-r--r--@ 1 oompa  access_bpf  843358 Jun 11 19:21 IMG_0013.PNG
bit:Cleanup At Startup oompa$ xattr -xl 5453CE6C-E443-4E02-AA50-2C6C839D6747/IMG_0005.JPG
com.apple.metadata:kMDItemWhereFroms:
00000000  62 70 6C 69 73 74 30 30 A1 01 59 44 61 64 65 70  |bplist00..YDadep|
00000010  68 6F 6E 65 08 0A 00 00 00 00 00 00 01 01 00 00  |hone............|
00000020  00 00 00 00 00 02 00 00 00 00 00 00 00 00 00 00  |................|
00000030  00 00 00 00 00 14                                |......|
00000036
```

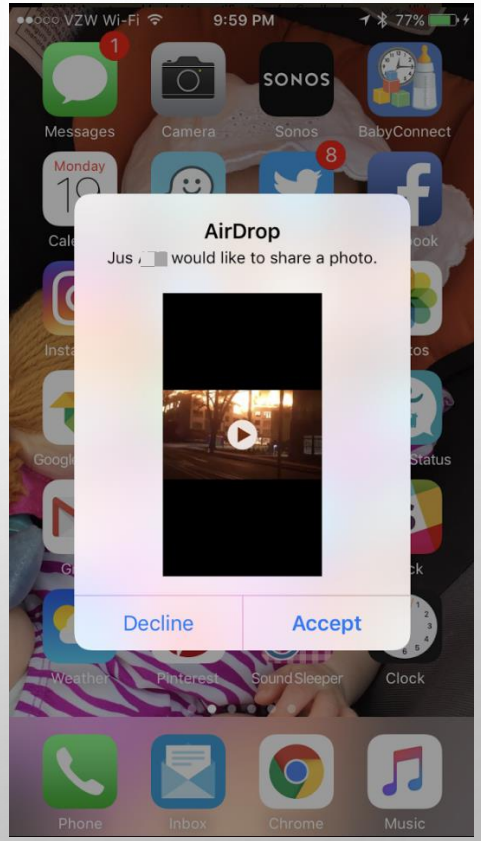
# AIRDROP - FILE TRANSFER (FROM MAC TO IPHONE) - MAC UNIFIED LOGS

```
SHARINGD: [COM.APPLE.SHARING.AIRDROP] CONNECTING TO ED2AB55F0119 AT
  [MIPHONE7.LOCAL]:8770
SHARINGD: [COM.APPLE.SHARING.AIRDROP] SENDING CLIENT CERTIFICATE TO ED2AB55F0119
SHARINGD: [COM.APPLE.SHARING.AIRDROP] STARTING TO SEND FILES (
    "FILE:///.FILE/ID=6571367.17174270"
)
SHARINGD: [COM.APPLE.SHARING.AIRDROP] AIRDROP IS USING ADAPTIVE COMPRESSION
SHARINGD: [COM.APPLE.SHARING.AIRDROP] AIRDROP SENDING OVER AWDL0
SHARINGD: [COM.APPLE.SHARING.AIRDROP] STARTING TO SEND FILES (
  "FILE:///VAR/FOLDERS/N7/VNFZC155443_QG0ZP2CWZ1880000GN/T/COM.APPLE.PHOTOS/SHAREK
  IT-EXPORTS/1C200C5D-81C8-4C4D-96B1-67D078DC7198/3252/IMG_1438.JPG",
  "FILE:///VAR/FOLDERS/N7/VNFZC155443_QG0ZP2CWZ1880000GN/T/COM.APPLE.PHOTOS/SHAREK
  IT-EXPORTS/1C200C5D-81C8-4C4D-96B1-67D078DC7198/3254/IMG_1439.JPG"
)
```

17174270 = File's Inode/CNID

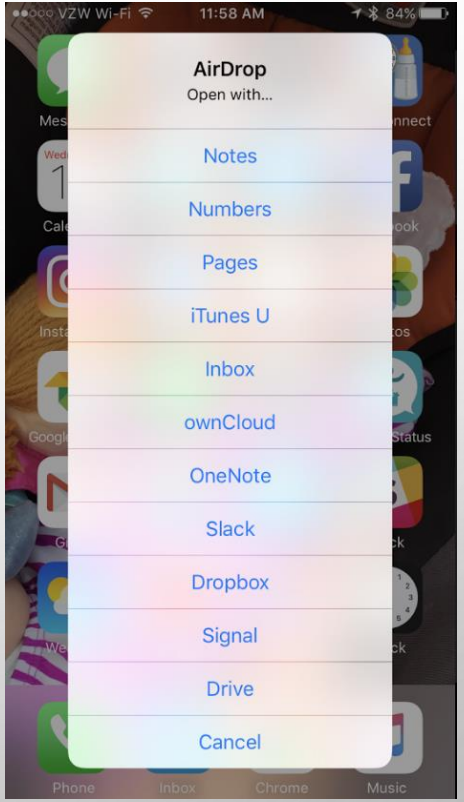
# AIRDROP - IOS ARTIFACTS – PHONE BACKUP
## UNASSOCIATED DEVICES

- GIVEN OPTION TO ACCEPT OR DECLINE
- ‘ACCEPT’:
  - DEFAULT DCIM DIRECTORY FOR PICTURE OR VIDEO
  - OPTION TO OPEN FOR OTHER ATTACHMENTS
- ‘DECLINE’:
  - NO LOGS… ☹



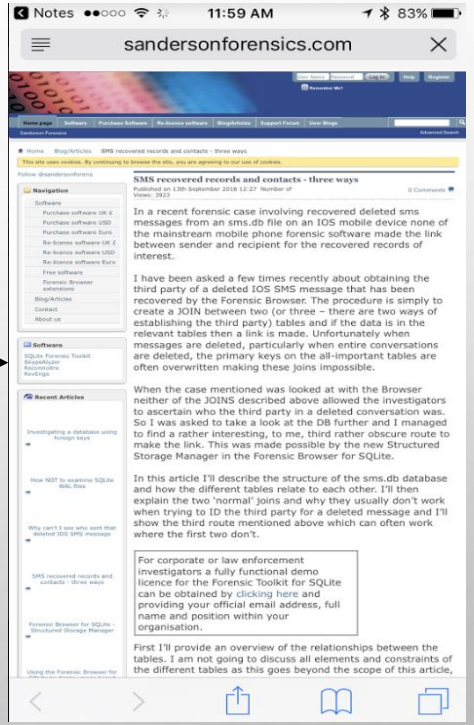
# AIRDROP - IOS ARTIFACTS -PHONE BACKUP
## DEVICES ON SAME ICLOUD

- ‘ACCEPT’ (AUTOMATIC):
  - DEFAULT DCIM DIRECTORY FOR PICTURE OR VIDEO
  - OPTION TO OPEN FOR OTHER ATTACHMENTS
- NO OPTION TO DECLINE “DROP” WHEN BOTH DEVICES ARE ON THE SAME ICLOUD ACCOUNT



# AIRDROP - IOS ARTIFACTS [1] – PHONE BACKUP

- TIME-LINING MAY BE POSSIBLE, BUT DIFFICULT
- IMAGES AND VIDEOS – IF YOU KNOW WHAT WAS DROPPED
  - TIMESTAMPS NOT ALWAYS IN TEMPORAL IN DCIM DIR IF FOLLOWING IMG_#### ORDER
- EXIF DATA NOT HELPFUL
- HOW WAS THE FILE ACCESSED BY THE USER? (YOU ARE NOW DESPERATE)
  - NATIVE APPS (NOTES)
  - SAFARI
  - THIRD - PARTY APPLICATIONS



# AIRDROP - IOS ARTIFACTS [2] – PHONE BACKUP

- ~LIBRARY/DATABASES/DATAUSAGE.SQLITE

Table: ZPROCESS

| | Z_PK | Z_ENT | Z_OPT | ZFIRSTTIMESTAMP | ZTIMESTAMP | ZBUNDLENAME ▲ | ZPROCNAME |
|---|---|---|---|---|---|---|---|
| | Fil... | Fil... | Fil... | Filter | Filter | datausage | Filter |
| 1 | 186 | 7 | 2424 | 453124545.171082 | 518472124.632133 | com.apple.datausage.airdrop | sharingd/com.apple.datausage.airdrop |
| 2 | 82 | 7 | 231 | 414816042.639162 | 518472125.09033 | com.apple.datausage.appleid | AppleIDAuthAgent/com.apple.datausage.appleid |
| 3 | 331 | 7 | 1246 | 496273311.670504 | 513554363.023668 | com.apple.datausage.appleid | identityservicesd/com.apple.datausage.appleid |
| 4 | 15 | 7 | 60703 | 401275316.417027 | 519237146.046816 | com.apple.datausage.applepushservice | apsd/com.apple.datausage.applepushservice |
| 5 | 119 | 7 | 47 | 432909486.968011 | 432918386.218557 | com.apple.datausage.atc | nsurlsessiond/com.apple.datausage.atc |
| 6 | 73 | 7 | 95 | 410818950.090341 | 466394367.037485 | com.apple.datausage.backup | backupd/com.apple.datausage.backup |
| 7 | 324 | 7 | 4512 | 495519880.562882 | 519237145.30366 | com.apple.datausage.bluetooth | BTServer/com.apple.datausage.bluetooth |

# AIRDROP - DISCOVERY OF DEVICES - IOS LOGS – DYNAMIC ANALYSIS

```
SHARINGD[64] <NOTICE>: BTLE SCANNING STARTED
SHARINGD[64] <NOTICE>: SCANNING MODE EVERYONE
SHARINGD(WIRELESSPROXIMITY)[64] <NOTICE>: STATE CHANGED TO 3 FROM 0
SHARINGD(WIRELESSPROXIMITY)[64] <NOTICE>: ADVERTISER STATE CHANGED TO 3 FROM 0
SHARINGD(WIRELESSPROXIMITY)[64] <NOTICE>: STATE IS ON, ADDING SERVICES IF NECESSARY
SHARINGD[64] <NOTICE>: BTLE SCANNER POWERED ON

BTSERVER[5960] <NOTICE>: SCANNING STARTED SUCCESSFULLY
SHARINGD[64] <NOTICE>: BTLE SCANNING STOPPED
SHARINGD(WIRELESSPROXIMITY)[64] <NOTICE>: WPCLIENT (0X15904CA30 - WPAWDL) XPC CONNECTION
  INVALIDATED
SHARINGD(WIRELESSPROXIMITY)[64] <NOTICE>: STATE CHANGED TO 0 FROM 3
SHARINGD(WIRELESSPROXIMITY)[64] <NOTICE>: ADVERTISER STATE CHANGED TO 0 FROM 3
WIRELESSPROXD[60] <NOTICE>: WPDCLIENT XPC CONNECTION FOR PROCESS SHARINGD (64) IS BECOMING
  INVALIDATED
WIRELESSPROXD[60] <NOTICE>: REMOVING WPDCLIENT 19B28287-93F0-41B0-A968-62DD5FB14DA4 OF
  PROCESS SHARINGD (64)
```

# AIRDROP - FILE TRANSFER (IPHONE TO IPHONE) [1] - IOS LOGS – DYNAMIC ANALYSIS

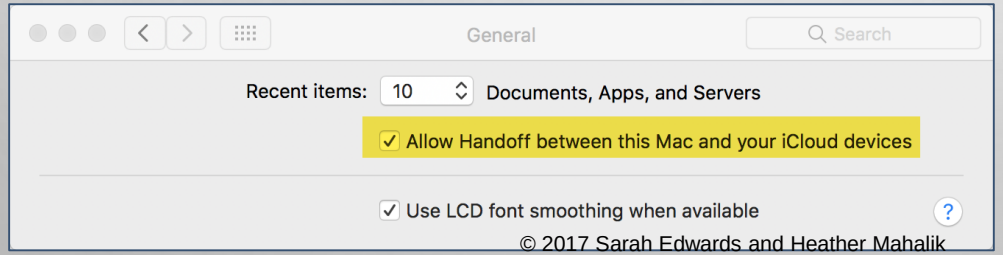
```
MOBILESLIDESHOW(SHARING)[13181] <NOTICE>: SFBROWSERCALLBACK (NODE = <SFNODE 0X1746E5680>
  {DOMAIN = AIRDROP})
MOBILESLIDESHOW(SHARING)[13181] <NOTICE>: ( "<SFNODE 0X1746E1880>{HEATHER MAHALIK, ID =
  DE8110984FD3, DEVICE = (NULL)}")

SHARINGD[64] <NOTICE>: NEW AIRDROP CONNECTION
SHARINGD(CFNETWORK)[64] <NOTICE>: TCP CONN 0X1593A7C60 STARTED
SHARINGD(CFNETWORK)[64] <NOTICE>: TCP CONN 0X1593A7C60 STARTING SSL NEGOTIATION
SHARINGD(CFNETWORK)[64] <NOTICE>: TCP CONN 0X1593A7C60 SSL HANDSHAKE DONE
SHARINGD[64] <NOTICE>: AIRDROP SERVER TRANSACTION BEGIN (1)
SHARINGD[64] <NOTICE>: AIRDROP RECEIVED ASK REQUEST
SHARINGD[64] <NOTICE>: AIRDROP PARSING ASK REQUEST
SHARINGD[64] <NOTICE>: AIRDROP RECEIVED UPLOAD REQUEST
SHARINGD[64] <NOTICE>: AIRDROP IS USING ADAPTIVE COMPRESSION
SPRINGBOARD(COREMOTION)[7792] <NOTICE>: NOTIFY FROM, FACEUP -> PORTRAIT
SPRINGBOARD[7792] <NOTICE>: RECEIVED REQUEST TO ACTIVATE ALERTITEM: <SFALERTITEM:
  0X1748C3FE0>
SPRINGBOARD[7792] <NOTICE>: ACTIVATION - PRESENTING <SFALERTITEM: 0X1748C3FE0> WITH
  PRESENTER: <SBUNLOCKEDALERTITEMPRESENTER: 0X174212690>
```

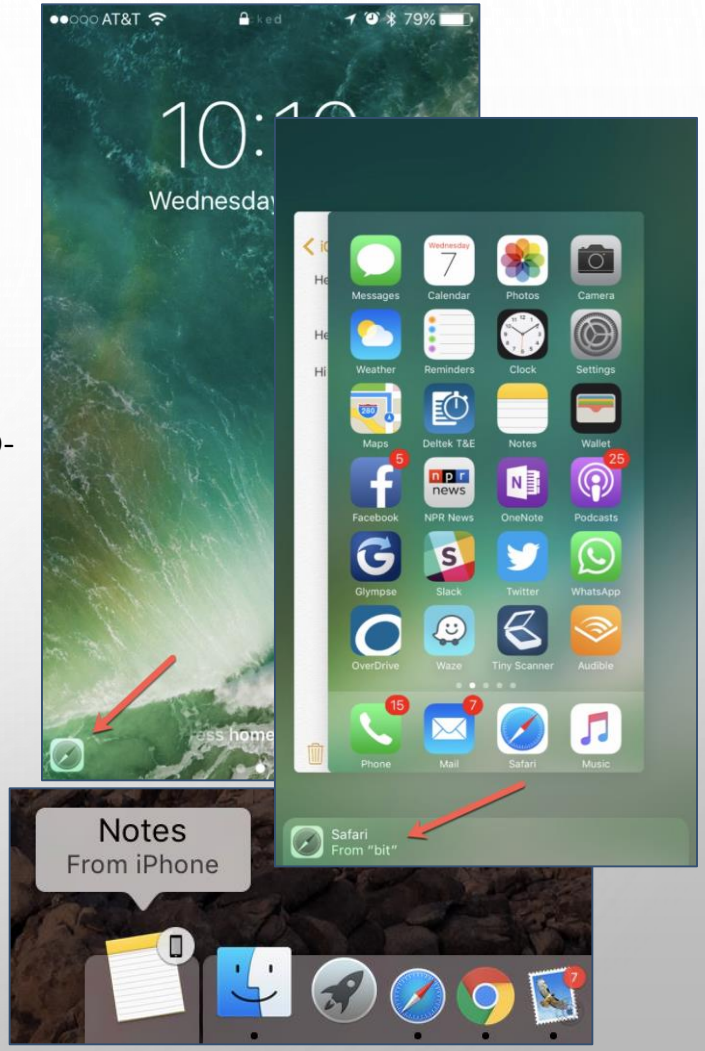
# AIRDROP - FILE TRANSFER (IPHONE TO IPHONE) [2] - IOS LOGS – DYNAMIC ANALYSIS

```
SHARINGD[64] <NOTICE>: ACCEPTING TRANSFER <SFAIRDROPTRANSFERDATA:
  0X159341920> RECORDID: 5CF33654-103D-42D5-9F3C-927BFE023E1F
SHARINGD[64] <NOTICE>: AIRDROP SERVER TRANSACTION END (0)
SHARINGD(CFNETWORK)[64] <NOTICE>: TCP CONN 0X15932F560 CANCELED
```

# HANDOFF

- CONTINUE USING APPLICATIONS BETWEEN YOUR IPHONE AND MAC (AND VICE VERSA!)
  - MESSAGES, NOTES, BROWSERS, MAIL, MAPS, REMINDERS, CALENDAR, CONTACTS, PAGES, NUMBERS, KEYNOTE, AND THIRD-PARTY APPS!
- BLUETOOTH & WI-FI ENABLED
- SAME WI-FI NETWORK
- SAME ICLOUD ACCOUNTS
- HANDOFF ENABLED

# HANDOFF FROM IPHONE TO MAC - MAC LOGS [1]

**SHARINGD: [COM.APPLE.SHARING.HANDOFF]** SUCCESSFULLY DECRYPTED **ADVERTISEMENT** (SHARING FLAGS + ADVERTISEMENTPAYLOAD): <B3A7F3448A2BCD1E7D46> => <008E6F4D00**476ED213EFA5140188**>, COUNTER: 28558

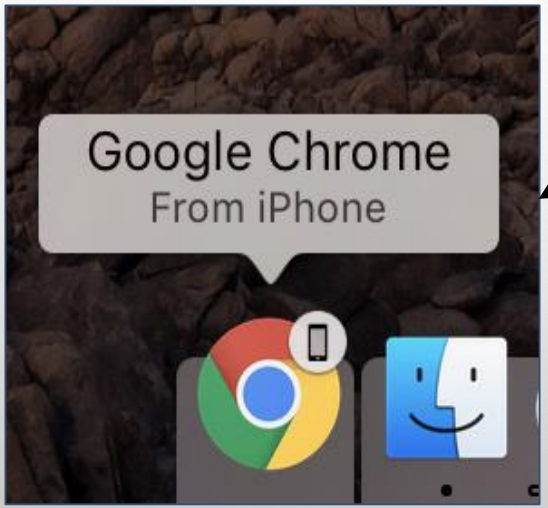
SHARINGD: [COM.APPLE.SHARING.HANDOFF] RECEIVED A NEW ADVERTISEMENT <SFACTIVITYADVERTISEMENT: 0X7FBCC0C86420, **DEVICEUNIQUEID:F9B85FFC-2BC6-4E80-93DA-67508472C8F8,** ADVERTISEMENTPAYLOAD:<**476ED213EFA5140188**>, OPTIONS:{SFACTIVITYADVERTISEROPTIONFLAGCOPYPASTEKEY = 0;SFACTIVITYADVERTISEROPTIONMINORVERSIONKEY = 0;SFACTIVITYADVERTISEROPTIONVERSIONKEY = 0;}, **DEVICENAME:MIPHONE7, DEVICEMODELIDENTIFIER:IPHONE9,3**>

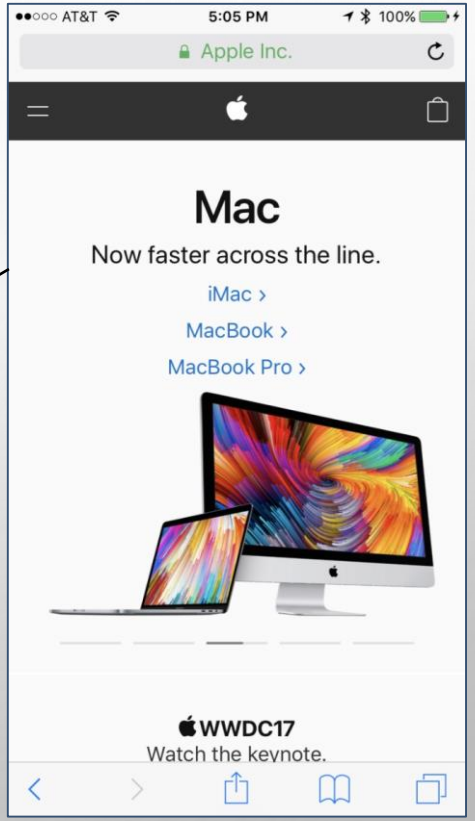
# HANDOFF FROM IPHONE TO MAC - MAC LOGS [2]

```
USERACTIVITYD: (SHARING) [COM.APPLE.SHARING.HANDOFF] [SFCONTINUITYSCANMANAGER]
  RECEIVED ADVERTISEMENT <SFACTIVITYADVERTISEMENT: 0X7FFC7AE219F0,
  DEVICEIDENTIFIER:F9B85FFC-2BC6-4E80-93DA-675084
DOCK: (USERACTIVITY) [COM.APPLE.USERACTIVITY.MAIN]
  NOTIFYBESTAPPCHANGED:B81C0F47-0724-4E2B-966C-67C9E2FBA669 USERACTIVITY
  <PRIVATE>/<PRIVATE> OPTS={
     SFACTIVITYADVERTISEROPTIONFLAGCOPYPASTEKEY = 0;
     SFACTIVITYADVERTISEROPTIONMINORVERSIONKEY = 0;
     SFACTIVITYADVERTISEROPTIONVERSIONKEY = 0;
     USERACTIVITYHASWEBPAGEURL = 1;
} WHEN=2017-06-17 20:53:38 +0000 CONFIDENCE=1 FROM=<PRIVATE>/<PRIVATE>

BIRD: (CLOUDDOCSDAEMON) [COM.APPLE.CLOUDDOCS.DEFAULT] [INFO]  ┌172 <PRIVATE>
  (<PRIVATE>) -[BRCXPCREGULARIPCSCLIENT
  DIDRECEIVEHANDOFFREQUESTFORBUNDLEID:REPLY:]
```

# HANDOFF FROM IPHONE TO MAC - MAC LOGS [3]

- BROWSING IN SAFARI ON IPHONE, WHILE MACBOOK PRO IS LOGGED IN
- WILL OPEN SAFARI LINK IN DEFAULT WEB BROWSER ON MAC - CHROME!
- NOTE: HANDOFF WAS NOT COMPLETED - ACTIVITY JUST HAPPENS IN THE BACKGROUND.



# HANDOFF FROM IPHONE TO MAC - MAC LOGS (LINK CLICKED) [1]

**USERACTIVITYD: [COM.APPLE.USERACTIVITY.MAIN]** QUEUING FETCH FOR BESTAPPUUID **009DBBD2-A6F6-4A2E-A5CE-46BD46B90108**

USERACTIVITYD: [COM.APPLE.USERACTIVITY.MAIN] -- ACTIVITY WITH UUID 009DBBD2-A6F6-4A2E-A5CE-46BD46B90108, **SO FETCHING PAYLOAD FOR IT.**

USERACTIVITYD: [COM.APPLE.USERACTIVITY.MAIN] **REQUESTING PAYLOAD** FOR ITEM 009DBBD2-A6F6-4A2E-A5CE-46BD46B90108 ADVERTISEMENTPAYLOAD=**41E36BAF264809** BUNDLEIDENTIFIER=<PRIVATE>

USERACTIVITYD: (SHARING) [COM.APPLE.SHARING.HANDOFF] [SFCONTINUITYSCANMANAGER] **DISPATCHING PAYLOAD REQUEST** TO **F9B85FFC-2BC6-4E80-93DA-67508472C8F8** FOR <**41E36BAF264809**>

SHARINGD: [COM.APPLE.SHARING.HANDOFF] **REQUESTING HANDOFF PAYLOAD** FOR <41E36BAF264809> WITH MESSAGE GUID: AE52B945-31A6-4ABC-8698-F0951E720ACB

# HANDOFF FROM IPHONE TO MAC - MAC LOGS (LINK CLICKED) [2]

SHARINGD: (IDS) [**COM.APPLE.TRANSPORT.IDSCONNECTION**] CLIENT REQUEST TO SEND PROTOBUF ON SERVICE: **COM.APPLE.PRIVATE.ALLOY.CONTINUITY.ACTIVITY** GUID: AE52B945-31A6-4ABC-8698-F0951E720ACB TO DESTINATIONS: <PRIVATE> OPTIONS: <PRIVATE> **SIZE: 107**] (1 PENDING)

IDENTITYSERVICESD: (WIRELESSPROXIMITY) [COM.APPLE.BLUETOOTH.WIRELESSPROXIMITY] **CONTINUITY CONNECT TO PEER: F768D25B-1EC8-476B-B4A3-D757890CD2E8**

**GOOGLE CHROME:** (COREFOUNDATION) [**COM.APPLE.CFPASTEBOARD.ENTRY**] **_COPYDATA**('APPLE CFPASTEBOARD FIND' GEN: 215 ITEM: 789514 FLAVOR: **'PUBLIC.UTF8-PLAIN-TEXT'**) CURRENT-GEN: 215

SHARINGD: [COM.APPLE.SHARING.HANDOFF] **RECEIVED REQUESTED HANDOFF PAYLOAD FROM "MIPHONE7"** (**F9B85FFC-2BC6-4E80-93DA-67508472C8F8**) FOR <**41E36BAF264809**> WITH ACTIVITY PAYLOAD OF SIZE 162 FOR REQUESTIDENTIFIER AE52B945-31A6-4ABC-8698-F0951E720ACB ((NULL)). RTT:2S944MS

# HANDOFF FROM IPHONE TO MAC - MAC LOGS - OTHER APPS

- **LOOK WITHIN CONTEXT!**

**NOTES:** (LIBSYSTEM_TRACE.DYLIB) SUBSYSTEM: **COM.APPLE.NOTES, CATEGORY: HANDOFF,** ENABLE_LEVEL: 3, PERSIST_LEVEL: 3, DEFAULT_TTL: 0, INFO_TTL: 0, DEBUG_TTL: 0, GENERATE_SYMPTOMS: 0, ENABLE_OVERSIZE: 0, PRIVACY_SETTING: 2, ENABLE_PRIVATE_DATA: 0

**REMINDERS:** (COREFOUNDATION) **_COPYDATA**

**MAIL:** (COREFOUNDATION) **_COPYDATA**

**MAPS:** (COREFOUNDATION) **_COPYDATA**

**NUMBERS:** (COREFOUNDATION) **_COPYDATA**

# HANDOFF FROM MAC TO IPHONE - MAC LOGS [1]

**MAPS: (CORESPOTLIGHT)** [COM.APPLE.CORESPOTLIGHT.DEFAULT] CREATED UA ITEM, IDENTIFIER:<PRIVATE>, SHOULDINDEX:YES, TITLE:"<PRIVATE>", USERACTIVITYTYPE:COM.APPLE.MAPS, BUNDLEID:COM.APPLE.MAPS

**SHARINGD: [COM.APPLE.SHARING.HANDOFF]** REQUEST TO ADVERTISE <**A0ED1D839414C8**008D> WITH OPTIONS {SFACTIVITYADVERTISEROPTIONFLAGCOPYPASTEKEY = 0;}

SHARINGD: [COM.APPLE.SHARING.HANDOFF] **RECEIVED HANDOFF PAYLOAD REQUEST FROM "MIPHONE7" (F9B85FFC-2BC6-4E80-93DA-67508472C8F8)** WITH REQUESTIDENTIFIER 9D4DEC8C-54FB-4B9D-94C1-3AF0143AD42B COMMAND=HANDOFF FOR ADVERTISEMENTPAYLOAD <**A0ED1D839414C8**>

USERACTIVITYD: (SHARING) [COM.APPLE.SHARING.HANDOFF] [SFACTIVITYADVERTISER] RECEIVED PAYLOAD REQUEST FROM <SFPEERDEVICE: 0X7FFC7AF83D40, UNIQUEID:F9B85FFC-2BC6-4E80-93DA-67508472C8F8, **MODELIDENTIFIER:IPHONE9,3, NAME:MIPHONE7**> FOR <**A0ED1D839414C8**>

# HANDOFF FROM MAC TO IPHONE - MAC LOGS [2]

SHARINGD: [COM.APPLE.SHARING.HANDOFF] **READY TO RESPOND TO HANDOFF** REQUEST FROM "MIPHONE7" (F9B85FFC-2BC6-4E80-93DA-67508472C8F8) WITH REQUESTIDENTIFIER 9D4DEC8C-54FB-4B9D-94C1-3AF0143AD42B FOR ADVERTISEMENTPAYLOAD <A0ED1D839414C8>, COMMAND: HANDOFF. RTT:3MS

USERACTIVITYD: (SHARING) [COM.APPLE.SHARING.HANDOFF] [SFACTIVITYADVERTISER] **RECEIVED PAYLOAD REQUEST** FROM <SFPEERDEVICE: 0X7FFC7AF83D40, UNIQUEID:F9B85FFC-2BC6-4E80-93DA-67508472C8F8, MODELIDENTIFIER:IPHONE9,3, NAME:MIPHONE7> FOR <A0ED1D839414C8>. HANDLED: YES

**BIRD: (CLOUDDOCSDAEMON) [COM.APPLE.CLOUDDOCS.DEFAULT]** [INFO] ⌐27C <PRIVATE> (<PRIVATE>) -[BRCXPCREGULARIPCSCLIENT DIDRECEIVEHANDOFFREQUESTFORBUNDLEID:REPLY:]

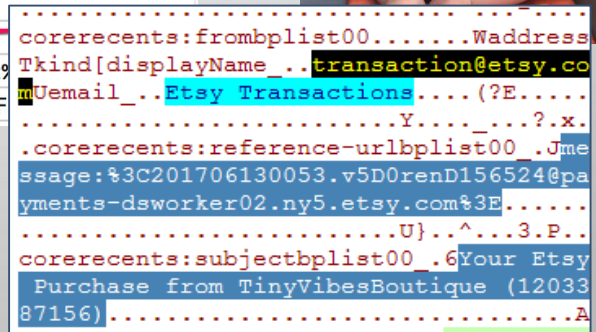
SHARINGD: [COM.APPLE.SHARING.HANDOFF] **REQUESTING HANDOFF ENCRYPTION KEY FROM "MIPHONE7"**

# IOS APPLE PAY ARTIFACTS

PAY FOR ITEMS USING SAFARI BY USING YOUR IPHONE TOUCHID OR APPLE WATCH

- /COM.APPLE.MOBILESAFARI/LIBRARY/SAFARI/HISTORY.DB
  - VERIFY ORIGIN COLUMN (ON DEVICE OR NOT)
    - 1= VISITED FROM ANOTHER SYSTEM, 0= ON DEVICE

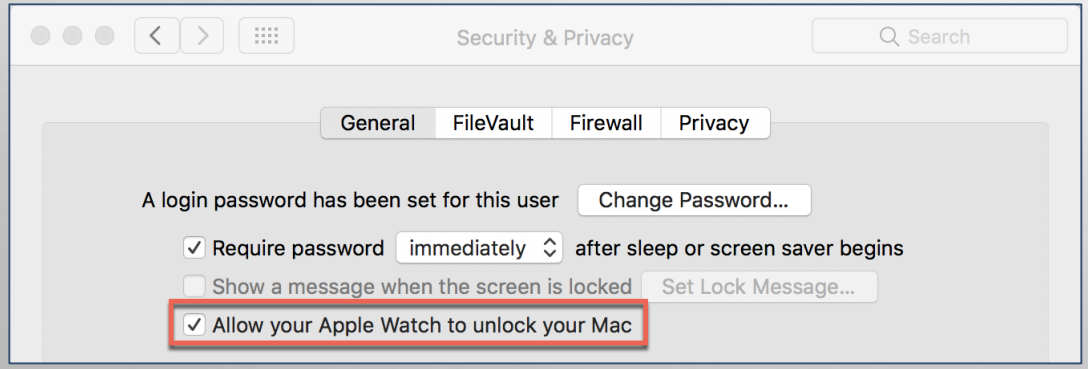
| | |
|---|---|
| 900 | https://www.etsy.com/ |
| 901 | http://etsy.com/ |
| 902 | https://www.etsy.com/shop/TinyVibesBoutique?ref=search_shop_redirect |
| 903 | https://www.etsy.com/search?q=tiny%20vibes%20boutique |
| 904 | https://www.etsy.com/signin?workflow=ZmF2b3JpdGVfdXNlcl9pZDo4MDM1OTA2NDoxNDk3MzE2MTA4OjFiMWI0MmVmMjkwYW |
| 905 | https://www.etsy.com/listing/535258907/tiny-vibes-lemon-yellow-maxi-bows?ref=shop_home_active_7 |
| 906 | https://www.etsy.com/cart?ref=hdr |
| 907 | https://www.etsy.com/cart/listing.php |
| 908 | https://www.etsy.com/cart/?show_cart=1299846552 |
| 909 | https://www.etsy.com/cart/1299846552/checkout/?guest=1&payment_method=apple_pay |
| 910 | https://www.etsy.com/join/email?from_action=checkout&from_page=https%3A%2F%2Fwww.etsy.com%2Fcart% |
| 911 | https://www.etsy.com/signin?from_action=checkout&from_page=https%3A%2F%2Fwww.etsy.com%2Fcart%2F |




- var/mobile/Library/Mail/recents

# AUTO UNLOCK

- UNLOCK YOUR MAC WITH YOUR APPLE WATCH
- DEVICES MUST BE USING SAME ICLOUD ACCOUNT
- TWO-FACTOR AUTHENTICATION ENABLED FOR ICLOUD ACCOUNT
- PASSWORD/PASSCODE ON EACH DEVICE
- BLUETOOTH/WI-FI ENABLED (DOES NOT HAVE TO BE ON WI-FI NETWORK)



# AUTO UNLOCK - MAC UNIFIED LOGS

- LOOK FOR THE FOLLOWING ENTRIES:

```
AKD: (AUTHKIT) [COM.APPLE.AUTHKIT.CORE] MKB REPORTED LOCK STATE: #
SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] KEYBAG STATE CHANGED #
```

- DEVICE LOCK STATES:
  - "2": LOCKING DEVICE
  - "1": DEVICE IS LOCKED
  - **"0": DEVICE IS UNLOCKED**
- WILL NEED TO LOOK CLOSER TO SEE IF SPECIFICALLY UNLOCKED WITH APPLE WATCH
- "`COM.APPLE.SHARING.AUTOUNLOCK`"…BUT ALSO:
  - `COM.APPLE.BLUETOOTH.WIRELESSPROXIMITY`
  - `COM.APPLE.SHARING.SDNEARBYAGENTCORE`
  - `COM.APPLE.SHARING.HANDOFF`
  - AND MORE!

# AUTO UNLOCK - MAC UNIFIED LOGS

```
SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] HINTS PROVIDER ACTIVATED FOR USER:
  OOMPA
SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] AUTOMATION: ATTEMPT START
SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] BEGIN AUTO UNLOCK: 15:00:00.651
SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] LAST MACHINE WAKE DATE 2017-06-17
  18:49:00 +0000

SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] TRYING TO USE CACHED DEVICE:
  <SFAUTOUNLOCKDEVICE: 0X7FBCC0F6A810, UNIQUEID:47B476E2-6B76-4D3D-B078-
  A24305AF1A21, BLUETOOTH ID:C905A733-BEA0-4680-A41F-4DCDF577A099, CLOUD
  PAIRED:YES, MODELIDENTIFIER:WATCH2,3, NAME:MIWATCH, UNLOCKENABLED:YES>

SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] SCANNING FOR BLUETOOTH IDS {(
    F768D25B-1EC8-476B-B4A3-D757890CD2E8,
    C905A733-BEA0-4680-A41F-4DCDF577A099
)}
```

# AUTO UNLOCK - MAC UNIFIED LOGS

```
SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] RETURNING HINTS DICTIONARY {
    1 = OOMPA;
    5 = "UNLOCKING WITH APPLE WATCH\U2026";
}
SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] FOUND PEER:
  DEVICE <NAME:MIWATCH, UNIQUEID:47B476E2-6B76-4D3D-B078-A24305AF1A21,
  BLUETOOTH ID:C905A733-BEA0-4680-A41F-4DCDF577A099,
  MODELIDENTIFIER:WATCH2,3>,
  PEER <SFBLEDEVICE ID C905A733-BEA0-4680-A41F-4DCDF577A099, ADVDATA
  '0180', RSSI -39, 0, [-39], NAME '?', PAIRED NO>,
  UNLOCK ENABLED: YES,
  PROXY UNLOCK ENABLED: NO,
  LOCKED ON WRIST: NO
```

# AUTO UNLOCK - MAC UNIFIED LOGS

- LOCALLY ADMINISTERED MAC ADDRESS SPACE (SIMILAR TO PRIVATE IP SPACE)
- IF FIRST OCTET'S SECOND CHARACTER = (2, 6, A, E) = LOCALLY ADMINISTERED SPACE
  - RANDOMIZED MAC ADDRESS WHEN WORKING WITH APPLE DEVICES
- 3**E**:C2:D8:12:E5:21 = NOT THE PERMANENT MAC ADDRESS OF THE APPLE WATCH

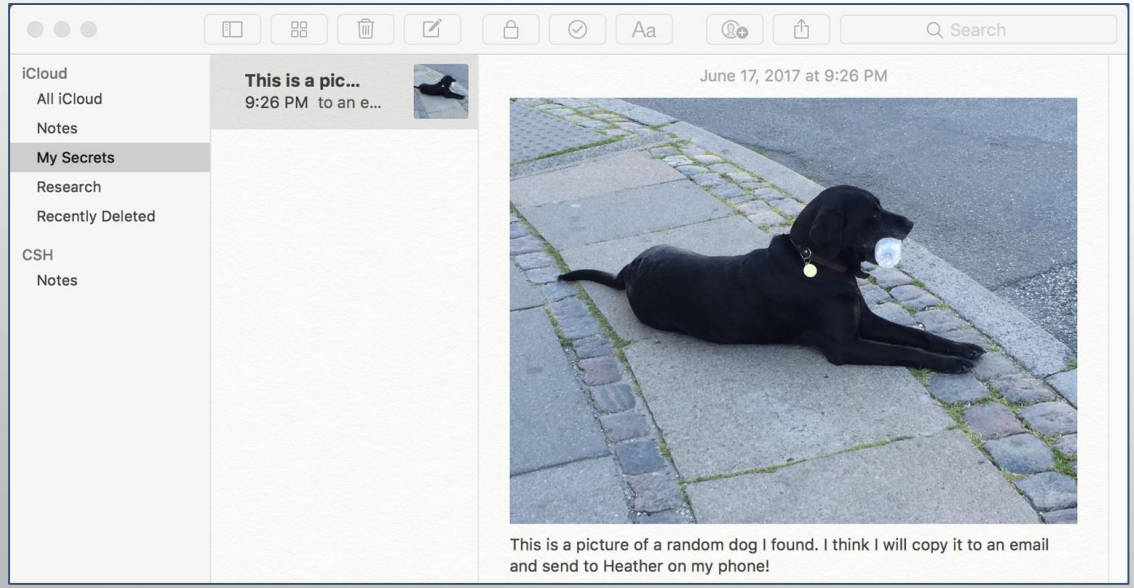
```
SHARINGD: (CORELOCATION) [COM.APPLE.LOCATIOND.POSITION.PROXIMITY] WRTT:
  RECEIVED ONCLIENTEVENTPEERRANGING
SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] CL COMPLETED RANGING: (
    "PEER: 3E:C2:D8:12:E5:21 TIME:2017-06-17 19:00:02 +0000
  DISTANCE[M]:1000.00 ACCURACY[M]:0.00 UNLOCK:YES SECURE:YES
  INITIATOR:NO"
)
SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] PEER IN RANGE
SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] AKS UNLOCK SUCCEEDED
SHARINGD: [COM.APPLE.SHARING.AUTOUNLOCK] KEYBAG STATE CHANGED 0
```

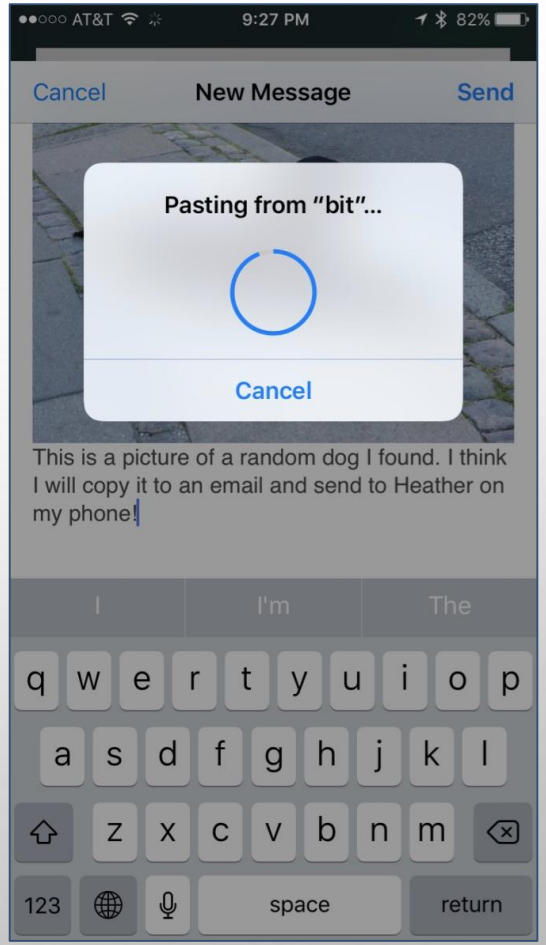
# AUTO UNLOCK - LOG CAVEATS

- UNIFIED LOGS
  - MANY, MANY, MANY MORE RELATED LOG ENTRIES!
- BSM AUDIT LOGS
  - DOES NOT GET RECORDED LIKE A LOGIN TYPED IN VIA ‘LOGINWINDOW’.
- SYSTEM.LOG
  - LOGIN/LOGOUT ACTIVITY APART FROM BOOT/REBOOT LOGINS DOES NOT GET RECORDED.

# UNIVERSAL CLIPBOARD

- COPY AND PASTE ACROSS DEVICES.
- VERY SIMILAR TO HANDOFF!



# UNIVERSAL CLIPBOARD - MAC LOGS (MAC TO IPHONE)

**USERACTIVITYD: [COM.APPLE.USERACTIVITY.PASTEBOARD-SERVER] [PBOARD] PASTE REQUESTED**

USERACTIVITYD: (SHARING) [**COM.APPLE.SHARING.HANDOFF**] [SFACTIVITYADVERTISER] **RECEIVED PAYLOAD REQUEST** FROM <SFPEERDEVICE: 0X7FFC7AE18900, **UNIQUEID:F9B85FFC-2BC6-4E80-93DA-67508472C8F8, MODELIDENTIFIER:IPHONE9,3, NAME:MIPHONE7**> FOR <7062706173746521>. HANDLED: YES

PBOARD: (COREFOUNDATION) **PROVIDE REMOTE PASTEBOARD DATA**

**PBOARD:** (COREFOUNDATION) [**COM.APPLE.CFPASTEBOARD.REMOTE**] REMOTE PASTEBOARD **FETCHING LOCAL DATA** FOR PROVIDER: (UUID:BF70B19C-4610-403F-A45B-F5C42120E988 GEN: 111 ITEM: 789514 FLAVOR: **'COM.APPLE.FLAT-RTFD'**)

# UNIVERSAL CLIPBOARD - MAC LOGS (IPHONE TO MAC)

PBOARD: (COREFOUNDATION) [**COM.APPLE.CFPASTEBOARD.REMOTE**] **REMOTE PASTEBOARD BECAME AVAILABLE**

USERACTIVITYD: (SHARING) [**COM.APPLE.SHARING.HANDOFF**] [SFCONTINUITYSCANMANAGER] **DISPATCHING PAYLOAD REQUEST TO F9B85FFC-2BC6-4E80-93DA-67508472C8F8** FOR <7062747970657321>

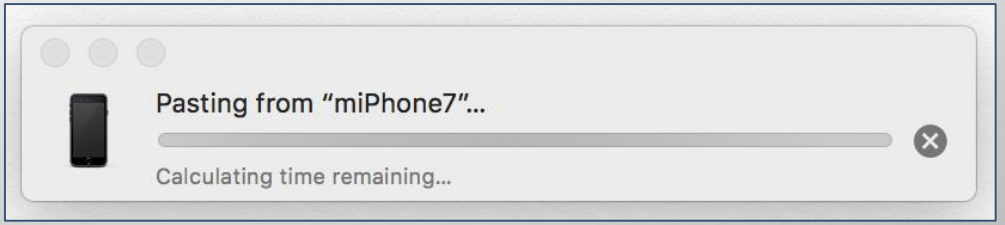
PBOARD: (COREFOUNDATION) [COM.APPLE.CFPASTEBOARD.REMOTE] REMOTE METADATA FETCH **RECEIVED 2 ITEMS**

PBOARD: (COREFOUNDATION) [COM.APPLE.CFPASTEBOARD.REMOTE] PROMISED REMOTE DATA FOR 'APPLE CFPASTEBOARD REMOTE' ITEM: **1 FLAVOR: 'PUBLIC.JPEG'** PROVIDER: METADATA RESULT: 0

PBOARD: (COREFOUNDATION) [COM.APPLE.CFPASTEBOARD.ENTRY] _PROMISEDATA('APPLE CFPASTEBOARD REMOTE' GEN: 120 ITEM: **1 FLAVOR: 'COM.APPLE.MOBILESLIDESHOW.ASSET.LOCALIDENTIFIER'** CONTEXT:(METADATA) NOTIFYSERVER: 0)

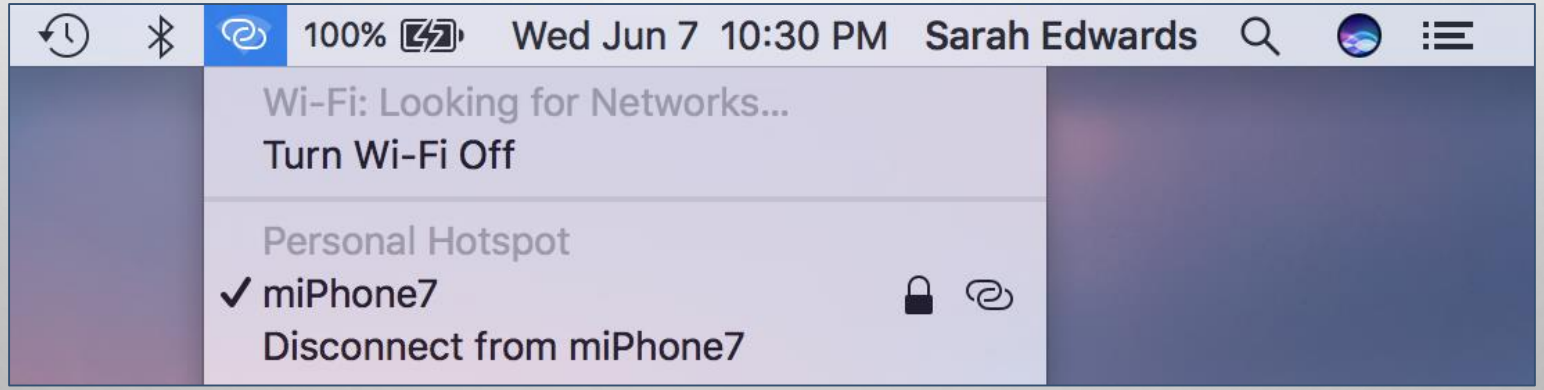
# UNIVERSAL CLIPBOARD - MAC LOGS (IPHONE TO MAC)

```
TEXTEDIT: (COREFOUNDATION) [COM.APPLE.CFPASTEBOARD.EXIT] NOT SETTING FLAGS FOR
  'APPLE CFPASTEBOARD GENERAL' - HAS PENDING REMOTE PASTEBOARD - GEN: -1 ITEM:
  2 FLAVOR: COM.APPLE.QUICKTIME-MOVIE
UASHAREDPASTEBOARDPROGRESSUI: [COM.APPLE.USERACTIVITY.SPBPROGRESSUI]
  [SHAREDPASTEBOARDPROGRESSUI] SHOWING PROGRESS UI
USERACTIVITYD: [COM.APPLE.USERACTIVITY.PASTEBOARD-SERVER] [IN STREAM] STARTED
  RECEIVING DATA FILE
MDNSRESPONDER: [COM.APPLE.MDNSRESPONDER.ALLINFO]  45:
  DNSSERVICERESOLVE(A55FF0A47E53._CONTINUITY._TCP.LOCAL.) RESULT
  MIPHONE7.LOCAL.:8771
```



# INSTANT HOTSPOT

- CONNECT TO YOUR IPHONE'S HOTSPOT USING YOUR MAC
- 'PERSONAL HOTSPOT' MUST BE ENABLED ON IDEVICE
- DEVICES SIGNED INTO SAME ICLOUD ACCOUNT
- BLUETOOTH AND WI-FI ENABLED

# INSTANT HOTSPOT - MAC LOGS

**WIFIAGENT: (SHARING) [COM.APPLE.SHARING.TETHERING] STARTING BROWSING**

SHARINGD: [COM.APPLE.SHARING.TETHERING] STARTING BROWSING

SHARINGD: [COM.APPLE.SHARING.TETHERING] RESTARTED **SCANNING FOR AVAILABLE TETHERING DEVICES** [5FC3A499-1C18-4957-819A-539D111AE921, F1BAD73A-97D9-40FB-9C7C-373333322A3A, **F768D25B-1EC8-476B-B4A3-D757890CD2E8**]

SHARINGD: [COM.APPLE.SHARING.TETHERING] **DISCOVERED NEW DEVICE** IN 1.677536 SECONDS

WIFIAGENT: (SHARING) [COM.APPLE.SHARING.TETHERING] ENABLING <**SFREMOTEHOTSPOTDEVICE**: 0X7FE674E52A10, **NAME: MIPHONE7, IDENTIFIER: F768D25B-1EC8-476B-B4A3-D757890CD2E8, BATTERY LIFE: 100, NETWORK TYPE: LTE, SIGNAL STRENGTH: 2**, HAS DUPLICATES: NO>

# INSTANT HOTSPOT - MAC LOGS

```
SHARINGD: [COM.APPLE.SHARING.TETHERING] ENABLING HOTSPOT FOR DEVICE (NAME =
  MIPHONE7, IDENTIFIER = F768D25B-1EC8-476B-B4A3-D757890CD2E8, BATTERYLIFE =
  100)

SHARINGD: [COM.APPLE.SHARING.TETHERING] REQUESTING CREDENTIALS FROM BLUETOOTH
  PEER = F768D25B-1EC8-476B-B4A3-D757890CD2E8

SHARINGD: [COM.APPLE.SHARING.TETHERING] RECEIVE CREDENTIALS DICTIONARY
  (DICTIONARY = YES, NAME = MIPHONE7, CHANNNEL = 6, PASSWORD = YES)

WIFIAGENT: (SHARING) [COM.APPLE.SHARING.TETHERING] ENABLED
  <SFREMOTEHOTSPOTDEVICE: 0X7FE674E52A10, NAME: MIPHONE7, IDENTIFIER:
  F768D25B-1EC8-476B-B4A3-D757890CD2E8, BATTERY LIFE: 100, NETWORK TYPE: LTE,
  SIGNAL STRENGTH: 2, HAS DUPLICATES: NO>, <SFREMOTEHOTSPOTINFO:
  0X7FE674C3FE20>, ERROR ((NULL))
```

# CAVEATS

WHAT WE KNOW SO FAR...

- MAC ARTIFACTS PROVED TO BE MORE FRUITFUL (PUN INTENDED)
- IOS MAY REQUIRE DYNAMIC ANALYSIS OF THE IPHONE
- DETERMINING WHERE THE ACTION OCCURRED MAY NOT ALWAYS BE POSSIBLE
- TIMESTAMPS ARE TRICKY FOR DCIM
- WE'VE ONLY SCRATCHED THE SURFACE

# STILL THIRSTY? LET US POUR YOU A COLD ONE.

- MUCH MORE RESEARCH TO DO! COME TO OUR UPDATED TALKS AT:
  - NETWORK SECURITY, SANSFIRE, CDI
  - *ADDING IN THE NETWORK PERSPECTIVE (THANKS PHIL HAGEN)
- COME TO OUR CLASSES!
- 585 - ADVANCED SMARTPHONE FORENSICS - FOR585.COM
  - CHICAGO (AUG), VEGAS (SEPT), BERLIN (OCT)
- 518 - MAC FORENSIC ANALYSIS - FOR518.COM
  - VEGAS (SEPT) & PRAGUE, CZ (OCT)