SANS DFIR CURRICULUM

(f) SANSForensics (D) @SANSForensics (D) dfir.to/DFIRCast (E) dfir.to/LinkedIn

DIGITAL FORENSICS





GCFE







Gigabyte

Evidence per

for585.com/poster

DFPS_FOR585_v3.9_04-24

FOR585: **Smartphone Forensic Analysis** In-Depth

sans.org/for585







FOR589 Cybercrime Cyber Threat Intelligence Intelligence **GCTI**



Enterprise-Class Incident Response & Threat Hunting **GEIR**

Enterprise Cloud

Forensics &

Incident Response

GCFR



INCIDENT RESPONSE & THREAT HUNTING

FOR528 Ransomware and Cyber **Extortion**

REM: Malware Analysis

Tools & Techniques



Advanced Network Forensics: Threat Hunting, Analysis & **Incident Response GNFA**

Reverse-Engineering

Malware: Advanced

Code Analysis



LINUX Incident Response and Threat

Hunting



SEC504

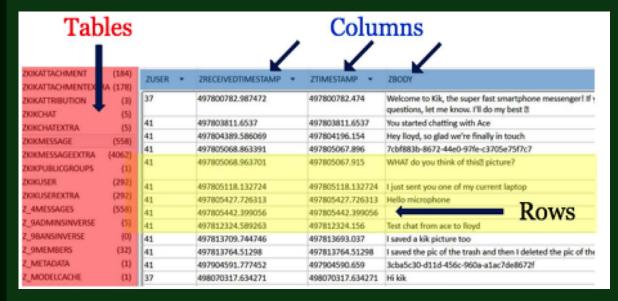
Hacker Tools, Techniques & Incident Handling

SQLite

SQLite Database Basics

SQLite databases are a self-contained database stored as a file system file (but may have a few supporting files that will also be needed for analysis!) Files have the magic number "SQLite format 3." SQLite files correspond to a database that contains tables. Tables contain rows of data with corresponding columns that describe the data in the row.

The Most Relevant



Some temporary files may also be created, including Journal files and Write Ahead Logs. Journal files store original data before a transaction change so the database can be restored to a known state if an error occurs. They are created by default.

Write Ahead Logs (WAL) contain new data changes, leaving original database untouched. After a set number of page changes, the WAL is used to update the actual database. Write ahead logs are optional. Journal files – stores original data before a transaction change so the database can be restored to a known state if an error occurs (created by default).

Timestamp Conversion

Timestamps are stored in the databases as one of several numerical representations. (Timestamps are assumed to be stored in UTC, you may need to verify this.)

UNIX Epoch (10 digits number – number of seconds since 01/01/1970 00:00:00):

• SELECT datetime (TS COLUMN, 'unixepoch') Or in **local time** as suggested by the device settings (this can be done for all the

following timestamps):

• SELECT datetime (TS COLUMN, 'unixepoch', 'localtime') UNIX Epoch MILLISECONDS (13 digits number – number of milliseconds since

01/01/1970 00:00:00): • SELECT datetime(TS COLUMN/1000, 'unixepoch');

UNIX Epoch MICROSECONDS (16 digits number – number of microseconds since 01/01/1970 00:00:00):

• SELECT datetime (TS COLUMN/1000000, 'unixepoch');

Mac Absolute (9 or 18 digits – number of seconds/nanoseconds since 01/01/2001 00:00:00. In order to correctly convert this timestamp, first, add the number of seconds since UNIXEPOCH time to Mac Absolute Time (978307200), then convert:

• SELECT datetime(TS_COLUMN + 978307200, 'unixepoch');

Chrome (17 digits – number of microseconds since 01/01/1601 00:00:00):

• SELECT datetime (TS COLUMN/1000000 + (strftime('%s','1601-01-01')),'UNIXEPOCH');

Basic Analysis Query Structure

Get everything from a single table: **SELECT * FROM A_TABLE**;

Get two columns from a single table: SELECT COLUMN A, COLUMN B FROM A TABLE;

Table Joins

Taking data from two (or more!) tables that have a column in common and joining them into one table. Identify tables of interest that contain unique values. **LEFT JOIN** – Resulting rows are returned from the **LEFT** table even if there are no matches in the right. Using the **LEFT JOIN** returns all the text messages, including those with and without attachments.

SELECT ZVIBERMESSAGE.ZTEXT AS "Message Text", ZATTACHMENT.ZNAME AS "Attachment Filename", datetime(ZVIBERMESSAGE.ZDATE+978307200, 'unixepoch', 'localtime') AS "Message Date", ZVIBERMESSAGE. ZSTATE AS "Message Direction/State" FROM ZVIBERMESSAGE LEFT JOIN ZATTACHMENT on ZATTACHMENT.Z PK=ZVIBERMESSAGE.ZATTACHMENT

INNER JOIN – Resulting rows are returned when both items are a match. Using the **INNER JOIN** (also achieved by typing "**JOIN**" in the query) returned just the messages that included attachments.

Useful Stuff

Column Renaming:

A_TABLE.ZAWKWARDCOLUMNNAME AS "Chat Messages'

SELECT COUNT(*) FROM A TABLE;

Aggregating with GROUP BY and COUNT (Count chat messages per contact): SELECT MESSAGES, COUNT(*) FROM CHAT GROUP BY CONTACT;

Sorting with ORDER BY: SELECT * FROM CHAT ORDER BY A TIMESTAMP ASC

ASC = Ascending DESC = Descending

Searching with WHERE and LIKE:

SELECT CONTACT, MESSAGE FROM CHAT WHERE CONTACT LIKE '%Hank%'

Our Favorite Mobile Forensics Resources

Practitioners/Researchers

Sarah Edwards Mattia Epifani Adrian Leong Alexis Brignoni Jon B Mari DeGrazia **Andrew Hoog**

Ian Whiffin

Josh Hickman

Scott Koenig

Kevin Pagano

Jessica Hyde

Heather Barnhart https://smarterforensics.com https://blog.digital-forensics.it http://cheeky4n6monkey.blogspot.com https://abrignoni.blogspot.com https://www.ciofecaforensics.com https://az4n6.blogspot.com https://www.hack42labs.com https://doubleblak.com https://thebinaryhick.blog https://theforensicscooter.com

https://www.hexordia.com/blog-1-1

https://www.mac4n6.com https://www.stark4n6.com

Vendors Oxygen Forensics Magnet Forensics Cellebrite Elcomsoft MSAB

Belkasoft Grayshift Paraben MobilEdit

https://blog.oxygen-forensic.com https://www.magnetforensics.com https://www.cellebrite.com/en/blog Sanderson Forensics https://sqliteforensictoolkit.com/ support-articles

https://blog.elcomsoft.com https://www.msab.com/resources/blog https://belkasoft.com/articles https://www.grayshift.com

https://paraben.com/forensic-impact https://www.mobiledit.com

Additional Resources

DFRWS https://dfrws.org iOS Jailbreaks https://www.theiphonewiki.com/wiki/Jailbreak **DFIR Review** https://dfir.pubpub.org This Week in 4N6 https://thisweekin4n6.com IMEI.info https://www.imei.info **GSM Arena** https://www.gsmarena.com Phone DB https://phonedb.net

DFIR mailing list

FOR585 Google Group *access granted to all 585 Alumni DFIR@lists.sans.org

Mobile Malware and Spyware

Key Artifacts: Static Analysis

Requested Permissions: Granted to an application by the user (1) during installation or (2) upon execution/runtime. Found in the AndroidManifest.xml file.

Activities: One or more activities comprise each application. Users

can navigate to/from and interact with activities directly through the User Interface (UI). **Services:** Tasks often running in the background and integrated into the application. User doesn't (normally) interact with Services.

Examples: music playing during a gaming application, or calculations

performed in the background. **Broadcast Receivers:** Facilitates the exchange of information for applications, which can be delivered between app components or between entirely different applications. Applications can be programmed to "listen" for events that are then delivered to the

broadcast receivers using Intents. **Content Providers:** Refers to how information is stored within an application and shared between multiple applications. Example: a contact database often used by many native and third-party applications. The code would call the ContentResolver (the global instance that provides access to the content) that passes on the request to the proper Content Provider.

📤 jadx-gui - evernote.apk ile View Navigation Tools Help 29 Resources ↑ AndroidManifest.xml 🗶 META-INF assets nanifest xmlns:android="http://schemas.android.com/apk/res/android" xmlns:app="http://schem classes.dex <uses-sdk android:minSdkVersion="23" android:targetSdkVersion="28"/> <uses-permission android:name="android.permission.ACCESS_NETWORK_STATE"/> classes2.dex <uses-permission android:name="android.permission.ACCESS_WIFI_STATE"/> firebase-abt.properties <uses-permission android:name="android.permission.FOREGROUND_SERVICE"/> firebase-analytics-impl.properties <uses-permission android:name="android.permission.GET_ACCOUNTS"/> firebase-analytics.properties <uses-permission android:name="android.permission.INTERNET"/> firebase-appindexing.properties <uses-permission android:name="android.permission.READ_SYNC_SETTINGS"/> firebase-common.properties <uses-permission android:name="android.permission.READ_SYNC_STATS"/> firebase-config.properties <uses-permission android:name="android.permission.RECEIVE_BOOT_COMPLETED"/> firebase-core.properties suses-permission android:name="android.permission.USE_BIOMETRIC"/ firebase-iid-interop.properties <uses-permission android:name="android.permission.VIBRATE"/> suses-permission android:name="android.permission.WAKE_LOCK"/> firebase-iid.properties firebase-measurement-connector-impl.properties <uses-permission android:name="android.permission.WRITE_SYNC_SETTINGS"/> suses-permission android:name="com.android.launcher.permission.INSTALL_SHORTCUT" firebase-measurement-connector.properties suses-permission android:name="android.permission.USE_FINGERPRINT"/> uses-permission android:name="android.permission.READ_CALENDAR"/> play-services-ads-identifier.properties suses-permission android:name="android.permission.CAMERA"/> play-services-analytics-impl.properties <uses-permission android:name="android.permission.READ_CONTACTS"/> play-services-analytics.properties <uses-permission android:name="android.permission.MANAGE_ACCOUNTS"/> play-services-audience.properties <uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION"/> play-services-auth-api-phone.properties <uses-permission android:name="android.permission.ACCESS_FINE_LOCATION"/> play-services-auth-base.properties <uses-permission android:name="android.permission.RECORD_AUDIO"/> play-services-auth.properties <uses-permission android:name="android.permission.READ_PHONE_STATE"/s</p> <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/> play-services-base.properties play-services-basement.properties <uses-permission android:name="com.android.vending.BILLING"/> <uses-permission android:name="android.permission.USE_CREDENTIALS"/> play-services-drive.properties play-services-gcm.properties suses-permission android:name="android.permission.AUTHENTICATE_ACCOUNTS"/> play-services-iid.properties

Common Signs and Symptoms

- Android devices are most at risk for Unexpected device behaviors mobile malware infection
- Poor battery life Dropped calls and call disruptions
- Unusually large phone bills
- Data plan spikes
- Device performance problems Unexplained application errors

Online Mobile Malware

Upload suspicious .apk files to the

• https://www.joesandbox.com

https://opentip.kaspersky.com

https://metadefender.opswat.com

https://www.virustotal.com

https://koodous.com

Internet for online sandbox analysis:

Sandboxes

- Risky downloads, browsing or link-clicking

- Spyware installation requires possession

- Apps that close or open on their own

• Spyware: Device was out of owner's control

- Unexplained settings changes

- Unplanned reboots

High-risk user behavior

of the device

Tools installed on the local machine for mobile

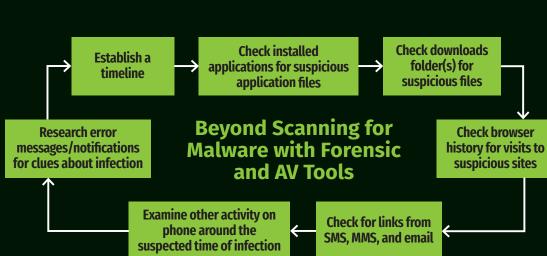
- Android SDK https://developer.android.com/studio https://github.com/pxb1988/dex2jar • Dex2Jar Drozer
- JADX https://github.com/skylot/jadx • JD-GUI https://java-decompiler.github.io/ MobFs

Local Static Malware Analysis malware analysis:

- https://github.com/WithSecureLabs/drozer
- https://github.com/MobSF/Mobile-Security-Framework-MobSF

Mobile Malware Signature-Based **Specification-Based Behavioral-Based Data Mining Cloud-Based** Malware action-**Bit Defender/** What activity is App store approach, **Hash Databases** considered normal in large datasets dynamic analysis the same?

Mobile Malware Detection



Free Scripts and Helpful Utilities

Apple Pattern of Life Lazy Output'er https://github.com/mac4n6/APOLLO iOS Logs, Events, And Properties Parser https://github.com/abrignoni/iLEAPP iOS-Mobile-InstallationiOS installation and uninstallation https://github.com/abrignoni/iOS-Mobile-Installation-Logs-Parser Logs-Parser log parser iOS Triage Incident response tool for iOS devices https://github.com/RealityNet/ios_triage Converts plist files to json, dot notation or csv https://www.hack42labs.com/tools/fplist/details iOS_sysdiagnose_ Scripts for parsing various iOS https://github.com/cheeky4n6monkey/iOS_ forensic_scripts sysdiagnose logs sysdiagnose_forensic_scripts libimobiledevice https://www.libimobiledevice.org https://doubleblak.com/app.php?id=ArtEx2 ArtEx Hexordia Evanole https://www.hexordia.com/evanolece iOS Unified Logs collector https://www.ios-unifiedlogs.com/downloads

ALEAPP Android Logs Events & Protobuf Parser Parser for Android Usagestats files in Android Usagestats xml or protobuf format Identifies, hashes and destructures all files recursively from any file system **FAPK** Extracts apk files from an Android device Andriller **Android Triage Avilla Forensics** Mobile Revelator

DFIR-SQL-Query-Repo forensics use by platform and application SQLite-Deleted-Recovers deleted entries from Automates the identification and SQLECmd processing of sqlite database files Mines SQLite databases for BLOBs and sqlite_miner

https://github.com/RealityNet/android_triage https://github.com/AvillaDaniel/AvillaForensics https://github.com/bkerler/MR/tree/master/ MobileRevelator Collection of SQL query templates for digital https://github.com/abrignoni/DFIR-SQL-Query-Repo https://github.com/mdegrazia/SQLite-Deletedhttps://github.com/EricZimmerman/SQLECmd https://github.com/threeplanetssoftware/ potential unparsed content of interest

https://github.com/abrignoni/ALEAPP

Android-Usagestats-XML-Protobuf

https://www.hack42labs.com/tools/fapk

https://github.com/den4uk/andriller

https://www.hack42labs.com/tools/ftree/details

https://github.com/abrignoni/





Education and

training

Poster Authors

Heather Mahalik

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hmahalik@gmail.com

4n6-scripts

Determine all possibile extraction methods for your search authority

Process the data in more than one tool

Collection of forensic and third-party scripts https://github.com/cheeky4n6monkey/4n6-scripts



Replication)

Reporting/Sharing your findings

@domenicacrognal

Validation (Visual, Cross-Tool, Call Detail Records, CCTV, Carving,

Domenica "Lee" Crognale Mattia Epifani domenica.crognale@gmail.com mattia.epifani@realitynet.it

@mattiaep

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Deep-dive forensics:

where the push

button stops

and forensic examination begin

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iOS Cheatsheet	Description	neu nul	C. P	5.4		
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Path Description	BFU	Backup	Sysdiagnose
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/private/var/mobile/Library/Health/NanoSync/com.apple.private.alloy.health.sync.db Apple Watch Health data sync	N	Υ	N
/private/var/mobile/Library/homed/datastore.sqlite Apple Home information and devices	N	Υ	N
/private/var/mobile/Library/NanoBackup/ Apple Watch information	Υ	Υ	N
/private/var/mobile/Library/NanoPreferencesSync/ Apple Watch information	Υ	N	N
/private/var/mobile/Library/NanoTimeKit/ Apple Watch information	Υ	N	N
/private/var/mobile/Library/Preferences/com.apple.carplay.plist Apple CarPlay configuration	Υ	Υ	N
/private/var/mobile/Library/Preferences/com.apple.CarPlayApp.plist Apple CarPlay configuration	Υ	Υ	N
/private/var/mobile/Library/Springboard/ <guid>-CarDisplay[Desired]IconState.plist Apple CarPlay per car App Icon configuration</guid>	Υ	Υ	N
/private/var/mobile/Media/iTunesControl/iTunes/iTunesPrefs List of computer where the device was connected by the connected by th		Υ	N
/private/var/networkd/netusage.sqlite Network data usage per App	N	N	N
/private/var/preferences/com.apple.networkextension.plist Network Extension	Υ	Υ	N
/private/var/preferences/com.apple.wifi.known-networks.plist Wi-Fi Network List	N	N	Y
/private/var/preferences/SystemConfiguration/com.apple.wifi.plist Wi-Fi Network List (old format)	Y	Υ	Y
/private/var/preferences/SystemConfiguration/com.apple.wifi-private-mac-networks.plist Wi-Fi Network List	Y	Υ	Y
/private/var/preferences/SystemConfiguration/preferences.plist Wi-Fi, VPN, Certs and more	Y	Υ	N
/private/var/root/Library/Application Support/com.apple.wifianalyticsd/DeviceAnalyticsModel.sqlite Wi-Fi information	N	N	N
/private/var/root/Library/Application Support/WiFiNetworkStoreModel.sqlite Wi-Fi information	N	N	N
/private/var/root/Library/Caches/com.apple.wifid/ThreeBars.sqlite Wi-Fi information	N	N	N
/private/var/root/Library/Preferences/com.apple.preferences.network.plist Wi-Fi ON/OFF	Y	Υ	N
/private/var/wireless/Library/Databases/DataUsage.sqlite Network data usage per App	N	Υ	N
/private/var/wireless/Library/Preferences/com.apple.CommCenter.counts.plist Data and Cellular network statistics	Υ	Υ	N

Partition I		File Format	Description
System Userdata	NFORMATION	TXT SQLite SQLite XML SQLite TXT N/A XML SQLite XML SQLite XML SQLite XML ABX ABX ABX SQLite Various SQLite	Device information (version, patches, etc.) IMSI of last used SIM Card Sim card information Activity on device related to installed SIM (ICCID and Google Account included) Fitness settings, network settings, other settings Timezone and local language Files needed for password cracking Passcode requirements and policies. Syncing info may exist Lock settings information Timezone Global settings Secure settings System settings System settings Sim card information Preference files Google preferences – location, maps, wallet, etc1=true
Userdata Userdata Userdata Userdata Userdata Userdata	/data/com.google.android.gsf/databases/gservices.db /system/notification_policy.xml /system/users/ <usernumber>/settings_global.xml /system/users/<usernumber>/settings_secure.xml /system/users/<usernumber>/settings_system.xml RDS AND ACCOUNT INFORMATION /data/com.android.providers.contacts/databases/contacts2.db</usernumber></usernumber></usernumber>	SQLite ABX ABX ABX ABX SQLite	Fitness settings, network settings, other settings Notifications settings Global settings Secure Settings System Settings Login info
Userdata	/data/com.android.vending/shared_prefs/lastaccount.xml /data/com.google.android.gms/databases/google_account_history.db /data/com.google.android.gms/shared_prefs/BackupAccount.xml /data/com.google.android.gsf/databases/gservices.db /system/sync/accounts.xml /system/sync/accounts.xml /system/users/ <usernumber>.xml /system_ce/<usernumber>/accounts_ce.db /system_de/<usernumber>/accounts_de.db</usernumber></usernumber></usernumber>	XML SQLite XML SQLite ABX ABX ABX SQLite SQLite	Last account used on Google PlayStore Google account history Backup account email address Fitness settings, network settings, other settings Account sync information Syncing information Local user information and Last loggedin timestamp Accounts with credentials Accounts with creation timestamps
Userdata	/app/* /data/ <application_sandbox> /data/com.android.vending/databases/auto_update.db /data/com.android.vending/databases/frosting.db /data/com.android.vending/databases/install_queue.db /data/com.android.vending/databases/library.db /data/com.android.vending/databases/localappstate.db /data/com.android.vending/databases/suggestions.db /data/com.android.vending/databases/verify_apps.db /data/com.android.vending/databases/xternal_referrer_status.db /data/com.google.android.gms/databases/gass.db /misc_de/<usernumber>/apexdata/com.android.permission/roles.xml /misc_de/<usernumber>/apexdata/com.android.permission/runtime-permissions.xml /system/packages.list /system/packages.cstats.list</usernumber></usernumber></application_sandbox>	APK Various Various SQLite XML XML TXT ABX TXT	APK files for installed applications .dex/.oat/.art files for installed applications Application Data Files* Packages set to auto update Tracks the installation and update of applications regardless of how they were installed Installed packages Contains the library of applications for the Google user in use on the device. Tracks applications installed on the device via the Google Play Store (not apps installed by other means) Keywords searched on the Google Play Store Installed packages Installed applications. The information is not removed when an app is uninstalled Tracks applications installed on the device, no matter how they were installed. It stores SHA-256 hash of the last APK. List of applications set by default for certain functions in Android Dangerous permissions information (for each package and each permission, granted true/false) Installed packages (package name, package UID, installer) Installed packages (package manager compiler (it contains references to an application, even after it has been uninstalled)
Userdata	/data/com.android.providers.calendar/databases/calendar.db /data/com.android.providers.contacts/databases/calllog.db /data/com.android.providers.contacts/databases/contacts2.db /data/com.android.providers.downloads/databases/downloads.db /data/com.android.providers.telephony/databases/mmssms.db /data/com.android.providers.userdictionary/databases/user_dict.db /data/com.google.android.gms/databases/android_pay /data/com.google.android.gms/databases/icing_contacts.db /data/com.google.android.gms/databases/icing_mmssms.db /data/com.sec.android.provider.logsprovider/databases/logs.db /data/user_de/ <usernumber>/com.android.providers.telephony/app_parts</usernumber>	SQLite Various	Calendar Call logs Contacts Downloads SMS/MMS User dictionary Android Pay Contacts SMS/MMS [Up to Android 11] Call logs [Up to Android 9] MMS Attachments
Userdata	/data/com.google.android.apps.docs.editors.docs/app_cello/email_address>/cello.db /data/com.google.android.apps.docs/databases/DocList.db /data/com.google.android.apps.dynamite/dynamite.db /data/com.google.android.apps.messaging/databases/annotaded_call_log.db /data/com.google.android.apps.messaging/databases/bugle_db /data/com.google.android.apps.messaging/databases/phone_lookup_history.db /data/com.google.android.apps.nbu.files/databases/files_master_database /data/com.google.android.apps.photos/databases/files_master_database /data/com.google.android.apps.photos/databases/gphotos <n>.db /data/com.google.android.calendar/databases/tachyon.db /data/com.google.android.dialer/databases/dialer.db /data/com.google.android.gm/databases/bigTopDataDB.<user-id> /data/com.google.android.googlequicksearchbox/app_session /data/com.google.android.googlequicksearchbox/files/recently /data/com.google.android.inputmethod.latin/databases/trainingcachev3.db /data/com.google.android.keep/databases/keep.db</user-id></n>	SQLite Various Various SQLite SQLite	Google Docs Google Docs Google Chat (formerly Hangouts) Phone by Google Google Android Messaging (including RCS) Phone by Google Files by Google Google Photos Google Photos Google Calendar Phone by Google Google Calendar Phone by Google Google Mail Google Quicksearch – Searches and personal assistant Google Quicksearch – Recent Searches Gboard – Google Keyboard Google Keep
APPLICAT Userdata	TION USAGE /data/com.android.vending/databases/data_usage.db /data/com.android.vending/databases/notification_cache /data/com.google.android.apps.turbo/databases/battery_health.db /data/com.google.android.apps.turbo/databases/turbo.db /data/com.google.android.apps.turbo/sahred_prefs/app_usage_stats.xml /data/com.google.android.asps.wellbeing/databases/app_usage /data/com.google.android.as/databases/cell_db /data/com.google.android.as/databases/cell_db /data/com.google.android.as/databases/people_search /data/com.google.android.as/databases/simpleStorage /data/com.google.android.as/databases/simpleStorage /data/com.google.android.as/databases/smartselect_db /data/com.google.android.gms/databases/reminders.db /data/com.google.android.gms/files/fcm_queued_messages.ldb /data/com.google.android.settings.intelligence/databases/battery-usage-db-v <number> /data/com.samsung.android.forest/databases/dwbCommon.db /data/com.samsung.android.providers.context/databases/ContextLog_0.db /data/com.sec.android.app.launcher/databases/launcher.db /data/semclipboard</number>	SQLite SQLite SQLite SQLite XML SQLite	Application usage traces Application usage traces Charging sessions, including start timestamp and duration Battery Level Application execution timestamps Digital Wellbeing (Google) Application usage traces Application, User and Location traces Application, User and Location traces Firebase Cloud Messaging Battery Usage [From Android 12] Digital Wellbeing (Samsung devices only) Application traces (only Samsung devices) [Up to Android 10] Application artifacts (even after deleted) Clipboard content (only Samsung devices)
Userdata	/system/appops.xml /system/appops_accesses.xml /system/battery-history/ /system/batterystats.bin /system/batterystats-daily.xml /system/battery-tasge-stats/ /system/dmappmgr.db /system/graphicsstats/ /system/job/jobs_ <uid>.xml /system/ontification_log.db /system/procstats /system/procstats /system/procstats /system/system/shutdown-checkpoints /system/users/<local_user_number>/app_idle_stats.xml /system_ce/<usernumber>/recent_images/*.png</usernumber></local_user_number></uid>	ABX ABX ABX ABX SQLite ABX SQLite SQLite TXT XML Protobuf PNG	Application permissions usage Privacy dashboard – Dangerous permissions usage [From Android 12] Application permissions usage Battery Usage Stats – Contains Application Usage information Application Usage (only Samsung devices) Graphic Stats Application Usage Application notifications [Up to Android 10] Application execution (only Samsung devices) Application usage traces Shutdown Checkpoints Application Usage Notification history Application snapshots
Userdata	/system_ce/ <usernumber>/recent_tasks/*.xml /system_ce/<usernumber>/shortcut_service/bitmaps/ /system_ce/<usernumber>/shortcut_service/packages/ /system_ce/<usernumber>/snapshots/*.jpg /system_ce/<usernumber>/usagestats/ KS AND CONNECTIONS /data/com.google.android.gms/databases/cast.db /data/com.google.android.gms/databases/herrevad /data/com.google.android.gms/databases/personalsafety_db /data/com.google.android.gms/shared_prefs/nearbysharing:service:state.xml /log/wifi/iwc/iwc_dump.txt /misc/adb/adb_keys /misc/apexdata/com.android.wifi/WiFiConfigStore.xml</usernumber></usernumber></usernumber></usernumber></usernumber>	XML PNG ABX JPG Protobuf SQLite SQLite SQLite SQLite XML TXT TXT XML	Recent Tasks Application usage traces Application usage traces Application snapshots Application Usage Stats Cast devices Wireless network and MAC addresses [Up to Android 9] Android Airtag Scans Nearby Share Wireless network connections log (Samsung device only) Computers connected via ADB Wireless network [From Android 11]
Userdata	/misc/apexdata/com.android.wifi/WiFiConfigStoreSoftAp.xml /misc/bluedroid/bt_config.conf /misc/bluedroiddump/mainBuffer.log /misc/wifi/WifiConfigStore.xml /system/wifigeofence.db EDIA /data/com.google.android.apps.maps/databases/ugc_photos_location_data.db /data/com.google.android.apps.photos/databases/gphotos <number>.db /data/com.google.android.providers.media.module/databases/external.db /data/com.samsung.android.providers.media/databases/media.db /data/com.samsung.cmh/databases/cmh.db</number>	XML TXT TXT XML SQLite SQLite SQLite SQLite SQLite SQLite SQLite	Information about the Wi-Fi hotspot of the device Information about the Bluetooth configuration of the device and the history of connected Bluetooth devices Bluetooth logs (only Samsung devices) Wireless network [Up to Android 10] Wi-Fi Geofence (only Samsung devices) Photos and Videos metadata Google Photos Traces to SD card used in the device or emulated SD card Media file metadata (only Samsung devices) Camera Photo (only Samsung Devices)
Userdata	/data/com.samsung.storyservice/databases/dme.db /data/com.samsung.visionprovider/databases/visionprovider.db /media/ N ARTIFACTS /data/com.google.android.apps.maps/app_tts-temp/tts-%UNIXEPOCH% /data/com.google.android.apps.maps/databases/gmm_myplaces.db /data/com.google.android.apps.maps/databases/gmm_storage.db /data/com.google.android.apps.maps/databases/gmm_sync.db /data/com.google.android.apps.maps/files/new_recent_history_cache_searches.cs /data/com.google.android.apps.turbo/databases/turbo.db /data/com.sec.android.daemonapp/db/weatherClock /log/wifi/iwc/iwc_dump.txt /Media/0/DCIM/Camera /system/wifigeofence.db	SQLite SQLite N/A WAV SQLite SQLite SQLite Protobuf SQLite SQLite TXT * SQLite	Samsung Story Service (only Samsung Devices) Camera Photo (only Samsung Devices) Emulated SD Card Google Maps turn-by-turn directions Home address/Work address/Labeled addresses Search history Maps Favorites Google Maps searches Timezone Wheather app (Samsung devices only) Wireless network connections log (Samsung device only) EXIF data with location info Wi-Fi Geofence (Samsung devices only)
Userdata	VIPING/SETUP /data/com.android.providers.media/databases/internal.db /data/com.google.android.apps.wellbeing/databases/app_usage /data/com.google.android.forest/databases/dwbCommon.db /data/data/com.google.android.settings.intelligence/shared_prefs/setup_wizard_info.xml /data/data/com.google.android.settings.intelligence/shared_prefs/suggestions.xml /misc/bootstat/factory_reset /misc/bootstat/last_boot_time_utc /property/persistent_properties /system/user/service/data/eRR.p	SQLite SQLite SQLite XML XML	Internal system files timestamps Digital Wellbeing (Google) Digital Wellbeing (Samsung) Setup wizard timestamp Setup wizard timestamp Check modified timestamp Check modified timestamp Reboot, Factory Reset Samsung devices only