

FORENSIC ANALYSIS OF DISCORD JPEG AND PNG PROCESSING:
METADATA, FILE STRUCTURE, AND IMAGE DATA ALTERATIONS
ACROSS COMMON DISCORD CLIENTS

by

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Forensic Analysis of Discord JPEG and PNG Processing: Metadata, File Structure, and Image
Data Alterations Across Common Discord Clients

Thesis directed by Associate Professor Catalin Grigoras

ABSTRACT

The Discord instant messaging application is a widely used communication platform with significant evidentiary value, particularly regarding images sent as message attachments. However, such files undergo consistent processing that may include compression, metadata stripping, or caching to non-obvious directories. This thesis examined the forensic acquisition and analysis of JPEG and PNG files transmitted through the Android, iOS, Windows, and browser Discord clients and subsequently viewed or downloaded on both Android and iOS mobile devices.

Through a series of quasi-experimental image processing tests, controlled images with varied formats and metadata were exchanged between Discord accounts using multiple devices and accessed on test Android and iOS devices, simulating typical user behavior. The test devices were forensically imaged, and Discord's application data directories were examined to extract downloads, cached images, and message metadata. Attachments collected from Discord's Content Distribution Network (CDN) were compared to the original images using hexadecimal analysis, EXIF and segment inspection, quantization table comparison, and pixel-level image quality metrics.

Results showed that Discord performs deterministic and client-dependent processing of JPEG images, stripping all EXIF metadata and, in many cases, restructuring file wrapper elements and recompressing image data. When orientation metadata was present, Discord's

server-side rotation introduced an additional recompression step that further altered file element order and image data. File structures and quantization tables were found to vary by client, providing a means of inferring the uploading platform. PNG images, by contrast, retained unaltered image data across all clients, with only minor metadata modifications. Discord's Android application was found to retain recoverable cache data – including upload preparation files, message preview caches, and deleted message remnants – more frequently than iOS, largely due to differences in logical imaging feasibility rather than client design. Collectively, these findings establish a reproducible framework for the forensic examination of Discord image artifacts and provide guidance for evidentiary retrieval, authentication, and attribution.

The form and content of this abstract are approved. I recommend its publication.

Approved: Catalin Grigoras

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ABBREVIATIONS

API – Application Programming Interface

CDN – Content Distribution Network

DM – Direct Message

EXIF – Exchangeable Image File Format

GUI – Graphical User Interface

HDR – High Dynamic Range

HTTP – Hypertext Transfer Protocol

ICC Profile – International Color Consortium Profile

IQA – Image Quality Assessment

JSON – JavaScript Object Notation

MAC – Modified, Accessed, and Created

MP / MPI – Multi-Picture Image

NSFW – Not Safe for Work

OS – Operating System

PCC – Pearson Correlation Coefficient

SQL – Structured Query Language

SSIM – Structural Similarity Index Measure

URL – Uniform Resource Locator

UUID – Universally Unique Identifier

XML – Extensible Markup Language

I. INTRODUCTION

Discord is an instant messaging platform that is available on web browsers, Windows, MacOS, iOS, Linux, and Android. Like many other applications of this type, Discord allows users to upload image files as attachments to messages, which the application then displays to recipients as embedded images that can be viewed and downloaded. Discord application data relating to user-submitted images is often relevant to criminal investigations. Despite efforts to utilize automated tools to detect and remove images that violate its terms of service, the platform can be used to plan or carry out illegal activities – such as terrorism planning and recruitment, trafficking in illicit materials, or grooming minors – often involving some use of Discord’s image transfer features.

During the year 2023, Discord reportedly disabled 983,524 accounts and removed 181,623 servers for violations including child endangerment, exploitative and unsolicited graphic sexual and/or violent content, harassment, bullying, and violent extremism; during this same period, Discord reported 164,478 accounts to the National Center for Missing and Exploited Children for follow-up on detected child sexual abuse material, and received 5,248 information requests and 3,686 preservation requests from law enforcement agencies in the United States [1-4]. In 2025, the state of New Jersey filed civil suit against Discord, alleging that the structure of the platform “expose[s] [children] to child sexual abuse material, videos depicting violence or terror, and other harmful content” [5].

Therefore, although some criminals may have turned their attention away from unencrypted messaging applications in favor of end-to-end encrypted platforms, the analysis of Discord application data remains relevant to the field of digital forensics. In addition, because the sending and receiving of image files is central to many of the crimes facilitated by the Discord

platform, it is critical for the forensic analyst to know how to properly find, handle, and analyze Discord-related image artifacts.

Discord messages may be sent to invite-only chat groups (“servers”), or directly to other users. A “server,” (or “guild,” as referred to in internal documentation), can be created by any user (the “owner,” who can designate other users as administrators, or transfer ownership), and is made up of owner- or administrator-defined conversation threads called “channels” [6].

Guild properties may include settings such as Explicit Content Filter (1=scan submissions by members without roles, or 2=scan submissions by all members), Verification Level (0=unrestricted, 1=verified email, 2=account older than 5 minutes, 3=member of guild longer than 10 minutes, or 4=verified phone number), NSFW Level (0=default, 1=explicit, 2=safe, or 3=age restricted), and Premium Tier (0, 1, 2, or 3; among other things, this affects the attachment upload size limit) [6]. These settings are maintained by guild owners or administrators and influence whether minor accounts can join and how explicit media is displayed to members. However, these safeguards rely on accurate self-reporting of age and on the accurate detection or disclosure of explicit content – processes that are often unreliable.

Image formats that are supported for user avatars, guild icons, custom emojis, and embedded image message attachments are JPEG, PNG, WebP, GIF, and Lottie. Other file types, including image file types not supported for embedded image display (e.g. BMP or TIFF), can also be sent as message attachments and downloaded [7]. Default upload size limit is 10MB, but this can be increased to as much as 500MB by increasing a guild’s premium “boost” level [7]. These upload limits have varied over time.

Discord uses a Content Distribution Network (CDN) to facilitate upload and download of these files. CDN endpoint URLs follow a pre-defined pattern and can be reverse engineered if

certain identification values are previously known, such as user ID, channel ID, or attachment ID. Some image types, such as custom emojis and user avatars, do not require any authorization to access in this manner. Message attachment URLs are issued with signed keys that have a preset expiry time, but otherwise require no additional credentials or authorization to access. These signed URLs are generated upon request by a bot or user client (given proper access permissions) and follow this format [7]:

cdn.discordapp.com/attachments/<channel_id>/<attachment_id>/<filename.ext>
?ex=<hex_of_expiry_time>&is=<hex_of_issue_time>&hm=<unique_signature>

Transformed image assets can be requested by Discord clients through the Media Proxy service [8]. Media Proxy request URLs are sent to the domain *media.discordapp.net/*, but otherwise utilize the same format and signed key system. The client may append the following values to the URL to change the returned dimensions and format [7], but the Discord API does not otherwise expose these transformation requests for message attachment images.

- ?size=<desired_size>
- ?width=<desired_width>
- ?height=<desired_height>
- ?format=<desired_format>

Discord uses the Snowflake ID format to generate unique identifiers for many objects, such as users, guilds, channels, messages, and attachments. The first 1-42 bits of a snowflake contain a timestamp of the moment the ID was created, in the number of milliseconds since the Discord Epoch (the first second of 2015, or 1420070400000) [7]. Using public documentation, it is possible to convert a Discord snowflake to a timestamp of asset creation.

Discord introduced message forwarding in October 2024, allowing users to forward messages or other media from one guild or channel to another. Users may forward any message they have access to, and may post these forwarded messages to any guild or channel, given proper access permissions [9].

Discord announced in August 2022 that it would overhaul the Android application, shifting to the React Native application framework [10]. This change was introduced to both Android and iOS in December of 2023 [11], allowing Discord to maintain multiple device-specific builds – influencing, for example, the generation of log files tailored to each operating system – while presenting a consistent user experience across operating systems. Implementation differences between builds are particularly relevant for Android devices, which can vary widely in their support for image metadata segments and color profiles.

Previous Research

The forensic analysis of Discord applications has been extensively studied over the past five years, although Discord image processing remains under-researched. The researchers in [12] and [13] discussed the general cache structure of the different versions of Discord, and developed a python-based tool to parse through the information that can be found within. Notably, they identified several artifacts that occasionally persist when cache files fail to update after messages are deleted, particularly if the user has closed the application. They also found that the Windows version of Discord flushes older cache files when reaching between 3,500 and 4,000 files in a cache directory. These findings emphasize the timely acquisition of application data whenever possible, in order to potentially recover these artifacts before they are cleared or overwritten.

Researchers have analyzed Windows 10 systems running the Discord application [14], performed a volatile memory analysis of Discord on Linux – finding user activity information such as usernames, passwords, messages, and guild IDs [15] – and analyzed Google Chrome cache files relating to Discord activity via the web browser-based version of the platform [16]. Most recently in a 2024 Journal of Forensic Sciences paper, the researchers in [17] analyzed volatile memory, network traffic, and hard disk storage of Discord on Windows 10 and Linux, providing a comprehensive overview of the Windows version of Discord and the chromium-style cache structure that it employs.

The Android and iOS versions of Discord have also been studied. The researchers in [18] found the Android Discord data package in */data/data/com.discord/*, and identified several forensically relevant files in the */files/* and */shared_prefs/* folders, containing information such as messages, channel and guild information, message attachment information, and usernames. The authors of [12] and [13] mention the Android version briefly, noting the general cache structure and identifying server HTTP response files which contain plaintext message attachment download information. The researchers in [19] found timestamps (in Unix Epoch format) of Discord user activities, as well as user ID and email address information, in */shared_prefs/* (Android) and */private/var/mobile/Containers/Data/Application/*UUID*/Library/Caches/com.hammerandchisel.discord/fsCachedData/* (iOS).

The author of [20] described a forensic examination of the Discord application on Android, identifying data consistent with prior studies and observing that the Android application data package, being contained in the */data/data/* directory, can only be accessed via a full filesystem acquisition.

Across these studies, a common finding is that regardless of Discord version analyzed, once the structure of the application cache was understood, cache contents were unencrypted and straightforward to examine, containing plaintext, SQL databases, JSON files, and image files, all of which could all be analyzed using standard tools such as text editors, hex editors, and database browsers. Acquired artifacts include messages (including information about message attachments), user profile information (including avatar ID), guild information, channel information, and cached image files (custom emojis, avatars, icons, and uploaded attachments).

The author of [21] provides a framework for the analysis of image files processed by Discord, finding through the evaluation of file hashes, image stream hashes, and image quality assessments that the premium “Nitro Boost” version of Discord processes images in the same way as the basic free version. The study also made preliminary findings that JPEG file structure and embedded metadata were processed differently by different application versions.

The paper also observed that when a JPEG file with embedded orientation metadata (the Orientation EXIF tag) was transferred via Discord, the orientation metadata was removed and the image was rotated by a corresponding amount, resulting in a pair of source and processed images which, while displaying similarly on the screen, actually had different dimensions (e.g., 4000x3000 pixels with an Orientation EXIF value of 6 vs. 3000x4000 pixels with no orientation metadata). This made the direct comparison of source and processed images difficult for the software tools utilized by that study [21]. However, as it is common for photographs taken with smartphone cameras to have embedded orientation metadata, the processing of these files by the Discord application remains a relevant research problem.

The present thesis builds on this prior work by focusing primarily on JPEG images with an Orientation EXIF value of 1 (normal orientation, no rotation) and applying alternative

methods for assessing image quality of rotated images. In addition, this study places greater emphasis on the location and analysis of image cache files produced by Discord applications, providing a more comprehensive view of client-side and server-side processing. The same analytical framework is extended to PNG images, allowing for a systematic comparison of processing behaviors across file formats and offering a more complete understanding of Discord's handling of image attachments.

Research Questions

For a forensic examiner to create an accurate timeline of a user's interactions with images of interest, and collect and analyze digital image evidence in a legally admissible manner, it is crucial to understand the ways in which these image files may be altered through the Discord transfer process. Because users do not always download relevant images, it is also important to know how, and to what extent, cached image files and other artifacts in the application data can be used to supplement these investigations.

Design of this study was guided by several research questions which can be broadly categorized into three topics: (1) Discord image processing, (2) Discord image cache files and other attachment related artifacts (Android), and (3) Discord image cache files and other attachment related artifacts (iOS).

Discord Image Processing

Does the process of uploading an embedded image attachment on Discord introduce any changes to JPEG or PNG files? What is the nature of these changes (file structure, embedded metadata, image structure)? Do these changes vary by uploading device (iOS, Android, Windows, Chrome on Windows)? Does the process of downloading and/or viewing an embedded image attachment on the Android and/or iOS versions of Discord introduce any

additional changes? Do image cache files differ in any way from user-downloaded files? Which method(s) of evidence collection results in the acquisition of best evidence?

Discord Application Data Analysis (Android)

Where are image cache files located within the Discord application data on Android? In what format are these image caches saved? What does a temporal analysis reveal about how image cache files are managed throughout common Discord activities (such as viewing – or not viewing – embedded image attachments, forwarding messages with embedded image attachments, deleting messages, or failing to tap on “spoilered” image previews in order to view them)? Are there any additional artifacts within the application data concerning the uploading, viewing, or downloading of embedded image attachments?

Discord Application Data Analysis (iOS)

Can any Discord cache files be recovered from an iOS device without jailbreaking? If so, where are image cache files located within the Discord application data on iOS? In what format are these image caches saved? What does a temporal analysis reveal about how image cache files are managed throughout common Discord activities (such as viewing – or not viewing – embedded image attachments, forwarding messages with embedded image attachments, deleting messages, or failing to tap on “spoilered” image previews in order to view them)? Are there any additional artifacts within the application data concerning the uploading, viewing, or downloading of embedded image attachments?

II. QUASI-EXPERIMENT OVERVIEW

Tests Conducted

The research topics outlined in Chapter I were investigated through two primary categories of tests, each with a number of subtests. The JPEG and PNG image formats were utilized throughout each of these tests due to their common use by end users.

Temporal Analysis and Forensic Metadata Tests

A series of common Discord user activities were simulated on the target operating systems (Android and iOS) and forensic images of the test devices were analyzed to evaluate image cache behavior surrounding these activities and describe any other discovered artifacts.

Image Processing Tests

Prepared reference JPEG and PNG files were transferred via Discord, collected in a variety of ways, and compared with each other and the originals, with particular focus on file structure, embedded metadata, quantization tables, and image data.

Hypotheses Under Investigation

These quasi-experimental tests were guided by a set of null hypotheses directly tied to the research questions posed in Chapter I. The hypotheses, which are summarized below, address (1) file structure / embedded metadata integrity, (2) image data fidelity, and (3) temporal caching behavior in Android and iOS environments.

H1. JPEG File Structure / Embedded Metadata Not Altered

- **Sub-conditions:** Tested regardless of orientation EXIF tags, message forwarding status, source device file structure (iPhone, Samsung, Pixel), uploading client (iOS, Android, Windows, Chrome), source filesystem location, in-app photograph, or collection method (download, cache, API request).

- **Rejection criterion:** Differences in file hash, file structure elements / order, EXIF contents, and/or quantization tables.

H2. JPEG Image Data Not Altered

- **Sub-conditions:** Tested regardless of orientation EXIF tags, message forwarding status, source device file structure (iPhone, Samsung, Pixel), uploading client (iOS, Android, Windows, Chrome), source filesystem location, in-app photograph, or collection method (download, cache, API request).
- **Rejection criterion:** Image data differences detected via stream hashing, SSIM, PCC, and/or Image Subtraction.

H3. PNG File Structure / Embedded Metadata Not Altered

- **Sub-conditions:** Tested regardless of message forwarding status, uploading client (iOS, Android, Windows, Chrome), or collection method (download, cache, API request).
- **Rejection criterion:** Differences in file hash and/or file structure elements / order.

H4. PNG Image Data Not Altered

- **Sub-conditions:** Tested regardless of message forwarding status, uploading client (iOS, Android, Windows, Chrome), or collection method (download, cache, API request).
- **Rejection criterion:** Image data differences detected via stream hashing, SSIM, PCC, and/or Image Subtraction.

H5-H9. Temporal Analysis Hypotheses

- **H5:** No cache for unviewed spoiled images (Android).
- **H6:** No cache for DM images (Android).
- **H7:** No cache for images in unviewed channels (Android).

- **H8:** Cache not retained after sender deletes message (Android), assessed for both re-viewing and non-re-viewing cases.
- **H9:** Discord data not recoverable from non-jailbroken iPhone.
- **Rejection Criteria:** Detection of cache files or recoverable data corresponding to these scenarios.

III. MATERIALS

Test Devices

Several test devices were used to prepare images, send Discord messages, download message attachments, and run analysis software. A summary of test device properties – including OS version and installed Discord client version – and uses can be found in Table 1. The differing Discord software builds between the two Android devices illustrate how the React Native framework produces device-specific variations, which may influence application behavior across devices even within a unified operating system environment.

One factory-reset iPhone SE, running iOS 15.8.4, was prepared for testing by installing the iOS version of the Discord application from the Apple store. This device was used to take test photographs with the native Camera app, send messages, and download message attachments. A “quick” forensic image was taken of this device after test dataset generation.

One Samsung Galaxy A51, running Android 13, was prepared for testing by installing the Android version of the Discord application from the Google Play store. This device was used to take test photographs with the native Camera app and send messages only.

One bootloader-unlocked, factory-reset Google Pixel 7 Pro, running Android 15, was prepared for testing by installing the Android version of the Discord application from the Google Play store. This device was used to take test photographs with the native Camera app, send messages, and download message attachments. Both quick and logical forensic images were taken of this device after test dataset generation.

One Windows laptop, running Windows 10 Pro (version 22H2, OS Build 19045.6093), was prepared for testing by installing the Windows Desktop version of the Discord application

from www.discord.com/download. This device was used to send messages through both the Windows Desktop and browser Discord clients, download messages, and run analysis software.

Table 1. Summary of Test Devices

	iPhone SE	Galaxy A51	Pixel 7 Pro	Windows Laptop	
OS Version	iOS 15.8.4	Android 13	Android 15	Windows 10 Pro v22H2 OS Build 19045.6093	
Discord Client	iOS App Version: 291.0 (81988) JS Build 81988	Android App Version: 291.12 (29101200285884) -googleRelease (a51(SM-S515DL) (33)) JS Build 291012	Android App Version: 290.19 (29001900284707) - googleRelease (cheetah (Pixel 7 Pro) (35)) JS Build 290019	Windows Desktop App Version: Stable 429117 (c562d05) Host 1.0.9202 x64 (66976) Windows 10 64-bit (10.0.19045)	Browser (www.discord.com) Accessed via Google Chrome Version 139.0.7258.67 (Official Build) (64-bit)
Take Photos	✓	✓	✓		
Send Messages	✓	✓	✓	✓	✓
Download Messages	✓		✓	✓	✓
Forensic Image (Quick)	✓		✓		
Forensic Image (Logical)			✓		
Run Analysis Software				✓	

Software

The open-source command-line tools ImageMagick (6.9.13-25) and EXIFtool (v13.0) were used for the preparation of test PNGs and landscape copies of portrait photographs.

Magnet AXIOM Process and Examine (8.9.1.43258) were used to collect and analyze, respectively, forensic images of the test mobile devices. Magisk (v29.0), PixelFlasher (8.2.1.0), and the Android software development tools Android Debug Bridge (adb) and fastboot (1.0.41, version 35.0.1-11580240) were used to perform a systemless root of the test Pixel device prior to the acquisition of a logical image.

Custom Python scripts, executed with Python 3.13.2, were used to perform image quality assessment tests and collect images from the Discord CDN via API request.

JPEG and PNG file structure and embedded metadata analysis were performed with EXIFtool and the hex editor 010 (16.0.1 (64-bit)). Findings were corroborated for JPEG files, especially regarding quantization tables, with JPEGsnoop (1.8.0a). The multimedia processing tool FFmpeg (version n7.1-195-g8cabfd922a-20250219 built with gcc 14.2.0 (crosstool-NG 1.26.0.120_4d36f27)) was used calculate image stream hash values.

Cache file analysis was performed with the text editor Notepad++ (8.6.8) and the GUI database management tool DB Browser for SQLite (version 3.12.2, Qt version 5.12.8, SQLite version 3.35.5). Discord IDs, in snowflake format [7], were converted to timestamps with *discordlookup.com* [22]. In addition, during analysis a cache file in the MMKV format [23] was recovered; this was parsed with *mmkv-visualizer.com* [24].

Test Accounts

Two test Gmail accounts were created to log in to the Apple store and Google Play store and create five Discord accounts, one for each Discord client. Each Discord account was given a display name corresponding to the client that would use that account (CHROME, WINDOWS, PIXEL, IPHONE, and GALAXY A51).

Test Discord Guilds

The following test guilds were created by the CHROME test account with default settings. The indicated users were invited to these guilds through a permanent invite URL and joined in preparation for testing.

ncmf-test-august-2025 (users: CHROME, WINDOWS, PIXEL, IPHONE, GALAXY A51)

- Channels:
 - #sending-from-chrome-on-windows
 - #sending-from-windows
 - #sending-from-android-13-sm-s515dl
 - #sending-from-android-15-pixel7pro
 - #sending-from-ios-15-8-4
 - #forwarded
 - #do-not-click
 - #spoilers
 - #delete-then-review
 - #delete

ncmf-test-forwarding-august-2025 (users: CHROME)

- Channels:
 - #to-forward

Test Images

Each test mobile device was used to take JPEG photographs with its native camera application and default settings. Each photograph taken in this way contained robust EXIF metadata, including GPS location data, camera data, and an embedded thumbnail, with other metadata segments varying from device to device.

Unless noted otherwise, the value of the Orientation EXIF tag for each photograph was 1 (normal, landscape/horizontal, no rotation). For each JPEG with an orientation value other than 1, a “no orientation” copy with the Orientation EXIF tag removed was generated via EXIFtool.

PNGs were prepared by converting several photographs to PNG with the ImageMagick command *mogrify*. PNG compression settings were applied to satisfy Discord's upload size requirements. EXIFtool was used to artificially insert eXIf and tEXt metadata segments to evaluate whether these uncommon PNG elements would be processed by Discord. For the purposes of PNG image processing tests, image fidelity was important only insofar as it affected comparisons between each PNG and its Discord-processed counterpart; therefore, no effort was made to ensure pixel-level identity between the PNGs and their original JPEG sources.

In this way, a common batch of twenty-four images was prepared and copied to each test device (Downloads folder, Galaxy and Pixel; Files app, iPhone; Desktop folder, Windows laptop). The file names of these images were changed to reflect which device had taken the photograph and which client would send that copy of the file as a message attachment, for ease of analysis. Each device retained in its native camera roll the photographs that it had generated, with file names unchanged. Five total images were also taken in the mobile Discord applications during testing. In addition, 6 JPEGs and 1 PNG, originating from the test Galaxy device, were retained on the Windows laptop to be sent by the browser client for temporal analysis tests.

SHA-256 file hashes were periodically computed as these files were copied from device to device to ensure data integrity. File hashes were also computed for newly generated files (PNGs, orientation-removed copies). Before testing, forensic images of the mobile devices were collected to ensure that the JPEG and PNG files they would be sending were exact copies of those stored on the Windows laptop.

In total, thirty-six images (28 JPEG, 8 PNG, including 5 JPEGs taken in-app), were sent via Discord a total of 149 times between devices and filesystem locations, as documented in Tables 2 – 9.

Table 2. Summary of Test Images

File Name	SHA-256
Pixel_01.jpg / PXL_20250731_230921599.jpg	01219a7775db68f316f49f47542b365a48d017c89c6b8992eff74b456a1b5516
Pixel_02.jpg / PXL_20250801_151320088.jpg	db1e542ce635cc2b615951c7006e0da26a4d8a76b5c6cce3da0c5359062521c3
Pixel_03.jpg / PXL_20250802_151025664.jpg	3a38ef674aecebf2589ff38f9350d46317b562ac5cdf0f4eff8e5227ee34583e
Pixel_04.jpg / PXL_20250803_151636753.jpg	8622e02f46bc490b780df88082fc93dd41f2befffd86f284f25fb939a4f7c5b7
Pixel_05.jpg / PXL_20250804_140922041.jpg	9d985a7b1e725ebaca5fbb8dd204164c45e53b618023577bb7b5cf424c7c8eb1
884fa8eb-58dd-430b-9288-235e4a56702b.jpg	1163fce667b881cbb994bec259da07e18b22acdef6a28fc65e66be7f82d0b98a
Samsung_01.jpg / 20250724_175734.jpg	b6c573392625c43da29765d309928cce5be6e459fdb267543aa75fcc078ead7
Samsung_01.png	ed294dd3a4255e95c7a9947df76e43864be5f25c8ea833cb4c8d39f714804a48
Samsung_02.jpg / 20250725_072910.jpg	acef6bbd3646d120f518097ace7c2bc11afa561d1872f5f2d6ef6ba89171132f
Samsung_02.png	99f8dac42ad8288a47f49e43405635a97663c7225172ca79b42bcd102e23f593
Samsung_03.jpg / 20250726_075828.jpg	f15d8c4d2b0a21a78273acd1c2915f3e2ee490ff0fe3762939b20187e8d7d859
Samsung_03.png	77d71de200802f6b29dbd108d958e23693498607bb7c75a0657b971d2864b2d4
Samsung_04.jpg / 20250727_082046.jpg	73eb2f6c20048dcfcc60d6be57b2a5723427ce75dcdbbb7d090f980afd44a6c1
Samsung_04.png	d676ec1e70d29e1acd50169b97fb170fbaeafcfae27cc2d5e84f6715db5f4dd0
Samsung_05_90CW.jpg / 20250728_110418.jpg	a04c0988c001490b579ef9f3141c9a0bec3cf43c5d24ded213600e7ed4992a44
Samsung_05_rotationRemoved.jpg	0c77853c9386bf280f54a498fe407bd99443aeb816b000d2903134fdac7b9787
Samsung_06_toForward.jpg / Samsung_06_notForwarded.jpg	d69ec7599f00956a04df7334892eb3cb67d5889e3ad53de5b91d9eaab3c56d2c
Samsung_06_toForward.png / Samsung_06_notForwarded.png	ce8a9195587e9a0e89569b81163258e275bbf9fb859068f65301294291fe3870
Samsung_07_spoiler.jpg	ddf11e5791c28c8816dc7593141f3f7df7beaaae968589df40cc2cab78f0d0bc
Samsung_08_directmessage.jpg	9beaebe1a0fe24c7f2969559815c9fff9d4b78530b46408b8969cdca71114810
Samsung_09_do-not-click.jpg	9ba066266cb2d55fe051c0338a46341fb8505fb8eff13fc48af2b49756181f7b
Samsung_10_delete-then-review.jpg	9ccd6bce2068de5f9af3208457c2a377b177e63c9203cd08d5b4e030c4f6d0cf
Samsung_11_delete.jpg	356b9f56392a8255c9ec143e4afa89d9914d063923fb8a1e279f0c8f15062171
eb107a35-cd25-4a81-a3cb-c92d2e7e65c8.jpg	878686118858e8f104a97c71909558100cd85a1b204891c3f7efc89b0a16341c
12938f97-224a-48dd-9f99-8f2d634e31ed.jpg	cc2144ff149f0b6230a534049528d7b2b1036a34a9f6c3d1b45a37a298cd5ff5
iPhone_01.JPG / IMG_0001.JPG	5b443a54823941f3862ef133ea9da838b09a5d523043d22520b36aef68048e19
iPhone_01.png	159335bcb851b194dd8cbc3d74ea3565da2b992a2f1855037a700f5b46962c8f
iPhone_02.JPG / IMG_0002.JPG	70c13de7118cb2ff28ac07e2609bb34c5dd8ed9fe6d321dea05fdb1643d611ba
iPhone_03.JPG / IMG_0003.JPG	348525eee6049a45e49d258407acacd70c8fb3dbe521834a8c70f49ba61729dc
iPhone_03.png	672e993c38cb319ea3e91b783bc587bc5f0eae255b5211e8d1a27d210fae4638
iPhone_04.JPG / IMG_0004.JPG	fe79c0df27f447f0dbeaa4c556102c4dd8762966e85128e76e210242a63751ea
iPhone_04.png	c749ca087266b3eb069356d2de74caa98e2e3ce7f64ac2998dd4b9237845d023
iPhone_05_90CW.JPG / IMG_0005.JPG	dbc041c3716cbdbaf84b1cc6e8e57cafbc67c0413c2e657caefa600938fd149c
iPhone_05_rotationRemoved.JPG	5144ec14b99b8063cd4530b0c45e2d4d88eb95da322b6f98fe903f505bc88aa7
IMG_0006.JPG	c8b596a863b39095537ebd66d660bcecb3adab02144bd63ea6094a1de75ae476
IMG_0007.JPG	aeb97a452944595a2cda6fba3f206043484d50f3e41c4ce2c1ad8742baf4d0d2

Table 3. Test Images – iPhone SE – Native Camera Roll

File Name	SHA-256
IMG_0001.JPG	5b443a54823941f3862ef133ea9da838b09a5d523043d22520b36aef68048e19
IMG_0002.JPG	70c13de7118cb2ff28ac07e2609bb34c5dd8ed9fe6d321dea05fdb1643d611ba
IMG_0003.JPG	348525eee6049a45e49d258407aeacd70c8fb3dbe521834a8c70f49ba61729dc
IMG_0004.JPG	fe79c0df27f447f0dbeaa4c556102c4dd8762966e85128e76e210242a63751ea
IMG_0005.JPG	dbe041c3716cbdbaf84b1cc6e8e57cafb67c0413c2e657caefa600938fd149c
IMG_0006.JPG	c8b596a863b39095537ebd66d660bcecb3adab02144bd63ea6094a1de75ae476
IMG_0007.JPG	aeb97a452944595a2cda6fba3f206043484d50f3e41c4ce2c1ad8742ba4d0d2

Table 4. Test Images – iPhone SE – Files App

File Name	SHA-256
Pixel_01_fromIOS-15-8-4.jpg	01219a7775db68f316f49f47542b365a48d017c89c6b8992eff74b456a1b5516
Pixel_02_fromIOS-15-8-4.jpg	db1e542ce635cc2b615951c7006e0da26a4d8a76b5c6cce3da0c5359062521c3
Pixel_03_fromIOS-15-8-4.jpg	3a38ef674aeceb2589ff38f9350d46317b562ac5cdf0f4eff8e5227ee34583e
Pixel_04_fromIOS-15-8-4.jpg	8622e02f46bc490b780df88082fe93dd41f2befffd86f284f25fb939a4f7c5b7
Pixel_05_fromIOS-15-8-4.jpg	9d985a7b1e725ebaca5fbb8dd204164c45e53b618023577bb7b5cf424c7c8eb1
Samsung_01_fromIOS-15-8-4.jpg	b6c5733392625c43da29765d309928cce5be6e459fdb267543aa75fcc078ead7
Samsung_01_fromIOS-15-8-4.png	ed294dd3a425e95c7a9947df76e43864be5f25c8ea833cb4c8d39f714804a48
Samsung_02_fromIOS-15-8-4.jpg	acef6bbd3646d120f518097aee7c2bc11afa561d1872f5f2d6ef6ba89171132f
Samsung_02_fromIOS-15-8-4.png	99f8dac42ad8288a47f49e43405635a97663c7225172ca79b42bcd102e23f593
Samsung_03_fromIOS-15-8-4.jpg	f15d8c4d2b0a21a78273acd1c2915f3e2ee490ff0fe3762939b20187e8d7d859
Samsung_03_fromIOS-15-8-4.png	77d71de200802f6b29dbd108d958e23693498607bb7c75a0657b971d2864b2d4
Samsung_04_fromIOS-15-8-4.jpg	73eb2f6c20048dcfcc60d6be57b2a5723427ce75dcdbbb7d090f980afd44a6c1
Samsung_04_fromIOS-15-8-4.png	d676ec1e70d29e1aed50169b97fb170fbaeafcfac27cc2d5e84f6715db5f4dd0
Samsung_05_90CW_fromIOS-15-8-4.jpg	a04c0988c001490b579ef9f3141c9a0bec3cf43c5d24ded213600e7ed4992a44
Samsung_05_rotationRemoved_fromIOS-15-8-4.jpg	0c77853c9386bf280f54a498fe407bd99443aeb816b000d2903134fdac7b9787
iPhone_01_fromIOS-15-8-4.JPG	5b443a54823941f3862ef133ea9da838b09a5d523043d22520b36aef68048e19
iPhone_01_fromIOS-15-8-4.png	159335bcb851b194dd8ebc3d74ea3565da2b992a2f1855037a700f5b46962c8f
iPhone_02_fromIOS-15-8-4.JPG	70c13de7118cb2ff28ac07e2609bb34c5dd8ed9fe6d321dea05fdb1643d611ba
iPhone_03_fromIOS-15-8-4.JPG	348525eee6049a45e49d258407aeacd70c8fb3dbe521834a8c70f49ba61729dc
iPhone_03_fromIOS-15-8-4.png	672e993c38cb319ea3e91b783bc587bc5f0eae255b5211e8d1a27d210fae4638
iPhone_04_fromIOS-15-8-4.JPG	fe79c0df27f447f0dbeaa4c556102c4dd8762966e85128e76e210242a63751ea
iPhone_04_fromIOS-15-8-4.png	c749ca087266b3eb069356d2de74caa98e2e3ce7f64ac2998dd4b9237845d023
iPhone_05_90CW_fromIOS-15-8-4.JPG	dbe041c3716cbdbaf84b1cc6e8e57cafb67c0413c2e657caefa600938fd149c
iPhone_05_rotationRemoved_fromIOS-15-8-4.JPG	5144ec14b99b8063cd4530b0c45e2d4d88eb95da322b6f98fe903f505bc88aa7

Table 5. Test Images – Samsung Galaxy A51 – Native Camera Roll

File Name	SHA-256
20250724_175734.jpg	b6c5733392625c43da29765d309928cce5be6e459fdb267543aa75fcc078ead7
20250725_072910.jpg	acef6bbd3646d120f518097aee7c2bc11afa561d1872f5f2d6ef6ba89171132f
20250726_075828.jpg	f15d8c4d2b0a21a78273acd1c2915f3e2ee490ff0fe3762939b20187e8d7d859
20250727_082046.jpg	73eb2f6c20048dcfcc60d6be57b2a5723427ce75dcdbbb7d090f980afd44a6c1
20250728_110418.jpg	a04c0988c001490b579ef9f3141c9a0bec3cf43c5d24ded213600e7ed4992a44
eb107a35-cd25-4a81-a3cb-c92d2e7e65c8.jpg	878686118858e8f104a97c71909558100cd85a1b204891c3f7efc89b0a16341c
12938f97-224a-48dd-9f99-8f2d634e31ed.jpg	cc2144ff149f0b6230a534049528d7b2b1036a34a9f6c3d1b45a37a298cd5ff5

Table 6. Test Images – Samsung Galaxy A51 – Downloads Folder

File Name	SHA-256
Pixel_01_fromAndroid-13-SM-S515DL.jpg	01219a7775db68f316f49f47542b365a48d017c89c6b8992eff74b456a1b5516
Pixel_02_fromAndroid-13-SM-S515DL.jpg	db1e542ce635cc2b615951c7006e0da26a4d8a76b5c6cce3da0c5359062521c3
Pixel_03_fromAndroid-13-SM-S515DL.jpg	3a38ef674aeceb12589ff38f9350d46317b562ac5cdf0f4eff8e5227ee34583e
Pixel_04_fromAndroid-13-SM-S515DL.jpg	8622e02f46bc490b780df88082fc93dd41f2befff86f284f25fb939a4f7c5b7
Pixel_05_fromAndroid-13-SM-S515DL.jpg	9d985a7b1e725ebaca5fbb8dd204164c45e53b618023577bb7b5cf424c7c8eb1
Samsung_01_fromAndroid-13-SM-S515DL.jpg	b6c5733392625c43da29765d309928cce5be6e459fdb267543aa75fcc078ead7
Samsung_01_fromAndroid-13-SM-S515DL.png	ed294dd3a4255e95c7a9947df76e43864be5f25c8ea833cb4c8d39f714804a48
Samsung_02_fromAndroid-13-SM-S515DL.jpg	acef6bbd3646d120f518097aee7c2bc11afa561d1872f5f2d6ef6ba89171132f
Samsung_02_fromAndroid-13-SM-S515DL.png	99f8dac42ad8288a47f49e43405635a97663c7225172ca79b42bcd102e23f593
Samsung_03_fromAndroid-13-SM-S515DL.jpg	f15d8c4d2b0a21a78273acd1c2915f3e2ee490ff0fe3762939b20187e8d7d859
Samsung_03_fromAndroid-13-SM-S515DL.png	77d71de200802f6b29dbd108d958e23693498607bb7c75a0657b971d2864b2d4
Samsung_04_fromAndroid-13-SM-S515DL.jpg	73eb2f6c20048dcfcc60d6be57b2a5723427ce75dcdbbb7d090f980afd44a6c1
Samsung_04_fromAndroid-13-SM-S515DL.png	d676ec1e70d29e1aed50169b97fb170fbaefcfac27cc2d5e84f6715db5f4dd0
Samsung_05_90CW_fromAndroid-13-SM-S515DL.jpg	a04c0988c001490b579ef9f3141c9a0bec3cf43c5d24ded213600e7ed4992a44
Samsung_05_rotationRemoved_fromAndroid-13-SM-S515DL.jpg	0c77853c9386bf280f54a498fe407bd99443aeb816b000d2903134fdae7b9787
iPhone_01_fromAndroid-13-SM-S515DL.JPG	5b443a54823941f3862ef133ea9da838b09a5d523043d22520b36aef68048e19
iPhone_01_fromAndroid-13-SM-S515DL.png	159335bec851b194dd8cbc3d74ea3565da2b992a2f1855037a700f5b46962c8f
iPhone_02_fromAndroid-13-SM-S515DL.JPG	70c13de7118cb2ff28ac07e2609bb34c5dd8ed9fe6d321dea05fdb1643d611ba
iPhone_03_fromAndroid-13-SM-S515DL.JPG	348525eee6049a45e49d258407aeacd70c8fb3dbe521834a8c70f49ba61729dc
iPhone_03_fromAndroid-13-SM-S515DL.png	672e993c38cb319ea3e91b783bc587bc5f0eae255b5211e8d1a27d210fae4638
iPhone_04_fromAndroid-13-SM-S515DL.JPG	fe79c0df27f447f0dbaea4c556102c4dd8762966e85128e76e210242a63751ea
iPhone_04_fromAndroid-13-SM-S515DL.png	c749ca087266b3eb069356d2de74caa98e2e3ce7f64ac2998dd4b9237845d023
iPhone_05_90CW_fromAndroid-13-SM-S515DL.JPG	db041c3716cbdbaf84b1cc6e8e57cafb6c7c0413c2e657caefa600938fd149c
iPhone_05_rotationRemoved_fromAndroid-13-SM-S515DL.JPG	5144ec14b99b8063cd4530b0c45e2d4d88eb95da322b6f98fe903f505bc88aa7

Table 7. Test Images – Google Pixel 7 Pro – Native Camera Roll

File Name	SHA-256
PXL_20250731_230921599.jpg	01219a7775db68f316f49f47542b365a48d017c89c6b8992eff74b456a1b5516
PXL_20250801_151320088.jpg	db1e542ce635cc2b615951c7006e0da26a4d8a76b5c6cce3da0c5359062521c3
PXL_20250802_151025664.jpg	3a38ef674aecebf2589ff38f9350d46317b562ac5cdf0f4eff8e5227ee34583e
PXL_20250803_151636753.jpg	8622e02f46bc490b780df88082fc93dd41f2befffd86f284f25fb939a4f7c5b7
PXL_20250804_140922041.jpg	9d985a7b1e725ebaca5fbb8dd204164c45e53b618023577bb7b5cf424c7c8eb1
884fa8eb-58dd-430b-9288-235e4a56702b.jpg	1163fce667b881cbb994bec259da07e18b22acdef6a28fc65e66be7f82d0b98a

Table 8. Test Images – Google Pixel 7 Pro – Downloads Folder

File Name	SHA-256
Pixel_01_fromAndroid-15-pixel7pro.jpg	01219a7775db68f316f49f47542b365a48d017c89c6b8992eff74b456a1b5516
Pixel_02_fromAndroid-15-pixel7pro.jpg	db1e542ce635cc2b615951c7006e0da26a4d8a76b5c6cce3da0c5359062521c3
Pixel_03_fromAndroid-15-pixel7pro.jpg	3a38ef674aecebf2589ff38f9350d46317b562ac5cdf0f4eff8e5227ee34583e
Pixel_04_fromAndroid-15-pixel7pro.jpg	8622e02f46bc490b780df88082fc93dd41f2befffd86f284f25fb939a4f7c5b7
Pixel_05_fromAndroid-15-pixel7pro.jpg	9d985a7b1e725ebaca5fbb8dd204164c45e53b618023577bb7b5cf424c7c8eb1
Samsung_01_fromAndroid-15-pixel7pro.jpg	b6c5733392625c43da29765d309928cce5be6e459fdb267543aa75fcc078ead7
Samsung_01_fromAndroid-15-pixel7pro.png	ed294dd3a4255e95c7a9947df76e43864be5f25c8ea833cb4c8d39f714804a48
Samsung_02_fromAndroid-15-pixel7pro.jpg	aceff6bbd3646d120f518097aee7c2bc11afa561d1872f5f2d6ef6ba89171132f
Samsung_02_fromAndroid-15-pixel7pro.png	99f8dac42ad8288a47f49e43405635a97663c7225172ca79b42bcd102e23f593
Samsung_03_fromAndroid-15-pixel7pro.jpg	f15d8c4d2b0a21a78273acd1c2915f3e2ee490ff0fe3762939b20187e8d7d859
Samsung_03_fromAndroid-15-pixel7pro.png	77d71de200802f6b29dbd108d958e23693498607bb7c75a0657b971d2864b2d4
Samsung_04_fromAndroid-15-pixel7pro.jpg	73eb2f6c20048dcfcc60d6be57b2a5723427ce75dcdabb7d090f980afd44a6c1
Samsung_04_fromAndroid-15-pixel7pro.png	d676ec1e70d29e1aed50169b97fb170fbaeafcae27cc2d5e84f6715db5f4dd0
Samsung_05_90CW_fromAndroid-15-pixel7pro.jpg	a04c0988c001490b579ef9f3141c9a0bec3cf43c5d24ded213600e7ed4992a44
Samsung_05_rotationRemoved_fromAndroid-15-pixel7pro.jpg	0c77853c9386bf280f54a498fe407bd99443aeb816b000d2903134fdae7b9787
iPhone_01_fromAndroid-15-pixel7pro.JPG	5b443a54823941f3862ef133ea9da838b09a5d523043d22520b36aef68048e19
iPhone_01_fromAndroid-15-pixel7pro.png	159335bcb851b194dd8cbc3d74ea3565da2b992a2f1855037a700f5b46962c8f
iPhone_02_fromAndroid-15-pixel7pro.JPG	70c13de7118cb2ff28ac07e2609bb34c5dd8ed9fe6d321dea05fdb1643d611ba
iPhone_03_fromAndroid-15-pixel7pro.JPG	348525eee6049a45e49d258407aeacd70c8fb3dbe521834a8c70f49ba61729dc
iPhone_03_fromAndroid-15-pixel7pro.png	672e993c38cb319ea3e91b783bc587bc5f0eae255b5211e8d1a27d210fae4638
iPhone_04_fromAndroid-15-pixel7pro.JPG	fe79c0df27f447f0dbeaa4c556102c4dd8762966e85128e76e210242a63751ea
iPhone_04_fromAndroid-15-pixel7pro.png	c749ca087266b3eb069356d2de74caa98e2e3ce7f64ac2998dd4b9237845d023
iPhone_05_90CW_fromAndroid-15-pixel7pro.JPG	dbe041c3716cbdbaf84b1cc6e8e57cafb6c67c0413c2e657caefa600938fd149c
iPhone_05_rotationRemoved_fromAndroid-15-pixel7pro.JPG	5144ec14b99b8063cd4530b0c45e2d4d88eb95da322b6f98fe903f505bc88aa7

Table 9. Test Images – Windows Laptop

File Name	SHA-256
Pixel 01 fromWindows.jpg	01219a7775db68f316f49f47542b365a48d017c89c6b8992eff74b456a1b5516
Pixel 02 fromWindows.jpg	db1e542ce635cc2b615951c7006e0da26a4d8a76b5c6cce3da0c5359062521c3
Pixel 03 fromWindows.jpg	3a38ef674aeceb2f589ff38f9350d46317b562ac5cd0f04eff8e5227ee34583e
Pixel 04 fromWindows.jpg	8622e02f46bc490b780df88082fe93dd41f2befffd86f284f25fb939a4f7c5b7
Pixel 05 fromWindows.jpg	9d985a7b1e725ebaca5fbb8dd204164c45e53b618023577bb7b5cf424c7c8eb1
Samsung 01 fromWindows.jpg	b6c5733392625c43da29765d309928cce5be6e459fdb267543aa75fcc078ead7
Samsung 01 fromWindows.png	ed294dd3a4255e95c7a9947df76e43864be5f25c8ea833cb4c8d39f714804a48
Samsung 02 fromWindows.jpg	acef6bbd3646d120f518097ace7c2bc11afa561d1872f5f2d6ef6ba89171132f
Samsung 02 fromWindows.png	99f8dac42ad8288a47f49e43405635a97663c7225172ca79b42bcd102e23f593
Samsung 03 fromWindows.jpg	f15d8c4d2b0a21a78273acd1c2915f3e2ee490ff0fe3762939b20187e8d7d859
Samsung 03 fromWindows.png	77d71de200802f6b29dbd108d958e23693498607bb7c75a0657b971d2864b2d4
Samsung 04 fromWindows.jpg	73eb2f6c20048dcfcc60d6be57b2a5723427ce75dcdabb7d090f980afd44a6c1
Samsung 04 fromWindows.png	d676ec1e70d29e1aed50169b97fb170fbaeafcfac27cc2d5e84f6715db5f4dd0
Samsung 05 90CW fromWindows.jpg	a04c0988c001490b579ef9f3141c9a0bec3cf43c5d24ded213600e7ed4992a44
Samsung 05 rotationRemoved fromWindows.jpg	0c77853c9386bf280f54a498fe407bd99443aeb816b000d2903134fdae7b9787
iPhone 01 fromWindows.JPG	5b443a54823941f3862ef133ea9da838b09a5d523043d22520b36aef68048e19
iPhone 01 fromWindows.png	159335bcb851b194dd8cbe3d74ea3565da2b992a2f1855037a700f5b46962c8f
iPhone 02 fromWindows.JPG	70c13de7118cb2f28ac07e2609bb34c5dd8ed9fe6d321dea05fdb1643d611ba
iPhone 03 fromWindows.JPG	348525eee6049a45e49d258407aeacd70c8fb3dbe521834a8c70f49ba61729dc
iPhone 03 fromWindows.png	672e993c38cb319ea3e91b783bc587bc5f0eae255b5211e8d1a27d210fae4638
iPhone 04 fromWindows.JPG	fe79c0df27f447f0dbaea4c556102c4dd8762966e85128e76e210242a63751ea
iPhone 04 fromWindows.png	c749ca087266b3eb069356d2de74caa98e2e3ce7f64ac2998dd4b9237845d023
iPhone 05 90CW fromWindows.JPG	db041c3716cbdbaf84b1cc6e8e57cafb67c0413c2e657caefa600938fd149c
iPhone 05 rotationRemoved fromWindows.JPG	5144ec14b99b8063cd4530b0c45e2d4d88eb95da322b6f98fe903f505bc88aa7
Pixel 01 fromChrome.jpg	01219a7775db68f316f49f47542b365a48d017c89c6b8992eff74b456a1b5516
Pixel 02 fromChrome.jpg	db1e542ce635cc2b615951c7006e0da26a4d8a76b5c6cce3da0c5359062521c3
Pixel 03 fromChrome.jpg	3a38ef674aeceb2f589ff38f9350d46317b562ac5cd0f04eff8e5227ee34583e
Pixel 04 fromChrome.jpg	8622e02f46bc490b780df88082fc93dd41f2befffd86f284f25fb939a4f7c5b7
Pixel 05 fromChrome.jpg	9d985a7b1e725ebaca5fbb8dd204164c45e53b618023577bb7b5cf424c7c8eb1
Samsung 01 fromChrome.jpg	b6c5733392625c43da29765d309928cce5be6e459fdb267543aa75fcc078ead7
Samsung 01 fromChrome.png	ed294dd3a4255e95c7a9947df76e43864be5f25c8ea833cb4c8d39f714804a48
Samsung 02 fromChrome.jpg	acef6bbd3646d120f518097ace7c2bc11afa561d1872f5f2d6ef6ba89171132f
Samsung 02 fromChrome.png	99f8dac42ad8288a47f49e43405635a97663c7225172ca79b42bcd102e23f593
Samsung 03 fromChrome.jpg	f15d8c4d2b0a21a78273acd1c2915f3e2ee490ff0fe3762939b20187e8d7d859
Samsung 03 fromChrome.png	77d71de200802f6b29dbd108d958e23693498607bb7c75a0657b971d2864b2d4
Samsung 04 fromChrome.jpg	73eb2f6c20048dcfcc60d6be57b2a5723427ce75dcdabb7d090f980afd44a6c1
Samsung 04 fromChrome.png	d676ec1e70d29e1aed50169b97fb170fbaeafcfac27cc2d5e84f6715db5f4dd0
Samsung 05 90CW fromChrome.jpg	a04c0988c001490b579ef9f3141c9a0bec3cf43c5d24ded213600e7ed4992a44
Samsung 05 rotationRemoved fromChrome.jpg	0c77853c9386bf280f54a498fe407bd99443aeb816b000d2903134fdae7b9787
Samsung 06 toForward.jpg / Samsung 06 notForwarded.jpg	d69ec7599f00956a04df7334892eb3cb67d5889e3ad53de5b91d9eab3c56d2c
Samsung 06 toForward.png / Samsung 06 notForwarded.png	ce8a9195587e9a0e89569b81163258e275bbf9fb859068f65301294291fe3870
Samsung 07 spoiler.jpg	ddf11e5791c28c8816dc7593141f3f7df7beaae968589df40cc2cab78f0d0bc
Samsung 08 directmessage.jpg	9beaeb1a0fe24c7f2969559815c9ff9d4b78530b46408b8969cdca71114810
Samsung 09 do-not-click.jpg	9ba066266cb2d55fe051c0338a46341fb8505fb8eff13fc48af2b49756181f7b
Samsung 10 delete-then-review.jpg	9ccd6bce2068de5f9af3208457c2a377b177e63c9203dc08d5b4e030c4f6d0cf
Samsung 11 delete.jpg	356b9f56392a8255c9ec143e4afa89d9914d063923fb8a1e279f0c8f15062171
iPhone 01 fromChrome.JPG	5b443a54823941f3862ef133ea9da838b09a5d523043d22520b36aef68048e19
iPhone 01 fromChrome.png	159335bcb851b194dd8cbe3d74ea3565da2b992a2f1855037a700f5b46962c8f
iPhone 02 fromChrome.JPG	70c13de7118cb2f28ac07e2609bb34c5dd8ed9fe6d321dea05fdb1643d611ba
iPhone 03 fromChrome.JPG	348525eee6049a45e49d258407aeacd70c8fb3dbe521834a8c70f49ba61729dc
iPhone 03 fromChrome.png	672e993c38cb319ea3e91b783bc587bc5f0eae255b5211e8d1a27d210fae4638
iPhone 04 fromChrome.JPG	fe79c0df27f447f0dbaea4c556102c4dd8762966e85128e76e210242a63751ea
iPhone 04 fromChrome.png	c749ca087266b3eb069356d2de74caa98e2e3ce7f64ac2998dd4b9237845d023
iPhone 05 90CW fromChrome.JPG	db041c3716cbdbaf84b1cc6e8e57cafb67c0413c2e657caefa600938fd149c
iPhone 05 rotationRemoved fromChrome.JPG	5144ec14b99b8063cd4530b0c45e2d4d88eb95da322b6f98fe903f505bc88aa7

IV. METHODS

Test Dataset Generation

Images were transmitted to Discord channels from multiple devices to document client-specific behavior. The PIXEL, IPHONE, GALAXY A51, and WINDOWS users each logged in through their respective clients and sequentially uploaded their image sets to the designated channels, including photographs taken in-app. The CHROME user, operating via the web client, sent and forwarded images across relevant channels, applied a spoiler effect, and transmitted direct messages to the mobile users. Afterward, the PIXEL and IPHONE users viewed and scrolled through the #delete-then-review and #delete channels before the CHROME user deleted the messages sent to those channels.

Data Collection

Subsequently, the PIXEL and IPHONE users accessed Discord through their respective mobile applications and sequentially reviewed all test channels. In each applicable channel – #sending-from-chrome-on-windows, #sending-from-windows, #sending-from-android-13-sm-s515dl, #sending-from-android-15-pixel7pro, #sending-from-ios, and #forwarded – both users scrolled through and manually downloaded all images via long-press and “Save Image.” Each also viewed the direct message from CHROME, reviewed the #delete-then-review channel, and viewed the #spoilers channel without deblurring its contents. Neither accessed #do-not-click, and both refrained from re-opening #delete.

Following this user activity, Magnet AXIOM was used to perform a quick image of the test Pixel device. The resulting forensic image contained the contents of

/data/media/0/Downloads/ (143 files downloaded during test dataset generation, with one

omitted in error) and */data/media/0/Pictures/* (one image captured in-app through Discord). These files were extracted from the image and preserved for analysis.

Next, Magisk was employed to conduct a systemless root of the Pixel device, enabling superuser-level access for subsequent acquisition of Discord application data. With root privileges obtained, Magnet AXIOM performed a logical image of the device. Within this image, the */data/data/com.discord/* directory was present but unparseable, while */data/user/0/com.discord/* contained the Discord application package, including 148 cached image preview files and associated application data. The previously imaged */data/media/0/Downloads/* and */data/media/0/Pictures/* directories were also present and confirmed to contain the same 143 downloaded and one captured image, respectively.

To ensure complete collection, ADB was then used to archive and pull the relevant Discord directories from the rooted Pixel device. The resulting archive included */data/data/com.discord/*, */data/user/0/com.discord/*, and */data/media/0/*. Comparison of the two application directories confirmed identical contents, suggesting that Magnet AXIOM had not been able to parse */data/data/com.discord/* because that directory may have been a symbolic link to */data/user/0/com.discord/*. Consequently, the duplicate path was excluded from further analysis.

Magnet AXIOM was then used to perform a quick image of the test iPhone device. The forensic image contained 144 downloaded images and two in-app photographs within */DCIM/100APPLE/*, along with application data located in */Photodata/*, */AppDomainGroup/group.com.hammerandchisel.discord/*, and */AppDomain/com.hammerandchisel.discord/*. All relevant files were extracted for subsequent analysis.

On the Windows workstation, a custom Python script – implemented as a Discord bot using the discord.py library – was executed to query the Discord API and download all available message attachments from the Discord Content Distribution Network (CDN), resulting in 148 recovered files.

Further examination of the Pixel device’s Discord application data revealed twenty-four image attachment URLs; these URLs were manually accessed and downloaded using Google Chrome, producing twenty-four recovered files. Some URLs identified later in the investigation had expired and could no longer be used to retrieve images.

Analytical Methods

File Structure and Embedded Metadata Analysis

For each JPEG or PNG file, file structure elements and order were documented using the hex editor 010, with JPEG findings corroborated with JPEGsnoop. JPEGsnoop was also used to extract quantization tables used for JPEG frequency data compression. Embedded metadata segment contents were parsed with EXIFtool, with particular focus placed on EXIF metadata.

To streamline analysis of potentially identical files, SHA-256 hashes were computed; files with matching hash values were regarded as having identical structures and content.

The null hypotheses H1 and H3 were evaluated by comparing the content and order of these file structure elements between relevant reference/processed file pairs. Sub-conditions were assessed by comparing relevant processed file pairs (e.g., processed by Android vs. iOS). A difference in any of these elements resulted in a rejection of the relevant hypothesis in favor of the alternative hypothesis that the relevant sub-condition does introduce file structure processing differences.

Image Data Analysis

For each JPEG or PNG file, image stream hashing was used to calculate the SHA-256 hash value of the decoded image contents [25]. The null hypotheses H2 and H4 were evaluated by comparing stream hash values for relevant reference/processed file pairs, with a difference in stream hash values indicating a difference in image data. Sub-conditions were further evaluated by comparing relevant processed file pairs (e.g., processed by Android vs. iOS).

Findings were corroborated for each file pair through pixel-level difference analysis (image quality assessments), performed by the calculation of structural similarity index (SSIM), Pearson correlation coefficient (PCC), and image subtraction metrics. Differences in image data were indicated by a SSIM score below 1.0, a PCC score below 1.0, and an image subtraction result of less than 100% identical pixels. Detected differences in image contents resulted in a rejection of the relevant hypothesis in favor of the alternative hypothesis that the relevant sub-condition does introduce image data variation.

Because the reliability of the image stream hash method depends on the accuracy with which the multimedia processing tool FFmpeg decodes image contents, it is important to ensure that its use is appropriate within a given analytical context. In this study, both image stream hashing and pixel-level image quality assessments produced consistent results, even when the compared images differed in terms of embedded elements such as thumbnails and MPI segments. These findings suggest that FFmpeg computes stream hashes based only upon the primary image content while disregarding embedded image elements, though some metadata relating to the interpretation of primary image data, such as Orientation EXIF metadata, are appropriately applied. Accordingly, the image stream hash method can be considered a reliable means for rapid comparison of digital images in Discord image processing investigations. However, this

reliability may not extend to cases beyond the scope of this study, such as when Discord’s Media Proxy Server transcodes images between formats.

Rotation vs. No Rotation Image Comparison Calibration Test

For this study, accurate comparison of image data required that software tools correctly interpret Orientation EXIF metadata by rotating images as indicated before computing comparison metrics. To evaluate software performance in this regard, a calibration test was conducted in which each *_90CW* image was compared with its corresponding *_rotationRemoved* image under various conditions. If orientation metadata was applied correctly, direct comparison of these pairs would either fail due to dimension mismatches or produce non-matching results. Conversely, matching results would indicate that the software had failed to rotate the *_90CW* image prior to calculating comparison metrics.

Temporal Analysis

For both the Pixel and iPhone devices, all relevant artifacts were first identified and documented, with particular attention paid to the location of cache files corresponding to specific usage scenarios, including images marked with the “spoiler” effect, images sent to channels that were not subsequently viewed by the user, images sent via direct message, and messages that were deleted. Using these artifacts, the test dataset timeline was reconstructed to the fullest extent possible. The Pixel device provided a rich set of application files and metadata, enabling a detailed timeline reconstruction, whereas the iPhone analysis was necessarily more limited due to the smaller set of accessible application files. These reconstructed timelines were then used to cross-validate event sequences as documented in contemporaneous notes, providing a foundation for subsequent temporal analysis.

V. RESULTS

Rotation Calibration Test Results

Calibration test results confirmed the correct loading of orientation metadata by the image data comparison tools utilized in this study.

Image Stream Hashing

Identical *_90CW* and *_rotationRemoved* pairs produced non-matching image stream hash values; adding a 90-degree clockwise rotation to the FFmpeg command used to calculate the stream hash of the *_rotationRemoved* variant resulted in matching image stream hashes. Taken together, these results confirmed that FFmpeg correctly loaded the orientation metadata for images containing the Orientation EXIF tag under these experimental conditions, without the need to make modification to the FFmpeg command utilized. These findings indicated that use of the image stream hashing method to detect image data differences in this study was appropriate and reliable.

SSIM, PCC, and Image Subtraction

Direct comparison of identical *_90CW* and *_rotationRemoved* pairs resulted in dimension mismatch errors. Comparison of each *_90CW* variant with its corresponding *_rotationRemoved* variant, after it had been rotated and resaved as a compressed JPEG, correctly detected differences; comparison of each *_90CW* variant with its corresponding *_rotationRemoved* variant, after it had been rotated and resaved as a PNG, correctly detected no differences. These results confirmed that the Python script used to perform these image data comparisons correctly loaded orientation metadata for images containing the Orientation EXIF tag and was suitable for detecting image differences in this study.

Temporal Analysis Results

Forensic Artifacts Recovered

iPhone SE Quick Image

Filesystem/DCIM/100APPLE/. The native camera roll folder contained each of the 144 images that had been manually downloaded through the Discord application, as well as the two photographs that had been taken in-app. For each image, the filename had been changed to follow the numerical sequence of the images already stored in this folder (e.g., IMG_0008.jpg).

CameraRollDomain/Media/PhotoData/Photos.sqlite. This SQLite database contained system metadata corresponding to photographs stored in the native camera roll. Images that had been manually downloaded through the Discord application or created in-app were identified through entries in the ZADDITIONALASSETATTRIBUTES table of this database. The value of the ZIMPORTEDBYBUNDLEIDENTIFIER field for each of these images was “com.hammerandchisel.discord,” and the value of the ZORIGINALFILENAME field was the same as the original file’s name in most cases (in a minority of cases, however, the value of this field was *cachedMedia.jpg*).

Home/Library/Preferences/com.apple.cameracapture.plist. This log file contained entries for each photograph that was captured on the device, but without file names or timestamps. The two images that had been generated in the Discord application were identified by the following key-value pairs:

- 'videoeffects/com-hammerandchisel-discord/centerstage-migration-complete': True
- 'videoeffects/com-hammerandchisel-discord/portraiteffect-migration-complete': True

AppDomain-com.hammerandchisel.discord/Library/Preferences/com.hammerandchisel.discord.plist. This file contained, among other application status settings, the timestamp of the most recent cache cleanup.

AppDomain-com.hammerandchisel.discord/Documents/mmkv/mmkv.default. This file contained several application status settings, such as the IDs of the logged-in user, most recently selected channel, the most recent direct message, and joined guilds.

AppDomainGroup-group.com.hammerandchisel.discord/Library/Preferences/group.com.hammerandchisel.discord.plist. This file contained the IDs of the logged-in user, most recently selected channel, and joined guilds.

Pixel 7 Pro Logical Image

/data/media/0/Download/. The native camera roll folder contained each of the 143 images that had been manually downloaded through the Discord application. For each image, the original filename had been retained (with “-1” appended if a file of that name already existed in the folder).

/data/media/0/Pictures/. This folder contained one .jpg file, corresponding to the one photograph that had been taken in the Discord application.

/data/user/0/com.discord/cache/. Contained in this directory were several folders, which are described below. Also in this directory were twenty-two .jpeg and eight .png files, corresponding to the files that had been uploaded by the user during testing. The names of these files contained the string “temp_” followed by a numerical sequence, possibly a timestamp or internal identifier. In addition, a .jpg file corresponding to the one photograph that had been taken in the Discord application was also discovered in this directory.

/data/user/0/com.discord/cache/app-images-cache/. This folder contained 148 image preview cache files, with .cnt extension, corresponding to images sent to channels viewed by the user. Despite the non-standard file extension, hexadecimal analysis confirmed that these were standard JPEG- and PNG-formatted files. These .cnt files were organized, in what appeared to be random order, in a series of subfolders, named “1” through “99”, and had filenames comprised of seemingly random alphanumeric sequences.

/data/user/0/com.discord/cache/Compressor. This folder contained twenty-two .jpg files, corresponding to the JPEG files uploaded by the user during testing. For each image, the original filename had been retained.

/data/user/0/com.discord/cache/http-cache/ (.0 files). The .0 files discovered in this directory contained cached plaintext HTTP requests. These corresponded to application maintenance actions (e.g., loading marketing event metadata), as well as message requests. These message requests were of two types. Most common were requests for the twenty-five most recent messages in a given channel. Less common were requests for the twenty-five most recent messages in a given channel, prior to a given timestamp. Sample message requests corresponding to these two request types are presented in Appendix A.

/data/user/0/com.discord/cache/http-cache/ (.1 files). The .1 files discovered in this directory were gzip-compressed JSON packets, each containing the response to the .0 HTTP request with the same filename. Responses to message requests contained messages in JSON format, with message contents, ID, sender information, attachment properties, and other Discord metadata. Notably for this study, attachment properties included such values as file type, filename, file size, height and width, Discord ID, and URLs (CDN and Media Proxy Server). A sample message JSON is presented in Appendix B.

/data/user/0/com.discord/cache/http-cache/journal. This DiskLruCache-formatted log file [26] appeared to track the writing, reading, overwriting, and deletion of the .0 and .1 files described above. While timestamps were not documented in this file, the order of operations was maintained, and resulting file sizes were documented. The contents of the recovered journal file are presented in Appendix C.

/data/user/0/com.discord/files/kv-storage/@account.<user-id>/a. This SQLite-formatted database contained twenty-four messages, corresponding to the twenty-five most recent messages in the #sending-from-chrome-on-windows channel, the latest channel selected by the user during testing (only twenty-four messages were sent to that channel). These messages contained the same properties, including attachment metadata, as the .1 files described above. No other messages were discovered in this database.

/data/user/0/com.discord/shared-prefs/CacheStore.xml. This XML file contained application status settings, such as logged-in user information (ID, username, display name, email address, token, etc.), recently selected guild IDs, recently selected channel IDs, whether or not multiple users had been logged on to the device, and more. Other XMLs in this directory contained much of the same information, among other application settings which may be of evidentiary value to an investigator.

Image Processing Results

File Structure and Embedded Metadata

Comparison of SHA-256 file hashes determined that all tested methods of collection from the CDN generated identical files. Taking the 144 image processing test files collected via API request as a baseline, 144 out of 144 iOS-downloaded files, 143 out of 143 Android-downloaded

files, and 24 out of 24 URL-downloaded files (100% of CDN-collected files) exhibited complete hash equivalence with their baseline counterparts.

File structure was characterized in terms of which structural elements were present in each file, as well as the order in which those elements appeared. This was done for both reference and processed files; processed files were then compared with their reference counterparts. 22 total reference JPEGs and 7 total reference PNGs were used for image processing tests. Broadly, these reference files had the following file structure properties. These properties are outlined in further detail in Table 10 (JPEG) and Table 11 (PNG).

- 36.4% of reference JPEG files contained app0 / JFIF segments.
- 100% of reference JPEG files contained app1 / EXIF segments.
- 27.3% of reference JPEG files contained embedded ICC profiles.
- 59.1% of reference JPEG files contained other appX segments.
- 50% of reference JPEG files contained post-0xFFD9 padding or other image data.
- 57.1% of reference PNG files contained zTXt segments.
- 100% of reference PNG files contained eXIf segments.
- 100% of reference PNG files contained tEXt segments.

Table 10. Reference JPEG File Structure Summary

Reference Image Source	iPhone SE Unprocessed	iPhone SE Discord In-App Unprocessed	Galaxy A51 Unprocessed	Galaxy A51 Discord In-App Unprocessed	Pixel 7 Pro Unprocessed	Pixel 7 Pro Discord In-App Unprocessed	Total Reference JPEG Files
App0 / JFIF	0 / 6 files	2 / 2 files	0 / 6 files	0 / 2 files	5 / 5 files	1 / 1 files	8 / 22 files
App1 / EXIF	6 / 6 files	2 / 2 files	6 / 6 files	2 / 2 files	5 / 5 files	1 / 1 files	22 / 22 files
ICC Profile	0 / 6 files	0 / 2 files	0 / 6 files	0 / 2 files	5 / 5 files	1 / 1 files	6 / 22 files
Other AppX segments	0 / 6 files	0 / 2 files	6 / 6 files	2 / 2 files	5 / 5 files	0 / 1 files	13 / 22 files
Post 0xFFD9 padding	0 / 6 files	0 / 2 files	6 / 6 files	0 / 2 files	5 / 5 files	0 / 1 files	11 / 22 files

Table 11. Reference PNG File Structure Summary

Reference Image Source	Transcoded from iPhone SE	Transcoded from Galaxy A51	Total Reference PNG Files
zTXt	0 / 3 files	4 / 4 files	4 / 7 files
eXIf	3 / 3 files	4 / 4 files	7 / 7 files
tEXt	3 / 3 files	4 / 4 files	7 / 7 files

Collected JPEG files exhibited several different file structure patterns, the properties of which are summarized in Table 12. 203 out of 233 total processed JPEG files (87.1%) were found to have a file structure element order that had changed in comparison to their reference counterparts.

Table 12. Processed JPEG File Structure Summary

Processed Image Source	Uploaded by iOS Client	Uploaded by Android Client	Uploaded by Windows / Browser Client	Pixel 7 Pro Upload Preparation Cache Files	Pixel 7 Pro Image Preview Cache Files	Total Processed
Structure element order changed	24 / 24 files	47 / 47 files	4 / 34 files	23 / 23 files	105 / 105 files	203 / 233 files
App0 / JFIF	3 / 24 files	2 / 47 files	14 / 34 files	23 / 23 files	105 / 105 files	147 / 233 files
App1 / EXIF	21 / 24 files	45 / 47 files	30 / 34 files	11 / 23 files	0 / 105 files	107 / 233 files
ICC Profile	0 / 24 files	45 / 47 files	10 / 34 files	23 / 23 files	0 / 105 file	78 / 233 files
Other AppX segments	2 / 24 files	10 / 47 files	20 / 34 files	10 / 23 files	0 / 105 files	42 / 233 files
Post 0xFFD9 padding	0 / 24 files	10 / 47 files	20 / 34 files	10 / 23 files	0 / 105 files	40 / 233 files

Processed PNG files exhibited a more limited distribution of file structure patterns (summarized in Table 13), as CDN-collected PNGs demonstrated complete hash equivalence across clients. 35 out of 77 total processed PNG files (45.5%) were found to have a file structure element order that had changed in comparison to their reference counterparts.

Table 13. Processed PNG File Structure Summary

Processed Image Source	Uploaded by iOS Client	Uploaded by Android Client	Uploaded by Windows / Browser Client	Pixel 7 Pro Upload Preparation Cache Files	Pixel 7 Pro Image Preview Cache Files	Total Processed
Structure element order changed	0 / 7 files	0 / 14 files	0 / 14 files	0 / 7 files	35 / 35 files	35 / 77 files
zTXt	4 / 7 files	8 / 14 files	8 / 14 files	4 / 7 files	0 / 35 files	93 / 77 files
eXIf	7 / 7 files	14 / 14 files	14 / 14 files	7 / 7 files	0 / 35 files	42 / 77 files
tEXt	7 / 7 files	14 / 14 files	14 / 14 files	7 / 7 files	0 / 35 file	42 / 77 files

Processed JPEG and PNG file structure patterns are outlined in further detail in Appendix D, Tables 19 – 32. These were distributed in a predictable manner, based on processing conditions. The impacts of these processing conditions on JPEG file structure are summarized in Tables 14 – 18, and are further discussed in Chapter VI. PNG processing conditions are likewise discussed in Chapter VI.

Table 14. Processed JPEG File Structure Properties (iOS Client)

	From Camera Roll	From Filesystem	With Orientation Metadata	In-App Photo	In-App Photo with Orientation Metadata	Total Uploaded by iOS Client
Structure element order changed	5 / 5 files	15 / 15 files	2 / 2 files	1 / 1 file	1 / 1 file	24 / 24 files
App0 / JFIF	0 / 5 files	0 / 15 files	2 / 2 files	0 / 1 file	1 / 1 file	3 / 24 files
App1 / EXIF	5 / 5 files	15 / 15 files	0 / 2 files	1 / 1 file	0 / 1 file	21 / 24 files
ICC Profile	0 / 5 files	0 / 15 files	0 / 2 files	0 / 1 file	0 / 1 file	0 / 24 files
Other AppX segments	0 / 5 files	2 / 15 files	0 / 2 files	0 / 1 file	0 / 1 file	2 / 24 files
Post 0xFFD9 padding	0 / 5 files	0 / 15 files	0 / 2 files	0 / 1 file	0 / 1 file	0 / 24 files

Table 15. Processed JPEG File Structure Properties (Android Client)

	From Camera Roll	From Filesystem	With Orientation Metadata	In-App Photo	In-App Photo with Orientation Metadata	Total Uploaded by Android Client
Structure element order changed	10 / 10 files	30 / 30 files	4 / 4 files	1 / 1 file	2 / 2 files	47 / 47 files
App0 / JFIF	0 / 10 files	0 / 30 files	0 / 4 files	0 / 1 file	2 / 2 files	2 / 47 files
App1 / EXIF	10 / 10 files	30 / 30 files	4 / 4 files	1 / 1 file	0 / 2 files	45 / 47 files
ICC Profile	10 / 10 files	30 / 30 files	4 / 4 files	1 / 1 file	0 / 2 files	45 / 47 files
Other AppX segments	5 / 10 files	5 / 30 files	0 / 4 files	0 / 1 file	0 / 2 files	10 / 47 files
Post 0xFFD9 padding	5 / 10 files	5 / 30 files	0 / 4 files	0 / 1 file	0 / 2 files	10 / 47 files

Table 16. Processed JPEG File Structure Properties (Windows / Browser Client)

	Uploaded by Windows / Browser Client	With Orientation Metadata	Total Uploaded by Windows / Browser Client
Structure element order changed	0 / 30 files	4 / 4 files	4 / 34 files
App0 / JFIF	10 / 30 files	4 / 4 files	14 / 34 files
App1 / EXIF	30 / 30 files	0 / 4 files	30 / 34 files
ICC Profile	10 / 30 files	0 / 4 files	10 / 34 files
Other AppX segments	20 / 30 files	0 / 4 files	20 / 34 files
Post 0xFFD9 padding	20 / 30 files	0 / 4 files	20 / 34 files

Table 17. Processed JPEG File Structure Properties (Upload Preparation Cache)

	From Camera Roll	From Filesystem	With Orientation Metadata	In-App Photo with Orientation Metadata	Total Pixel 7 Pro Upload Preparation Cache Files
Structure element order changed	5 / 5 files	15 / 15 files	2 / 2 files	1 / 1 files	23 / 23 files
App0 / JFIF	5 / 5 files	15 / 15 files	2 / 2 files	1 / 1 files	23 / 23 files
App1 / EXIF	5 / 5 files	5 / 15 files	0 / 2 files	1 / 1 files	11 / 23 files
ICC Profile	5 / 5 files	15 / 15 files	2 / 2 files	1 / 1 files	23 / 23 files
Other AppX segments	5 / 5 files	5 / 15 files	0 / 2 files	0 / 1 files	10 / 23 files
Post 0xFFD9 padding	5 / 5 files	5 / 15 files	0 / 2 files	0 / 1 files	10 / 23 files

Table 18. Processed JPEG File Structure Properties (Image Preview Cache)

	From Camera Roll	From Filesystem	With Orientation Metadata	In-App Photo	In-App Photo with Orientation Metadata	Total Pixel 7 Pro Image Preview Cache Files
Structure element order changed	15 / 15 files	75 / 75 files	10 / 10 files	2 / 2 files	3 / 3 files	105 / 105 files
App0 / JFIF	15 / 15 files	75 / 75 files	10 / 10 files	2 / 2 files	3 / 3 files	105 / 105 files
App1 / EXIF	0 / 15 files	0 / 75 files	0 / 10 files	0 / 2 files	0 / 3 files	0 / 105 files
ICC Profile	0 / 15 files	0 / 75 files	0 / 10 files	0 / 2 files	0 / 3 files	0 / 105 files
Other AppX segments	0 / 15 files	0 / 75 files	0 / 10 files	0 / 2 files	0 / 3 files	0 / 105 files
Post 0xFFD9 padding	0 / 15 files	0 / 75 files	0 / 10 files	0 / 2 files	0 / 3 files	0 / 105 files

Regardless of whether app1 / EXIF segments were retained, EXIF segment contents were removed for 233 out of 233 total processed JPEG files (100%) and 77 out of 77 total processed PNG files (100%).

Collected JPEG files utilized several different quantization tables, which are summarized in Appendix D, Tables 33 – 41. 203 out of 233 total processed JPEG files (87.1%) were found to contain quantization tables that had changed in comparison to their reference counterparts. As with file structure, these quantization tables were distributed in a predictable manner based on processing conditions.

Image Data

In this study, both image stream hash comparison and pixel-level image quality assessments produced consistent results, identifying the same images as altered. Of processed files, 203 out of 233 JPEGs (87.1%) and 35 out of 77 PNGs (45.5%) produced non-matching image stream hash values relative to their reference counterparts; these same files also returned SSIM and PCC values below 1.0 and less than 100% identical pixels. These results indicate that image data in these files were altered.

Full image data processing results are provided in Appendix E. The tables list each reference file and its processed versions, along with their stream hash values. When applicable, SSIM, PCC and percentage of identical pixels (image subtraction) are also reported, computed in comparison to the corresponding reference image. These metrics are not valid for resized images and were omitted in those cases. SSIM and PCC values range from 0.0 – 1.0, with 1.0 indicating identical image data; percentage of identical pixels range from 0 – 100%.

File structure analysis determined that all tested methods of collection from the CDN (iOS download, Android download, API request, URL download) generated identical files. Accordingly, these redundant entries have been consolidated, with only the API request version of each file presented.

VI. ANALYSIS

Temporal Analysis

iPhone SE Quick Image

Image Upload / Download

No artifacts relating to the upload of message attachments were recovered from the quick forensic image of the test iOS device.

When the user of the iOS client clicks “Save Image” to manually download a message attachment, it is saved to the */DCIM/100APPLE/* folder, with filename changed to follow the numerical sequence of the images already present (e.g., *IMG_0008.jpg*). The file size of this downloaded image matches that of the Discord attachment properties stored on the CDN. The system database *Photos.sqlite* is then updated with the metadata of this newly imported file. Included in this metadata are the original name of the file and “com.hammerandchisel.discord,” the iOS system name for the Discord application. These values are found in the *ZADDITIONALASSETATTRIBUTES* table (*ZORIGINALFILENAME* and *ZIMPORTEDBYBUNDLEIDENTIFIER*, respectively).

In-App Photograph Upload

Photographs taken in-app are saved to the */DCIM/100APPLE/* folder, with a filename that follows the numerical sequence of the images already present (e.g., *IMG_0008.jpg*). The system database *Photos.sqlite* is then updated with the metadata of this newly created file. Included in this metadata is “com.hammerandchisel.discord,” the iOS system name for the Discord application, found in the *ZADDITIONALASSETATTRIBUTES* table (*ZIMPORTEDBYBUNDLEIDENTIFIER*). Unlike photographs taken with the Camera app

(Table 19), these photos do not contain EXIF information (Table 25); therefore, EXIF-related fields in *Photos.sqlite* are empty for these in-app produced photographs.

The system log file *com.apple.cameracapture.plist* is also updated, identifying “com.hannerandchisel-discord” as the source of the captured image, but failing to document file name or timestamp.

Viewing Messages with Embedded Image Attachments

No artifacts directly relating to the viewing of messages, with or without embedded image attachments, were recovered from the quick forensic image of the test iOS device, as this contained only few Discord application files, storing mostly preferences and application status settings. Artifacts recovered through these files included IDs for logged-in user, most recent direct message, most recently selected channel, and joined guilds. These values were updated periodically as the user interacted with the application.

Pixel 7 Logical Image

Image Upload / Download

When the user sends a message containing an image attachment, a processed copy of the image is saved to */com.discord/cache/*. If a PNG, this processed copy undergoes some limited metadata laundering (Table 30) and no image data alteration. If a JPEG, an exact copy is concurrently saved to */cache/Compressor/*, with identical Modified timestamp. These copies have undergone EXIF laundering and file element reordering (Table 26), as well as JPEG image recompression with one of the quantization tables described in Tables 38 – 39.

The image is then uploaded to Discord servers from the */cache/* folder, undergoing some additional, server-side processing (Table 27, JPEG; Table 31, PNG). Additional server-side orientation processing may also occur at this stage (Tables 28 and 40). The Discord attachment

properties corresponding to this processed image include, among other values, filename, file size, and Discord ID (in snowflake format, which can be converted to uploaded timestamp).

When the user clicks “Save Image” to manually download an image, the file is saved to the */media/0/Downloads/* folder. The filename and file size of this downloaded image match those of the Discord attachment properties stored on the CDN.

In-App Photograph Upload

Photographs taken in-app are saved simultaneously to */media/0/Pictures/* and */com.discord/cache/*. These two files contain different quantization tables (Tables 34 – 35, */Pictures/*; Table 39, */cache/*) and file structure elements (Tables 22 and 24, */Pictures/*; Table 26, */cache/*), and it is unclear whether one file is derived from the other, or whether they are both derived from the same raw image data obtained directly from the camera. The copy of the file saved to the */cache/* folder contains EXIF Orientation tags, regardless of whether the utilized phone model normally saves photographs with such metadata, potentially triggering server-side orientation processing. Image upload then proceeds as described above.

Viewing Messages with Embedded Image Attachments

When the user selects a channel, the client requests that channel’s twenty-five most recent messages from the CDN. The HTTP request is stored in plaintext format as a .0 cache file. The response is stored in gzip-compressed JSON format as a .1 cache file with a corresponding filename. The journal file in */com.discord/cache/http-cache/* is updated with the name of these files and the resultant file sizes.

Messages are stored in the SQLite-formatted database in */files/kv-storage/*, but the contents of this database are updated routinely, and it is therefore not a reliable repository of downloaded messages.

Received messages are then displayed in the client. Image previews corresponding to embedded image attachments are automatically downloaded (with .cnt extension). All image preview cache files in this study had been downsized to render the longest dimension to 1080 pixels. Resized images are processed and delivered by Discord's Media Proxy server, not the CDN [8]. These processed images contain a minimal file structure (Table 28, JPEG; Table 32, PNG), and JPEG image previews are compressed with the quantization tables described in Table 41.

If a duplicate request is sent (e.g., the twenty-five most recent messages for an already-viewed channel) the original .0/.1 files are overwritten with the new request and response. As before, the journal in */com.discord/cache/http-cache/* is updated with the name of these files and the resultant file sizes. If a message is deleted after being received, therefore, it is only removed from the HTTP cache if its channel is reselected, generating a duplicate request. Importantly, image preview caches corresponding to messages removed from the HTTP cache remain over the period studied, as if the message were not deleted.

If the user scrolls upward, past these loaded images, the client requests the channel's twenty-five most recent messages prior to the timestamp of the earliest loaded image. As this request contains the relevant timestamp, it is not considered a duplicate request and is cached in its own .0/.1 pair.

Image Processing Analysis

Analysis of image processing results, in conjunction with temporal analysis of the Discord application packet on the test Pixel device, revealed that Discord image processing occurs in a number of steps:

1. **Client-side upload preparation.** The majority of processing, including JPEG image recompression and EXIF metadata laundering, occurs during this step.
2. **Upload processing.** Some minimal metadata processing may occur to remove unneeded metadata segments generated by Step 1. Any EXIF tags not removed during Step 1, if any, are removed at this point.
 - a. **(Server-side orientation processing).** The presence of an Orientation EXIF value other than 1 triggers this additional processing step, which restructures file elements as described in Table 28, removing the EXIF segment and rotating the image accordingly, possibly performing an additional chroma sub-sampling pass and re-saving the image with quantization tables comprised of all 1s (Table 40).
3. **Storage of file on CDN.** The uploaded attachment file is stored on the CDN; this copy does not undergo any additional processing. Attachment properties for the file are also stored on the Discord CDN, and can be requested by the client or through the Discord API.
4. **(Server-side Media Proxy processing).** Additional server-side processing may be triggered when a client requests reformatted or resized assets from Discord's Media Proxy service; this processing returns transformed assets, but does not alter the copy of the file stored on the CDN.

PNG Processing

File Structure / Embedded Metadata

PNG files are processed identically regardless of uploading client. Any present eXIf segments are emptied, but retained. File structure element order and metadata segment contents are otherwise identical to their unprocessed counterparts (Table 31).

Downsized image preview cache files delivered by the Media Proxy Server contain a minimal file structure, with all optional metadata segments removed (Table 32).

Image Data

Uploaded PNG image data remains unaltered in all tested scenarios. Downsized image preview cache files delivered by the Media Proxy Server have undergone image data processing to downsize the longest dimension to 1080 pixels.

JPEG Processing

File Structure / Embedded Metadata

All EXIF data – including Orientation, camera information, GPS coordinates, and embedded thumbnails – are lost in all processed JPEG files. The app1 segment is usually retained, but always emptied. The size of this empty EXIF segment varies depending on uploading client. Other metadata segments (Adobe XMP, HDR data, trailing MP image data, etc.) remain intact in some cases. Resultant file structure elements, element order, and quantization tables are dependent on uploading client. See the tables in Appendix D for more information.

JPEG file structure order and quantization table data remain unaltered by the browser and Windows clients, in the absence of subsequent server-side orientation processing. While any present EXIF segments are emptied, all other metadata segments remain unaltered.

Uploads by Android clients insert an app2 segment containing ICC Profile information, or update this segment if already present. Exact formatting of this segment varies slightly by application build. Minor variation in metadata processing is also present, as native metadata support can vary widely between different makes of Android-based phones. This can result, for example, in the retention of HDR-related metadata segments by one build of the Android

application, but not another. Despite this variability, Android-processed file structures can be generalized (Table 27).

Likewise, minor variation in file structure and quantization table values were found in some, but not all processed versions of iPhone-originating images uploaded from the Files app instead of the camera roll (Tables 36 – 37).

Downsized image preview cache files delivered by the Media Proxy Server contain a minimal file structure, with all optional metadata segments removed. This minimal file structure is shared by images that have undergone server-side orientation processing (Table 28).

Image Data

JPEGs with no Orientation EXIF tags, or with an Orientation tag value of 1, undergo no image data alteration when uploaded by the browser and Windows clients. All other tested upload scenarios and/or clients result in JPEG image recompression, even if minimal. Quantization tables utilized for this recompression are dependent on uploading client (Tables 36 – 39). Server-side orientation processing introduces no additional frequency data compression (Table 40), but does result in some image data alteration, possibly due to chroma sub-sampling.

Downsized image preview cache files delivered by the Media Proxy Server have undergone image data processing to downsize the longest dimension to 1080 pixels. JPEG quantization tables are as described in Table 41.

Hypotheses and Tying Back to Research Questions

H1. JPEG File Structure / Embedded Metadata Not Altered

Testing across all sub-conditions revealed that JPEG structure and embedded metadata were not preserved uniformly following upload. Files containing an Orientation EXIF tag value other than 1 underwent reordering or removal of file structure elements, and substitution of the

original quantization tables with those described in Table 40. This pattern was not consistently observed for the Android client, which appeared to perform orientation processing client-side in most cases and therefore maintained a uniform file structure across both orientation subgroups.

Uploading an in-app photograph, by itself, did not trigger structural differences; however, because the Android client stored such photographs in its upload cache with Orientation EXIF tags, this condition indirectly prompted server-side orientation processing for non-horizontal images.

Uploading client type also produced systematic and reproducible differences. Files uploaded through the Windows and browser clients preserved file structure elements and order, merely emptying EXIF segment contents, whereas iOS and Android clients generated distinctive metadata block arrangements and quantization tables. Minor variations in metadata segment handling, particularly for HDR-related fields, were also observed based on the specific Android build. Uploading iOS-originating files from the Files app similarly resulted in minor differences in quantization tables and metadata segments in some, but not all cases.

No differences were observed between forwarded and non-forwarded file attachments. Likewise, collection method did not introduce any additional structural changes when files were retrieved from the Discord CDN. However, upload preparation cache files and image preview cache files consistently contained alternative file structures.

Taken together, the results demonstrate that JPEG file structure and embedded metadata were altered under specific, repeatable conditions, most notably when Orientation EXIF tags were present or when uploads originated from mobile clients. Accordingly, H1 is rejected. The consistency of these modifications within each sub-condition indicates that Discord's processing behavior is deterministic and predictable.

H2. JPEG Image Data Not Altered

Testing across all sub-conditions revealed that JPEG image data was not preserved uniformly following upload. The primary determinants of image data differences were uploading client and the presence of Orientation EXIF tag values other than 1.

Images uploaded through the Windows and browser clients preserved their original image data when no server-side orientation processing was required, whereas uploads from the Android and iOS clients consistently applied distinct quantization tables, yielding measurable but deterministic image data differences. Uploading iOS-originating files from the Files app similarly resulted in minor image data differences due to the differing quantization tables utilized.

Files requiring server-side orientation processing exhibited minor additional pixel-level differences possibly attributable to chroma sub-sampling, despite overall lossless preservation of frequency data.

No differences were observed between forwarded and non-forwarded messages. Collection method did not introduce any additional image data changes when files were retrieved from the Discord CDN; upload preparation cache files, likewise, contained consistent image data in the absence of server-side orientation processing. However, image preview cache files were systematically downsized and recompressed.

Taken together, the results demonstrate that image data alterations occurred under specific, repeatable conditions. Accordingly, H2 is rejected. The consistency of these modifications within each sub-condition indicated that Discord's processing behavior is deterministic and predictable.

H3. PNG File Structure / Embedded Metadata Not Altered

Testing across all sub-conditions revealed limited but consistent file structure processing for PNG images. Most notably, uncommon metadata segments such as eXIf were emptied during upload. This behavior was observed uniformly across message forwarding status, uploading client, and CDN-based collection methods, indicating a standardized handling process.

Upload preparation cache files displayed minor deviations from this pattern, as some eXIf segment values were zeroed rather than fully removed. Image preview cache files, by contrast, employed a minimal PNG structure, omitting all optional metadata segments entirely.

Taken together, these results demonstrate that Discord applies a consistent metadata sanitization process to PNG uploads, resulting in limited but systematic structural modifications. Accordingly, H3 is rejected. The consistency of these alterations within each sub-condition again indicated deterministic and predictable processing behavior.

H4. PNG Image Data Not Altered

Testing across all sub-conditions revealed that PNG image data remained fully preserved through upload and CDN retrieval. For all message forwarding statuses, uploading clients, and collection methods, image data were found to be identical to their respective source files.

The sole deviation was observed in image preview cache files, which contained downscaled versions of the original images. No other image data alterations were detected in any sub-condition. Taken together, the results confirm that Discord preserves PNG image data apart from images intentionally resized for preview caching. Accordingly, with this qualification, H4 is not rejected.

H5-H9. Temporal Analysis Hypotheses

H5. No Cache for Unviewed Spoilered Images (Android)

Examination of the Pixel device revealed the presence of an image preview cache file corresponding to the unviewed spoilered image. Accordingly, H5 is rejected, indicating that Discord's caching mechanism for spoilered images does not prevent storage prior to user interaction.

H6. No Cache for Direct Message Images (Android)

Examination of the Pixel device revealed the presence of an image preview cache file corresponding to the image sent via direct message. Accordingly, H6 is rejected.

H7. No Cache for Images in Unviewed Channels (Android)

No cache files corresponding to the image sent in the channel that was not subsequently viewed by the user were detected. Accordingly, H7 is not rejected.

H8. Cache Not Retained After Sender Deletes Message (Android)

Image preview cache files corresponding to deleted messages were retained on the Pixel device, regardless of whether the channel was re-viewed after deletion. Accordingly, H8 is rejected.

H9. Discord Data Not Recoverable from Non-Jailbroken iPhone

Application data recovered from the iPhone was extremely limited and did not directly correspond to any image content sent or received during test dataset generation. While this confirms that meaningful user images were largely unrecoverable, the presence of residual application data, as well as some operating system files tying downloaded and captured files to the Discord application, introduces a minor caveat. Accordingly, H9 is rejected with qualifications, reflecting the limited but nonzero recoverable data.

Relationship of Hypothesis Results to Research Questions

The hypothesis testing directly addressed the study's research questions concerning Discord image processing and cache behavior. Across all tested sub-conditions, the evaluation of JPEG and PNG uploads, including variations in client, orientation, message forwarding, and collection method, allowed for a systematic assessment of changes to file structure, metadata, and image data. Analysis of Android and iOS cache files, combined with temporal reconstruction of events, allowed for detailed characterization of how image viewing, downloading, and deletion affect cached content.

The structured sub-condition testing and controlled collection methods provided sufficient evidence to evaluate most scenarios, including edge cases such as in-app photographs, “spoiled” images, and deleted images. Some limitations remain, particularly the restricted recoverability of iOS application data and the relatively small sample sizes for image quality assessment metrics. Despite these caveats, the quasi-experimental design ensured that all research questions could be addressed in a repeatable and well-documented manner. Overall, the analysis framework proved effective for systematically assessing Discord's image processing behaviors and cache management across multiple devices and conditions.

VII. CONCLUSIONS

The analysis of Discord application data relating to uploaded JPEG and PNG files demonstrates a series of predictable behaviors that hold significant forensic value. On iOS, the scope of recoverable Discord artifacts is limited, but still useful in establishing investigatory context. Quick images of iOS devices may reveal identifiers such as user ID, most recent direct message ID, currently selected channel ID, and joined guild IDs. While these identifiers do not directly relate to the examination of Discord-processed image files, they are relevant to emergency disclosure or preservation requests submitted through Discord's Government Request Portal [27]. In addition, system files such as *Photos.sqlite* and *com.apple.cameracapture.plist* can reveal whether the Discord application has interacted with the device camera, providing indirect evidence of application usage.

On Android, recoverable data appears more extensive, largely due to the greater feasibility of obtaining a logical image. Logical imaging, which captures the active file system, allows examiners to access detailed application cache contents. Folders such as */cache/* and */cache/Compressor/* contain client-side image upload preparation files that are, in most cases, identical to the files later hosted on the Content Distribution Network, aside from minor metadata differences. Upload preparation caches may also include files corresponding to attachments that were never successfully uploaded, such as those exceeding Discord's file size limitations.

The */cache/http-cache/* directory retains recent message data and attachment URLs not preserved in the primary client database, while */cache/app_images_cache/* stores preview images of message attachments in the form of JPEG or PNG files with a *.cnt* extension. These preview files, resized to a maximum of 1080 pixels, are automatically downloaded when a message

containing media is received. Importantly, the presence of such preview files does not necessarily indicate that the user viewed or interacted with the image itself – only that the channel containing the image was accessed.

Discord applies deterministic, client-dependent transformations to uploaded media, particularly JPEG images, which can reveal information about both the original file and the uploading client. For example, JPEGs uploaded from Chrome or Windows without orientation metadata retain their file structure, quantization tables, and image data, enabling reliable inferences about the original image (although EXIF data is consistently stripped). Both iOS and Android platforms use small, characteristic sets of quantization tables that can serve as client identifiers. Orientation metadata introduces additional complexity, as Discord’s server-side rotation reprocessing applies an extra chroma sub-sampling pass and replaces all quantization table values with 1s, slightly altering image data and producing a larger file. On Android, orientation metadata is typically – but not always – corrected by the client prior to upload, resulting in fewer server-side transformations. These complex, but predictable behaviors allow examiners to attribute uploads to specific clients through hex and JPEG structure analysis using tools capable of interpreting quantization tables and markers, and to infer how the original image may have differed from its processed counterpart.

In contrast, PNG uploads remain largely unaltered across all clients, with only minor metadata adjustments such as the removal of uncommon chunks (e.g., eXIf). Processed PNGs exhibit complete hash equivalence across clients. While PNG files do not carry client-specific signatures like JPEG quantization tables, their consistency ensures they can serve as reliable evidence of the original image content.

From an evidentiary standpoint, Discord's caching and file-handling behaviors offer several practical implications. Deleted messages may remain recoverable from an Android device's HTTP cache until the affected channel is reselected by the Android user, underscoring the importance of timely device acquisition when Discord activity is suspected. In this way, logical imaging of the device can allow for recovery of a greater quantity of attachment URLs. Image preview cache files are not automatically removed upon deletion of corresponding messages, providing additional means of potentially recovering evidence of deleted messages.

When an original image file is unavailable, the version stored on Discord's Content Distribution Network constitutes best evidence. CDN-hosted images represent the final form stored on Discord's servers after any client- or server-side processing during upload. Downloads from the CDN reproduce this file, regardless of client used. However, care must be taken to distinguish true CDN URLs from those used by Discord's Media Proxy server, which can serve resized or transcoded versions of the same file. Since proxy and CDN URLs can appear similar, recovered URLs should be verified to ensure that unmodified evidence is collected. CDN assets may be obtained in several ways: through credentialed downloads from an official Discord client, through API access using a bot account, or through direct URL retrieval from recovered cache data. The latter method requires no authentication but is time-sensitive, as Discord's CDN URLs are signed and expire after a set interval.

Collectively, these findings establish a reliable framework for the forensic interpretation of Discord image evidence. The application's transformations are deterministic and platform-dependent, meaning that investigators can infer uploading client from image characteristics alone, and may, in some cases, be able to make inferences about the original generating device. While EXIF metadata cannot be relied upon – having been stripped in all testing cases –

quantization tables, file structure, and cache persistence patterns provide alternative means of attribution and validation. Discord's predictable behavior across platforms allows for consistent interpretation of recovered data, supporting both evidentiary verification and timeline reconstruction in digital investigations.

Future Research

Future work should focus on developing a robust decision framework capable of linking processed JPEG file structures to uploading devices. This will require more comprehensive testing of various appX segments, including files that contain no EXIF data. In addition, images uploaded from Linux and macOS clients should be systematically analyzed to provide a complete understanding of platform-specific processing behaviors.

Expanding the sample size will increase the statistical significance of image quality assessments; furthermore, incorporating additional image quality metrics could provide a more nuanced understanding of subtle alterations introduced during upload. Image preview cache files corresponding to images originally at or below 1080 pixels (which, presumably, would not be downsized) should be examined to determine whether the absence of resizing affects the ability to infer the uploading client or original device.

Research should also be extended to other image file formats to determine whether similar forensic patterns exist beyond those observed for JPEG and PNG images. The framework used in this study to analyze image files could likewise be adapted to the examination of video and audio files uploaded to the Discord platform, to develop a unified approach to media forensics within the Discord environment. Collectively, these investigations would strengthen the evidentiary utility of Discord media artifacts and enhance forensic interpretation across a broader range of scenarios.

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APPENDIX A:

MESSAGE HTTP REQUEST EXAMPLES

Requesting 25 Most Recent Messages

<https://discord.com/api/v9/channels/1401420860132294686/messages?limit=25>

GET

1

Accept-Encoding: gzip

HTTP/1.1 200

18

date: Sat, 09 Aug 2025 23:26:23 GMT

content-type: application/json

strict-transport-security: max-age=31536000; includeSubDomains; preload

x-discord-features: chat

content-encoding: gzip

vary: Accept-Encoding

via: 1.1 google

alt-svc: h3=":443"; ma=86400

cf-cache-status: BYPASS

report-to:

{"endpoints":[{"url":"https://a.nel.cloudflare.com/report/v4?s=16Fn4ttwxKAPc83fyh2QjV0B43jhlYLZYbReMpQ9iKheTOOWJzwrY%2BUKaEMcn%2FxoNcJoNvpEkn%2BBkjcRtj6ef%2BMjvzr0Ia92TyuZnKsR2Hu%2FB9geQQbv2Z8gXaqz"}],"group":"cf-nel","max_age":604800}

nel: {"success_fraction":0,"report_to":"cf-nel","max_age":604800}

x-content-type-options: nosniff

reporting-endpoints: csp-

sentry="https://o64374.ingest.sentry.io/api/5441894/security/?sentry_key=8fbbce30bf5244ec9429546beef21870&sentry_environment=stable"

content-security-policy: frame-ancestors 'none'; default-src https://o64374.ingest.sentry.io; report-to csp-sentry; report-uri

https://o64374.ingest.sentry.io/api/5441894/security/?sentry_key=8fbbce30bf5244ec9429546beef21870&sentry_environment=stable

server: cloudflare

cf-ray: 96cb04a2aa16cb93-LAX

OkHttp-Sent-Millis: 1754781983194

OkHttp-Received-Millis: 1754781983505

TLS_AES_128_GCM_SHA256

3

MIIDpDCCA0ugAwIBAgIRAOgzVRXspLwrE5xRo0vCh28wCgYIKoZIzj0EAwIwOzELMAkGA1UEBhMCVV
MxHjAcBgNVBAoTFUdvb2dsZSBUCnVzdCBTZXJ2aWNlczEMMAoGA1UEAxMDV0UxMB4XDTI1MDcxMT
AzMDExM1oXDTI1MTAwOTA0MDEwOVowFjEUMBGA1UEAxMLZGZlY29yZC5jb20wWTATBgqhkhjOPQ
IBBggqhkhjOPQMBBwNCAASz86fFbE5Ayy3qSj5uKfYwng7qFXRKbNR3Q1kNQyIRYkw5sO8xylRo8ftTHhTH
GTHx/OB1VK7BiNE1DP1a0l7Eo4ICUzCCAk8wDgYDVR0PAQH/BAQDAgeAMBMGA1UdJQQMMAoGCCs
GAQUFBwMBMAwGA1UdEwEB/wQCMAAwHQYDVR0OBBYEFCbYVRE9tva0OttqBb1DdTTV7WkKMB8
GA1UdIwQYMBaAFJB3kjVnxP+ozKnme9mAeXvMk/k4MF4GCCsGAQUFBwEBBFIwUDAnBggrBgEFBQcw

AYYbaHR0cDovL28ucGtpLmdvb2cvcy93ZTEvNkRNMCGCCsGAQUFBzACChlodHRwOi8vaS5wa2kuZ29vZy93ZTEuY3J0MCUGA1UdEQQeMByCC2Rpc2NvcuY29tgg0qLmRpc2NvcuY29tMBMGA1UdIAQMMAowCAYGZ4EMAQIBMDYGA1UdHwQvMC0wK6ApoCeGJWh0dHA6Ly9jLnBraS5nb29nL3dlMS82WHM0aWRycTM1VS5jcmwwggEEBgorBgEEAdZ5AgQCBIH1BIHyAPAAAdgDd3Mo0ldfhFgXnlTL6x5/4PRxQ39sAOHQSDgOSrLVikgAAAZf3pPkkAAAEAwBHMEUCIB2+Xf5ZXBwW9Ht2jh6eq2FWaabwY1mwZ89jF5XO78lqAiEA91X/sruaS0Kj7CJMr1McwQ7jWS0GNKgebX6p+Zzr4bsAdgDM+w9qhXEJZf6Vm1PO6bJ8lumFXA2XjbapflTA/kwNsAAAAZf3pP0hAAAEAwBHMEUCIQDcM1WPTv5v+noFzRIJ1ioySA0DChOuXCMJIINw+8QeeAIgHRZVRULLfHqbImPbp208/qPzCYm7eNf8lgGw04y0cT4wCgYIKoZlZj0EAWIDRwAwRAIgOipYlOxfn33Dz37y9/mtbO05kHbRGLIPDKaNOBcngyQCIBCMFtit5en039QB3G9NCL4O5Jr+EWaZBrpM6s75vBH
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0
TLsv1.3

Requesting 25 Most Recent Messages Prior to a Given Timestamp

<https://discord.com/api/v9/channels/1401386008955850843/messages?before=1403861882632273990&limit=25>
GET

1

Accept-Encoding: gzip

HTTP/1.1 200

18

date: Sat, 09 Aug 2025 23:25:55 GMT

content-type: application/json

strict-transport-security: max-age=31536000; includeSubDomains; preload

x-discord-features: chat

content-encoding: gzip

vary: Accept-Encoding

via: 1.1 google

alt-svc: h3=":443"; ma=86400

cf-cache-status: BYPASS

report-to:

{\"endpoints\": [{\"url\": \"https://a.nel.cloudflare.com/report/v4?s=q3UB7aZPEjQp97yshFZv2YBJvB5EKKU5KusnMx5S0znXEeVKA%2FsQHSakGnLsqOc%2B0xtuNT2IOBEW%2FrFx%2FCvwSJzpKnBctIDZi0XjYLe61thHILD5z8BNXb1543W\"}], \"group\": \"cf-nel\", \"max_age\": 604800}

nel: {\"success_fraction\": 0, \"report_to\": \"cf-nel\", \"max_age\": 604800}

x-content-type-options: nosniff

reporting-endpoints: csp-

sentry= \"https://o64374.ingest.sentry.io/api/5441894/security/?sentry_key=8fbbce30bf5244ec9429546beef21870&sentry_environment=stable\"

content-security-policy: frame-ancestors 'none'; default-src https://o64374.ingest.sentry.io; report-to csp-sentry;

report-uri

https://o64374.ingest.sentry.io/api/5441894/security/?sentry_key=8fbbce30bf5244ec9429546beef21870&sentry_environment=stable

server: cloudflare

cf-ray: 96cb03f62865cb93-LAX

OkHttp-Sent-Millis: 1754781955530

OkHttp-Received-Millis: 1754781956066

TLS_AES_128_GCM_SHA256

3

MIIDpDCCA0ugAwIBAgIRAOgzVRXspLwrE5xRo0vCh28wCgYIKoZIzj0EAwIwOzELMAkGA1UEBhMCVV
MxHjAcBgNVBAoTFUdvd2dsZSBUcnVzdCBTZXRJ2aWNlcEMMAoGA1UEAxMDV0UxMB4XDTI1MDcxMT
AzMDExM1oXDTI1MTAwOTA0MDEwOVowFjEUMBIGA1UEAxMLZGZyY29yZC5jb20wWTATBgqhkJOPQ
IBBggqhkJOPQMBBwNCAASz86fFbE5Ayy3qSj5uKfYwng7qFXRKbNR3Q1kNQyIRYkw5sO8xylRo8ftTHhTH
GTHx/OB1VK7BiNE1DP1a0l7Eo4ICUzCCAk8wDgYDVR0PAQH/BAQDAgeAMBMGA1UdJQQMMAoGCCs
GAQUFBwMBMAwGA1UdEwEB/wQCMAAwHQYDVR0OBBYEFCbYVRE9tva0OttqBb1DdT7V7WkKMB8
GA1UdIwQYMBaAFJB3kjVnxP+ozKnme9mAeXvMk/k4MF4GCCsGAQUFBwEBBFiWUDAnBggrBgEFBQcw
AYYbaHR0cDovL28ucGtpLmdvb2cvcy93ZTEvNkRNMUCGCCsGAQUFBzACHhlodHRwOi8vaS5wa2kuZ29vZ
y93ZTEuY3J0MCUGA1UdEQQeMByCC2Rpe2NvcuQuY29tgq0qLmRpe2NvcuQuY29tMBMGA1UdIAQMMA
owCAYGZ4EMAQIBMDYGA1UdHwQvMC0wK6ApoCeGJWh0dHA6Ly9jLnBraS5nb29nL3dlMS82WHM0aW
RYcTM1VS5jcmwwggEEBgorBgEEAdZ5AGQCBIIH1BIHyAPAAAdgDd3Mo0ldfhFgXnlTL6x5/4PRxQ39sAOhQS
dgosrLvIKgAAAZf3pPkkAAAEAwBHMEUCIB2+Xf5ZXBwW9Ht2jh6eq2FWaabwY1mwZ89jF5XO78lqAiEA9

1X/sruaS0Kj7CJMr1McwQ7jWS0GNKgebx6p+Zzr4bsAdgDM+w9qhXEJZf6Vm1PO6bJ8IumFXA2XjbapfITa/k
wNsAAAAZf3pP0hAAAEAwBHMEUCIQDcM1WPTv5v+noFzRIJ1ioySA0DChOuXCMJIINw+8QeeAIgHRZV
RULLfHqbImPbp208/qPzCYm7eNf8lgGw04y0cT4wCgYIKoZlZj0EAwIDRwAwRAIgOipYlOxfN33Dz37y9/mtb
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MIICnzCCAiWgAwIBAgIQf/MZd5csIkp2FV0TttaF4zAKBggqhkjOPQQDAzBHMqswCQYDVQQGEwJVUzEi
MCAGA1UEChMZR29vZ2xlIFRydXN0IFNlcnZpY2VzIEExMQzEUMBIGA1UEAxMLR1RTIFJvb3QgUjQwHhc
NMjMxMjEzMDkwMDAwWHcNMjkwMjIwMTQwMDAwWjA7MQswCQYDVQQGEwJVUzEeMBwGA1UEC
hMVR29vZ2xlIFRydXN0IFNlcnZpY2VzMQwwCgYDVQQDEwNXRTEwWTATBgqhkhjOPQIBBggqhkjOPQM
BBwNCAARvzTr+Z1dHTCEDhUDCR127WEcPQMFC4XGGTfn1XzthkubgdnXGhOlCgP4mMTG6J7/EFmPLC
aY9eYmJbsPAvpWo4H+MIH7MA4GA1UdDwEB/wQEAwIBhjAdBgNVHSUEFjAUBgggBgEFBQcDAQYIKwY
BBQUHAAwIwEgYDVR0TAQH/BAgwBgEB/wIBADAdBgNVHQ4EFgQUkHeSNWfE/6jMqeZ72YB5e8yT+Tgw
HwYDVR0jBBgwFoAUgEzW63T/STaj1dj8tT7FavCUHYwwNAYIKwYBBQUHAQEEDAmMCQGCCsGAQU
FBZACHhhdHRwOi8vaS5wa2kuZ29vZy9yNC5jcnQwKwYDVR0fBCQwIjAgoB6gHIYaaHR0cDovL2MucGtpL
mdvb2cvci9yNC5jcmwwEwYDVR0gBAwwCjAIBgZngQwBAgEwCgYIKoZlZj0EAwMDaAAwZQIxAOcCq1H
W90OVznX+0RGU1cxAQXomvtgM8zItPZCuFQ8jSBJsJz5keROv9aYsAm5VsQIwJonMaAFi54mrhfFoFNZEfuN
MSQ6/bIBiNLiyoX46FohQvKeIoJ99cx7sUkFN7uJW
MIICCTCCAY6gAwIBAgINAgPlwGjvYxqccpBQUjAKBggqhkjOPQQDAzBHMqswCQYDVQQGEwJVUzEiM
CAGA1UEChMZR29vZ2xlIFRydXN0IFNlcnZpY2VzIEExMQzEUMBIGA1UEAxMLR1RTIFJvb3QgUjQwHhcN
MTYwNjIyMDAwMDAwWHcNMzYwNjIyMDAwMDAwWjBHMqswCQYDVQQGEwJVUzEiMCAGA1UECh
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4R9gq55KRanPpsXI5nymfopjTX15YhmUPoYRlBtHci8nHc8iMai/lxKvRHYqjQjBAMA4GA1UdDwEB/wQEAwI
BhjAPBgNVHRMBAf8EBTADAQH/MB0GA1UdDgQWBBSATNbrdP9JNqPV2Py1PsVq8JQdjDAKBggqhkjOP
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0

TLSv1.3

APPENDIX B:

MESSAGE JSON EXAMPLE

```
{
  "attachments": [
    {
      "content_scan_version": 2,
      "content_type": "image/jpeg",
      "filename": "PXL_20250804_140922041.jpg",
      "height": 4080,
      "id": "1403861751740629122",
      "placeholder": "IPgJDQJFdXaZOJkJiHl3mqT7aumP",
      "placeholder_version": 1,
      "proxy_url":
"https://media.discordapp.net/attachments/1401386008955850843/1403861751740629122/PXL_20250804_140922041.jpg?ex=689917a4&is=6897c624&hm=cdc6e63fcd93bab9d7d3296790900b1ad363a9ba8ddeae0f365e07d28920d100&",
      "size": 283840,
      "url":
"https://cdn.discordapp.com/attachments/1401386008955850843/1403861751740629122/PXL_20250804_140922041.jpg?ex=689917a4&is=6897c624&hm=cdc6e63fcd93bab9d7d3296790900b1ad363a9ba8ddeae0f365e07d28920d100&",
      "width": 3072
    }
  ],
  "author": {
    "accent_color": null,
    "avatar": null,
    "avatar_decoration_data": null,
    "banner": null,
    "banner_color": null,
    "clan": null,
    "collectibles": null,
    "discriminator": "0",
    "display_name_styles": null,
    "flags": 0,
    "global_name": "PIXEL",
    "id": "1391425813869494303",
    "primary_guild": null,
    "public_flags": 0,
    "username": "ncmftestaccount003"
  },
  "channel_id": "1401386008955850843",
  "components": [],
  "content": "",
  "edited_timestamp": null,
  "embeds": [],
  "flags": 0,
  "id": "1403861751639838771",
  "mention_everyone": false,
  "mention_roles": [],
  "mentions": [],
  "pinned": false,
  "timestamp": "2025-08-09T22:05:24.081000+00:00",
  "tts": false,
  "type": 0
}
```

APPENDIX C:

JOURNAL FILE EXAMPLE

libcore.io.DiskLruCache

1

201105

2

DIRTY fab0fcb1e3ccc3ae74febf6cfa21b79c
CLEAN fab0fcb1e3ccc3ae74febf6cfa21b79c 4820 8503
DIRTY 70689a982bc5034567530df41f755ac8
CLEAN 70689a982bc5034567530df41f755ac8 4135 112
READ fab0fcb1e3ccc3ae74febf6cfa21b79c
DIRTY fab0fcb1e3ccc3ae74febf6cfa21b79c
CLEAN fab0fcb1e3ccc3ae74febf6cfa21b79c 4162 8412
READ 70689a982bc5034567530df41f755ac8
DIRTY 70689a982bc5034567530df41f755ac8
CLEAN 70689a982bc5034567530df41f755ac8 4135 112
DIRTY 327ded0ee976710fec6327ab7553bb3d
CLEAN 327ded0ee976710fec6327ab7553bb3d 4171 16
DIRTY 3d328aef3e4929a5f6dcfc48f51afcaf
CLEAN 3d328aef3e4929a5f6dcfc48f51afcaf 4149 98
DIRTY 56ee3eaf61ba53248daff887bf3b3b2a
CLEAN 56ee3eaf61ba53248daff887bf3b3b2a 4180 3
DIRTY 56ee3eaf61ba53248daff887bf3b3b2a
CLEAN 56ee3eaf61ba53248daff887bf3b3b2a 4190 3
DIRTY 7386578786ebb79ef5a974be6186e4a0
CLEAN 7386578786ebb79ef5a974be6186e4a0 4149 245
DIRTY 88604aa784a493b62e9a754a0bd20f19
CLEAN 88604aa784a493b62e9a754a0bd20f19 4166 101
DIRTY f963bf6024c5ece25b88dcee9138b31d
DIRTY 603a08a3ad8a3ea259d45fb6dd342ca5
CLEAN f963bf6024c5ece25b88dcee9138b31d 4149 99
CLEAN 603a08a3ad8a3ea259d45fb6dd342ca5 4608 299
DIRTY 8cc63ed301770c7dc6c2548ec54f37f7
CLEAN 8cc63ed301770c7dc6c2548ec54f37f7 4176 2225
DIRTY f92229784f67fb95628e049e1b98f28a
CLEAN f92229784f67fb95628e049e1b98f28a 4941 40
DIRTY 0e498eb08a3e13b420ab55c11f8411b3
CLEAN 0e498eb08a3e13b420ab55c11f8411b3 4268 128
DIRTY 116799f7d931e88514d4e5545b05e0ea
CLEAN 116799f7d931e88514d4e5545b05e0ea 4124 11983
DIRTY 42b1fce53aa9609fb137f9378bdeb394
CLEAN 42b1fce53aa9609fb137f9378bdeb394 3971 201
DIRTY 83096631dfc3f01f7ac237e23bd4b7d8
CLEAN 83096631dfc3f01f7ac237e23bd4b7d8 4202 578
DIRTY 2b1f85d4807dc82a550cb699f093165f
CLEAN 2b1f85d4807dc82a550cb699f093165f 4178 3
DIRTY 165902c572ea2328c55f2c7cd4e79e16
CLEAN 165902c572ea2328c55f2c7cd4e79e16 4168 3
DIRTY d82becc865f68ec25ef9f63fecf730e4
CLEAN d82becc865f68ec25ef9f63fecf730e4 4159 202
READ d82becc865f68ec25ef9f63fecf730e4
REMOVE d82becc865f68ec25ef9f63fecf730e4

DIRTY d4362588d427b47d6f964df6a9c9ab51
CLEAN d4362588d427b47d6f964df6a9c9ab51 4176 26685
DIRTY 31a8389975eafe9323507fa261e470cd
CLEAN 31a8389975eafe9323507fa261e470cd 4171 3850
READ 56ee3eaf61ba53248daff887bf3b3b2a
READ 116799f7d931e88514d4e5545b05e0ea
DIRTY 56ee3eaf61ba53248daff887bf3b3b2a
CLEAN 56ee3eaf61ba53248daff887bf3b3b2a 4178 3
DIRTY 26ae6777547d5b3103012ff9db5edc78
CLEAN 26ae6777547d5b3103012ff9db5edc78 4268 125
DIRTY 116799f7d931e88514d4e5545b05e0ea
CLEAN 116799f7d931e88514d4e5545b05e0ea 4126 11983
READ 165902c572ea2328c55f2c7cd4e79e16
READ 56ee3eaf61ba53248daff887bf3b3b2a
DIRTY 165902c572ea2328c55f2c7cd4e79e16
CLEAN 165902c572ea2328c55f2c7cd4e79e16 4162 3850
DIRTY 56ee3eaf61ba53248daff887bf3b3b2a
CLEAN 56ee3eaf61ba53248daff887bf3b3b2a 4190 3
READ f963bf6024c5ece25b88dcee9138b31d
READ 88604aa784a493b62e9a754a0bd20f19
READ f92229784f67fb95628e049e1b98f28a
DIRTY 88604aa784a493b62e9a754a0bd20f19
CLEAN 88604aa784a493b62e9a754a0bd20f19 4166 101
DIRTY f963bf6024c5ece25b88dcee9138b31d
CLEAN f963bf6024c5ece25b88dcee9138b31d 4149 99
DIRTY a853f7e3e931856c1a6e831b6e5d7f13
CLEAN a853f7e3e931856c1a6e831b6e5d7f13 4452 304
DIRTY f92229784f67fb95628e049e1b98f28a
CLEAN f92229784f67fb95628e049e1b98f28a 4171 40
READ 116799f7d931e88514d4e5545b05e0ea
READ 26ae6777547d5b3103012ff9db5edc78
READ 42b1fce53aa9609fb137f9378bdeb394
DIRTY 116799f7d931e88514d4e5545b05e0ea
CLEAN 116799f7d931e88514d4e5545b05e0ea 4128 11984
DIRTY 26ae6777547d5b3103012ff9db5edc78
CLEAN 26ae6777547d5b3103012ff9db5edc78 4266 127
DIRTY 42b1fce53aa9609fb137f9378bdeb394
CLEAN 42b1fce53aa9609fb137f9378bdeb394 3975 201
DIRTY a5eb0b95adf47b4ac68390f73e529219
CLEAN a5eb0b95adf47b4ac68390f73e529219 4904 644
DIRTY 3e1ca9d34726365426900db1c79a2dcc
CLEAN 3e1ca9d34726365426900db1c79a2dcc 4164 636
READ 2b1f85d4807dc82a550cb699f093165f
DIRTY 2b1f85d4807dc82a550cb699f093165f
CLEAN 2b1f85d4807dc82a550cb699f093165f 4184 3
DIRTY d82becc865f68ec25ef9f63fecf730e4
CLEAN d82becc865f68ec25ef9f63fecf730e4 4161 229
READ d82becc865f68ec25ef9f63fecf730e4
REMOVE d82becc865f68ec25ef9f63fecf730e4
DIRTY 39f149917a872982567d1bdf4b00ea68
CLEAN 39f149917a872982567d1bdf4b00ea68 4164 3556
DIRTY b8f86ce19218bd7e1da935be9248c458
CLEAN b8f86ce19218bd7e1da935be9248c458 4162 3552
DIRTY bae6d2924dc3488cc1a6f3322dea24b1
CLEAN bae6d2924dc3488cc1a6f3322dea24b1 4154 3904
DIRTY b26d906e3937fe58a52a4559415c14af

CLEAN b26d906e3937fe58a52a4559415c14af 4189 1355
DIRTY f9760713dfa550f8c92068d8412d6ca4
CLEAN f9760713dfa550f8c92068d8412d6ca4 4187 1215
DIRTY ddf208f1a99c48042b4db18939d58543
CLEAN ddf208f1a99c48042b4db18939d58543 4922 3738
DIRTY 7a766bd2a0297b9a7f0d14bfb6e5e197
CLEAN 7a766bd2a0297b9a7f0d14bfb6e5e197 4185 1343
READ ddf208f1a99c48042b4db18939d58543
READ 56ee3eaf61ba53248daff887bf3b3b2a
DIRTY 56ee3eaf61ba53248daff887bf3b3b2a
DIRTY ddf208f1a99c48042b4db18939d58543
CLEAN 56ee3eaf61ba53248daff887bf3b3b2a 4180 3
CLEAN ddf208f1a99c48042b4db18939d58543 4170 3738
READ f963bf6024c5ece25b88dcee9138b31d
READ 88604aa784a493b62e9a754a0bd20f19
READ f92229784f67fb95628e049e1b98f28a
DIRTY f963bf6024c5ece25b88dcee9138b31d
DIRTY 5ebb1ac5959d2e63250a2665ee75222e
CLEAN f963bf6024c5ece25b88dcee9138b31d 4155 99
CLEAN 5ebb1ac5959d2e63250a2665ee75222e 4440 299
DIRTY 88604aa784a493b62e9a754a0bd20f19
CLEAN 88604aa784a493b62e9a754a0bd20f19 4168 101
DIRTY f92229784f67fb95628e049e1b98f28a
CLEAN f92229784f67fb95628e049e1b98f28a 4191 40
DIRTY d82becc865f68ec25ef9f63fecf730e4
CLEAN d82becc865f68ec25ef9f63fecf730e4 4165 349
READ 116799f7d931e88514d4e5545b05e0ea
READ 26ae6777547d5b3103012ff9db5edc78
DIRTY 26ae6777547d5b3103012ff9db5edc78
DIRTY 116799f7d931e88514d4e5545b05e0ea
CLEAN 26ae6777547d5b3103012ff9db5edc78 4270 124
CLEAN 116799f7d931e88514d4e5545b05e0ea 4132 10500
READ 42b1fce53aa9609fb137f9378bdeb394
DIRTY 42b1fce53aa9609fb137f9378bdeb394
CLEAN 42b1fce53aa9609fb137f9378bdeb394 3983 199
READ 7a766bd2a0297b9a7f0d14bfb6e5e197
DIRTY 7a766bd2a0297b9a7f0d14bfb6e5e197
CLEAN 7a766bd2a0297b9a7f0d14bfb6e5e197 4183 1339
DIRTY c21f02863a06a6ac6736df1cb63ecf8d
CLEAN c21f02863a06a6ac6736df1cb63ecf8d 4156 1091
DIRTY 2f0c7b507f264beec294b08e5a69c672
CLEAN 2f0c7b507f264beec294b08e5a69c672 4148 43
DIRTY 8518263611ee55b128eb13fff3c3eb1c
CLEAN 8518263611ee55b128eb13fff3c3eb1c 4156 651
DIRTY 430f48747462c07e0c547517243ce7d5
CLEAN 430f48747462c07e0c547517243ce7d5 4164 642
DIRTY 64675426d8f931ea515e31c0168d331d
CLEAN 64675426d8f931ea515e31c0168d331d 4235 348
DIRTY ed609b35db5ea0a840dddb014e8a76c4
CLEAN ed609b35db5ea0a840dddb014e8a76c4 4195 3
DIRTY 594a2e1ef672e0e658619477b170f0bc
DIRTY 8c2e481e496a0864a2b282fd50ad100e
CLEAN 8c2e481e496a0864a2b282fd50ad100e 4162 3
CLEAN 594a2e1ef672e0e658619477b170f0bc 4158 33277
DIRTY 8db72d17da5a78dcce68b11f9f2a0acc
CLEAN 8db72d17da5a78dcce68b11f9f2a0acc 4162 3533

READ a5eb0b95adf47b4ac68390f73e529219
 DIRTY a5eb0b95adf47b4ac68390f73e529219
 CLEAN a5eb0b95adf47b4ac68390f73e529219 4176 3
 READ 2b1f85d4807dc82a550cb699f093165f
 DIRTY 2b1f85d4807dc82a550cb699f093165f
 CLEAN 2b1f85d4807dc82a550cb699f093165f 4174 3
 READ d82becc865f68ec25ef9f63fecf730e4
 REMOVE d82becc865f68ec25ef9f63fecf730e4
 READ 2b1f85d4807dc82a550cb699f093165f
 READ 56ee3eaf61ba53248daff887bf3b3b2a
 DIRTY 56ee3eaf61ba53248daff887bf3b3b2a
 DIRTY 2b1f85d4807dc82a550cb699f093165f
 CLEAN 56ee3eaf61ba53248daff887bf3b3b2a 4184 3
 CLEAN 2b1f85d4807dc82a550cb699f093165f 4938 3
 READ f963bf6024c5ece25b88dcee9138b31d
 READ 88604aa784a493b62e9a754a0bd20f19
 READ f92229784f67fb95628e049e1b98f28a
 DIRTY f963bf6024c5ece25b88dcee9138b31d
 CLEAN f963bf6024c5ece25b88dcee9138b31d 4149 99
 DIRTY 70a28550738ac1e7b58a9f68c32bba8a
 DIRTY 88604aa784a493b62e9a754a0bd20f19
 CLEAN 88604aa784a493b62e9a754a0bd20f19 4168 101
 CLEAN 70a28550738ac1e7b58a9f68c32bba8a 4443 299
 DIRTY f92229784f67fb95628e049e1b98f28a
 CLEAN f92229784f67fb95628e049e1b98f28a 4177 40
 READ 165902c572ea2328c55f2c7cd4e79e16
 DIRTY 165902c572ea2328c55f2c7cd4e79e16
 CLEAN 165902c572ea2328c55f2c7cd4e79e16 4158 3850
 READ 116799f7d931e88514d4e5545b05e0ea
 DIRTY 61a4090782aabbee2ca96ac152c0982d
 CLEAN 61a4090782aabbee2ca96ac152c0982d 4266 130
 DIRTY 116799f7d931e88514d4e5545b05e0ea
 CLEAN 116799f7d931e88514d4e5545b05e0ea 4128 10495
 READ 42b1fce53aa9609fb137f9378bdeb394
 DIRTY 42b1fce53aa9609fb137f9378bdeb394
 CLEAN 42b1fce53aa9609fb137f9378bdeb394 3971 207
 READ f9760713dfa550f8c92068d8412d6ca4
 DIRTY f9760713dfa550f8c92068d8412d6ca4
 CLEAN f9760713dfa550f8c92068d8412d6ca4 4187 1211
 DIRTY d82becc865f68ec25ef9f63fecf730e4
 CLEAN d82becc865f68ec25ef9f63fecf730e4 4165 435
 READ bae6d2924dc3488cc1a6f3322dea24b1
 DIRTY bae6d2924dc3488cc1a6f3322dea24b1
 CLEAN bae6d2924dc3488cc1a6f3322dea24b1 4162 3904
 READ b26d906e3937fe58a52a4559415c14af
 DIRTY b26d906e3937fe58a52a4559415c14af
 CLEAN b26d906e3937fe58a52a4559415c14af 4935 1355
 READ b8f86ce19218bd7e1da935be9248c458
 DIRTY b8f86ce19218bd7e1da935be9248c458
 CLEAN b8f86ce19218bd7e1da935be9248c458 4162 3552
 READ 39f149917a872982567d1bdf4b00ea68
 DIRTY 39f149917a872982567d1bdf4b00ea68
 CLEAN 39f149917a872982567d1bdf4b00ea68 4902 3556

APPENDIX D:

FILE STRUCTURE PROCESSING FULL RESULTS

File Structure Patterns

Table 19. iPhone SE JPEGs – Unprocessed

0xFFD8	
app1	EXIF (big-endian, including embedded thumbnail)
dqt	
dri	
sof0	
dht	
scanStart	
sd	
0xFFD9	

Table 20. iPhone SE JPEGs – Discord In-App – Unprocessed

0xFFD8	
app0	JFIF 1.1, 72x72 density
app1	EXIF (big-endian, including embedded thumbnail)
sof0	
dht[0]-[3]	
dqt[0]-[1]	
dri	
scanStart	
sd	
0xFFD9	

Table 21. Galaxy A51 JPEGs – Unprocessed

0xFFD8	
app1	EXIF (little-endian, including embedded thumbnail)
app4	Custom metadata chunk
sof0	
dqt	
dht	
dri	
scanStart	
sd	
0xFFD9	
Trailing Metadata	Image_UTC_Data Camera_Capture_Mode_Info

Table 22. Galaxy A51 JPEGs – Discord In-App – Unprocessed

0xFFD8	
app1	EXIF (little-endian, including embedded thumbnail)
app4	Custom metadata chunk
sof0	
dqt	
dht	
dri	
scanStart	
sd	
0xFFD9	

Table 23. Pixel 7 Pro JPEGs – Unprocessed

0xFFD8	
app1[0]	EXIF (little-endian, including embedded thumbnail, no Orientation tag)
app0	JFIF 1.2, 1x1 density
app2[0]	ICC Profile (Google © 2023)
app1[1]	Adobe XMP Core
app1[2]	Adobe XMP Extension
app1[3]	Adobe XMP Extension
app2[1]	MPF II
dqt[0]-[1]	
sof0	
dht[0]-[3]	
scanStart	
sd	
FFD9	
FFD8	Trailing MP Image
app1	Adobe XMP
0xFFD9	

Table 24. Pixel 7 Pro JPEGs – Discord In-App – Unprocessed

0xFFD8	
app1[0]	EXIF (little-endian, including embedded thumbnail, yes Orientation tag)
app0	JFIF 1.2
dqt[0]-[1]	
app2[0]	ICC Profile (Google © 2023)
sof0	
dht[0]-[3]	
scanStart	
sd	
0xFFD9	

Table 25. JPEGs Uploaded by iOS Client

0xFFD8	
app1	EXIF (big-endian, 0x24 bytes, empty)
***app13	***Photoshop 3.0 IPTC Digest ***Only present in iOS-originating photographs uploaded from the Files app
sof0	
dht[0]-[3]	
dqt[0]-[1]	
dri	
scanStart	
sd	
0xFFD9	

Table 26. JPEG Upload Preparation Cache Files – Pixel 7 Pro

0xFFD8	
***app1	***EXIF (big-endian, ImageWidth, ImageHeight, ExifOffset, and Orientation) ***if taken in-app
app0	JFIF 1.1, 1x1 density
***app1	***EXIF (big-endian, 0x26 bytes, version 2.32) ***Only present in JPEGs originating from Pixel
***app2	***MPF II ***If segment present in original and supported by specific client build
***app1	***Adobe XMP Core ***If segment present in original and supported by specific client build
app2	ICC_Profile (Google © 2016) Minor client differences in profile format
***app2	***ISO 2146-1 (Universalized HDR metadata) ***If HDR metadata present in original and supported by specific client build
dqt[0]-[1]	
sof0	
dht[0]-[3]	
scanStart	
sd	
0xFFD9	
***0xFFD8	***Trailing MP Image ***If segment present in original and supported by specific client build
***app1	***Adobe XMP ***If segment present in original and supported by specific client build
***0xFFD9	***If segment present in original and supported by specific client build

Table 27. JPEGs Uploaded by Android Clients

0xFFD8	
app1	EXIF (big-endian, 0x18 bytes, empty)
***app2	***MPF II ***If segment present in original and supported by specific client build
***app1	***Adobe XMP Core ***If segment present in original and supported by specific client build
app2	ICC_Profile (Google © 2016) Minor client differences in profile format
***app2	***ISO 2146-1 (Universalized HDR metadata) ***If HDR metadata present in original and supported by specific client build
dqt[0]-[1]	
sof0	
dht[0]-[3]	
scanStart	
sd	
0xFFD9	
***0xFFD8	***Trailing MP Image ***If segment present in original and supported by specific client build
***app1	***Adobe XMP ***If segment present in original and supported by specific client build
***0xFFD9	***If segment present in original and supported by specific client build

Table 28. JPEGs – Orientation Processing and Image Preview Cache

0xFFD8	
app0	JFIF 1.1, 1x1 density
dqt[0]-[1]	
sof0	
dht[0]-[3]	
scanStart	
sd	
0xFFD9	

Table 29. PNGs – Unprocessed

sig	
IHDR	
cHRM	
bKGD	
pHYs	
***zTXt	***Not present in all unprocessed files
iDAT	Multiple segments, number varied
eXIf	
tEXt	Multiple segments, number varied

Table 30. PNG Upload Preparation Cache Files – Pixel 7 Pro

sig	
IHDR	
cHRM	
bKGD	
pHYs	
***zTXt	***If present in original
iDAT	Multiple segments, number same as original
eXIf	Some values zeroed out, but not all
tEXt	Multiple segments, number same as original

Table 31. Uploaded PNGs

sig	
IHDR	
cHRM	
bKGD	
pHYs	
***zTXt	***If present in original
iDAT	Multiple segments, number same as original
eXIf	Empty
tEXt	Multiple segments, number same as original

Table 32. PNGs – Image Preview Cache

sig	
IHDR	
iDAT	Multiple segments
IEND	

Quantization Tables (QT)

Table 33. iPhone SE JPEGs – Unprocessed QT

luminance							
2	2	2	3	5	6	8	10
2	2	2	3	5	6	8	10
2	2	3	5	6	8	10	12
3	3	5	6	8	10	12	14
5	5	6	8	10	12	14	15
6	6	8	10	12	14	15	15
8	8	10	12	14	15	15	15
10	10	12	14	15	15	15	15
chrominance							
2	2	4	7	16	16	16	16
2	4	4	11	16	16	16	16
4	4	9	16	16	16	16	16
7	11	16	16	16	16	16	16
16	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16

Table 34. Galaxy A51 JPEGs – Unprocessed QT

luminance							
3	3	3	2	2	2	3	3
3	3	2	2	2	2	3	3
3	2	2	2	2	3	3	4
3	2	2	3	3	3	4	5
2	2	2	3	4	5	6	7
2	2	3	3	5	7	9	11
3	3	3	4	6	9	12	14
3	3	4	5	7	11	14	19
chrominance							
4	5	4	4	4	4	5	6
5	4	4	4	4	4	5	6
4	4	4	4	4	5	6	7
4	4	4	5	5	6	7	8
4	4	4	5	7	8	10	11
4	4	5	6	8	11	13	16
5	5	6	7	10	13	17	21
6	6	7	8	11	16	21	28

Table 35. Pixel 7 Pro JPEGs – Unprocessed QT

luminance							
3	3	1	1	1	3	7	8
4	5	4	4	4	6	8	10
2	4	4	4	5	7	9	10
1	4	4	5	7	8	9	10
1	3	5	7	8	9	11	12
3	6	7	9	11	11	12	11
6	7	8	9	11	12	12	11
8	7	7	8	9	10	11	10
chrominance							
3	3	5	7	11	11	11	12
3	4	6	8	11	11	12	12
5	6	8	11	11	11	12	12
7	8	11	11	11	11	12	12
11	11	11	11	11	12	12	12
11	11	11	12	12	12	12	12
11	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12

Table 36. JPEGs Uploaded by iOS Client – QT

luminance							
9	9	9	16	22	30	38	46
9	9	9	16	22	30	38	46
9	9	16	22	30	38	46	55
16	16	22	30	38	46	55	65
22	22	30	38	46	55	65	73
30	30	38	46	55	65	73	73
38	38	46	55	65	73	73	73
46	46	55	65	73	73	73	73
chrominance							
11	12	18	32	76	76	76	76
12	17	17	51	76	76	76	76
18	17	42	76	76	76	76	76
32	51	76	76	76	76	76	76
76	76	76	76	76	76	76	76
76	76	76	76	76	76	76	76
76	76	76	76	76	76	76	76
76	76	76	76	76	76	76	76

Table 37. JPEGs Uploaded by iOS Client (iOS Image from Files App) – QT

luminance							
9	9	9	16	22	30	38	46
9	9	9	16	22	30	38	46
9	9	16	22	30	38	46	55
16	16	22	30	38	46	55	64
22	22	30	38	46	55	64	72
30	30	38	46	55	64	72	72
38	38	46	55	64	72	72	72
46	46	55	64	72	72	72	72
chrominance							
11	12	18	31	75	75	75	75
12	17	17	51	75	75	75	75
18	17	42	75	75	75	75	75
31	51	75	75	75	75	75	75
75	75	75	75	75	75	75	75
75	75	75	75	75	75	75	75
75	75	75	75	75	75	75	75
75	75	75	75	75	75	75	75

Table 38. JPEGs Uploaded by Android Clients – QT

luminance							
20	14	13	20	30	50	64	76
15	15	18	24	33	73	75	69
18	16	20	30	50	71	86	70
18	21	28	36	64	109	100	78
23	28	46	70	85	136	129	96
30	44	69	80	101	130	141	115
61	80	98	109	129	151	150	126
90	115	119	123	140	125	129	124
Chrominance							
21	23	30	59	124	124	124	124
23	26	33	83	124	124	124	124
30	33	70	124	124	124	124	124
59	83	124	124	124	124	124	124
124	124	124	124	124	124	124	124
124	124	124	124	124	124	124	124
124	124	124	124	124	124	124	124
124	124	124	124	124	124	124	124

Table 39. JPEGs Uploaded by Android Clients (In-App Photo) – QT

Luminance							
13	9	8	13	19	32	41	49
10	10	11	15	21	46	48	44
11	10	13	19	32	46	55	45
11	14	18	23	41	70	64	50
14	18	30	45	54	87	82	62
19	28	44	51	85	83	90	74
39	51	62	70	82	97	96	81
58	74	76	78	90	80	82	79
Chrominance							
14	14	19	38	79	79	79	79
14	17	21	53	79	79	79	79
19	21	45	79	79	79	79	79
38	53	79	79	79	79	79	79
79	79	79	79	79	79	79	79
79	79	79	79	79	79	79	79
79	79	79	79	79	79	79	79
79	79	79	79	79	79	79	79

Table 40. JPEG Server-Side Orientation Processing – QT

luminance							
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
chrominance							
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1

Table 41. JPEG Image Preview Cache Files – QT

luminance							
8	6	5	8	12	20	26	31
6	6	7	10	13	29	30	28
7	7	8	12	20	29	35	28
7	9	11	15	26	44	40	31
9	11	19	28	34	55	52	39
12	18	28	32	41	52	57	46
25	32	39	44	52	61	60	51
36	46	48	49	56	50	52	50
chrominance							
9	9	12	24	50	50	50	50
9	11	13	33	50	50	50	50
12	13	28	50	50	50	50	50
24	33	50	50	50	50	50	50
50	50	50	50	50	50	50	50
50	50	50	50	50	50	50	50
50	50	50	50	50	50	50	50
50	50	50	50	50	50	50	50

APPENDIX E:

IMAGE DATA PROCESSING FULL RESULTS

JPEG

Table 42. JPEG – From Filesystem – Stream Hash Values

	Filename	Stream Hash
1a Upload Prep. Cache	Pixel_01.jpg	ad6563456f3ed19d6ce6ba0e5af3eb9e36739d13a2d9712548c8deded85f7dd7
	temp_979787337308724475.jpeg	20fbf04b59ef99ba2b7ea90ab2b2ee9a74d229b5d4162f8b107304ced1d78c97d
	Pixel_01_fromAndroid-15-pixel7pro.jpg	20fbf04b59ef99ba2b7ea90ab2b2ee9a74d229b5d4162f8b107304ced1d78c97d
Image Prev. Cache	RUEVVX5LG-dS3_n17YSbhO4oQPE.cnt	425afcafe0a66b0a4aff8e1037a13095eb061e48ce7e7e8d8f2720bce9041666
	QTVPaFTlthu7vP45XZ1gh7EbpEA.cnt	425afcafe0a66b0a4aff8e1037a13095eb061e48ce7e7e8d8f2720bce9041666
	3bdazJvOXat7cZ2JUYGTVlhi3Fs.cnt	d30cce303682210d6235d48698213c7b0f68ba9710f2a02bd298c6810d3510f7
	TlziVdlmZDlfaZt4XRbhdwKlTjg.cnt	d30cce303682210d6235d48698213c7b0f68ba9710f2a02bd298c6810d3510f7
	bWF-2TnFilfJD-78f9fptD7pNFo.cnt	3bb43cc9bb697a7515a7382d9f1808fb2bc98838435a72baae3f0cd2e35409f8c
Discord CDN Downloads	Pixel_01_fromChrome_1403870164965130320.jpg	ad6563456f3ed19d6ce6ba0e5af3eb9e36739d13a2d9712548c8deded85f7dd7
	Pixel_01_fromWindows_1403872276096614504.jpg	ad6563456f3ed19d6ce6ba0e5af3eb9e36739d13a2d9712548c8deded85f7dd7
	Pixel_01_fromAndroid-13-SM-S515DL_1403868205675446362.jpg	20fbf04b59ef99ba2b7ea90ab2b2ee9a74d229b5d4162f8b107304ced1d78c97d
	Pixel_01_fromAndroid-15-pixel7pro_1403862596465066184.jpg	20fbf04b59ef99ba2b7ea90ab2b2ee9a74d229b5d4162f8b107304ced1d78c97d
	Pixel_01_fromIOS-15-8-4_1403865860522774630.jpg	9602794c05b37be9e3df50340432bb3083ff0e425d2a436a8615677169e33e37

Table 42. Continued

	Filename	Stream Hash
2a Upload Prep. Cache	Pixel_02.jpg	06e25333b8856fb57ee073680042d2482dcdcc4b0312aa326f12bc9022b2783e
	temp_3200348265416227744.jpeg	b38ee874f1cc37f3619cbf99552af093041e72b413d5e7834aeadafb6bfa424a
Image Prev. Cache	Pixel_02_fromAndroid-15-pixel7pro.jpg	b38ee874f1cc37f3619cbf99552af093041e72b413d5e7834aeadafb6bfa424a
	YbVvYTmpvJr-9ic-F7aSPYbdQgo.cnt	dd8ccc527aeed5f0ace970d3f57897bfbaca0e69bc6714a9b3f6c1f06de668c8
	Rmo3qvT2JjM0y1ulrY33-Cl8M.cnt	dd8ccc527aeed5f0ace970d3f57897bfbaca0e69bc6714a9b3f6c1f06de668c8
	dkGc1QcP9bvamS55YQesda9nZdA.cnt	914822aa7749d9f4cd2146807a6038f51166b94a7b4022661b52afda04b23b70
	RLvDee87eCYB3y3I298iGXvAJM.cnt	914822aa7749d9f4cd2146807a6038f51166b94a7b4022661b52afda04b23b70
	m4wDtwNCUmyQL0In8dCFkh9Y50E.cnt	f7f1073e72130a1c41530d2e6ebc351c7fa0c504b0e6ee12ef3404da93d48185
Discord CDN Downloads	Pixel_02_fromChrome_1403870202608881735.jpg	06e25333b8856fb57ee073680042d2482dcdcc4b0312aa326f12bc9022b2783e
	Pixel_02_fromWindows_1403872308656865321.jpg	06e25333b8856fb57ee073680042d2482dcdcc4b0312aa326f12bc9022b2783e
	Pixel_02_fromAndroid-13-SM-S515DL_1403868028025700492.jpg	b38ee874f1cc37f3619cbf99552af093041e72b413d5e7834aeadafb6bfa424a
	Pixel_02_fromAndroid-15-pixel7pro_1403862502928027759.jpg	b38ee874f1cc37f3619cbf99552af093041e72b413d5e7834aeadafb6bfa424a
	Pixel_02_fromIOS-15-8-4_1403865899219423322.jpg	d192e1c3d60f1c70352c4e148ff22ea467e9551b84c9c1f37a5cc6e7a413c860
	Pixel_03.jpg	12b0694420958bb7b70f522298f004f356d5d11081c56flac4c5d19347fd899c
3a Upload Prep. Cache	temp_7306773415079783223.jpeg	54493622f8df5f14db0f68b0265b3fcf773652ecb4681ed99e1ff992f33dc812
	Pixel_03_fromAndroid-15-pixel7pro.jpg	54493622f8df5f14db0f68b0265b3fcf773652ecb4681ed99e1ff992f33dc812
Image Prev. Cache	XxOFD51FXZgv5Pug_lmS9UVd8M.cnt	b91fd9e8f778b3c36b0d80eab33e95fdc7634e99e582f45942f810c1123be7e1
	wgz520TU918JBHfMqWGAmdIoUe8.cnt	b91fd9e8f778b3c36b0d80eab33e95fdc7634e99e582f45942f810c1123be7e1
	BAN93RaV_IYmo5zDDe0UMQWtY6E.cnt	01432f23d4ec1f6c3126c1cc84703d10206b2947edb8dc8d4a8efc5222da3b54
	BA6eMDwBQJJAuDT9luQdXmOTiEM.cnt	01432f23d4ec1f6c3126c1cc84703d10206b2947edb8dc8d4a8efc5222da3b54
	ZQE3gaIrBoYq_PZKSUjjmGsHh8o.cnt	c981b80bb912e5297c5f7a271e29b880215418d3c7d98f0021273759b5bc561d
Discord CDN Downloads	Pixel_03_fromChrome_1403870240898678844.jpg	12b0694420958bb7b70f522298f004f356d5d11081c56flac4c5d19347fd899c
	Pixel_03_fromWindows_1403872341515309197.jpg	12b0694420958bb7b70f522298f004f356d5d11081c56flac4c5d19347fd899c
	Pixel_03_fromAndroid-13-SM-S515DL_1403868776541458523.jpg	54493622f8df5f14db0f68b0265b3fcf773652ecb4681ed99e1ff992f33dc812
	Pixel_03_fromAndroid-15-pixel7pro_1403862462297673809.jpg	54493622f8df5f14db0f68b0265b3fcf773652ecb4681ed99e1ff992f33dc812
	Pixel_03_fromIOS-15-8-4_1403865933520568330.jpg	9f846f28612ff3c2af008dcf36aec2df15f4589efb5a8a91f2793e8d8d0dc20

Table 42. Continued

	Filename	Stream Hash
4a Upload Prep. Cache	Pixel_04.jpg	51b9c27f865c01e3881509717912b4be493e8f69bc69113ee9ad51f4cd767585
	temp_3512395594810084901.jpeg	7e4fad0f23f5348ca5b039da2b31845a00539a9a240d68403d49709bcc50c44a
	Pixel_04_fromAndroid-15-pixel7pro.jpg	7e4fad0f23f5348ca5b039da2b31845a00539a9a240d68403d49709bcc50c44a
Image Prev. Cache	aGkov5aU3BGsYIHYi9Bd34aXe_Y.cnt	06ea810031d44f99d56fa210fd5f87d959bb2f173c75f7d70e8252069feb5aa
	g7Ny0dDMhlesn9vB5fMr84u8w9Q.cnt	f198ef092334723c8df440a63b58fcaaa20fae6ef6726300fd27b0d869ab6b74
	g1sbBpJN3PeHlwGfDKT99Yqqqc4.cnt	f198ef092334723c8df440a63b58fcaaa20fae6ef6726300fd27b0d869ab6b74
	_sKL5rTsQ_DYmRux8Kta-g4bjs.cnt	bd242bd424efb9a1a7bb9443c9658c09233abba49d7bf3146fe418814f639657
	anb1YI_NrFNfAg-fo2d7s3d6OqL.cnt	bd242bd424efb9a1a7bb9443c9658c09233abba49d7bf3146fe418814f639657
Discord CDN Downloads	Pixel_04_fromChrome_1403870280761344010.jpg	51b9c27f865c01e3881509717912b4be493e8f69bc69113ee9ad51f4cd767585
	Pixel_04_fromWindows_1403872375748952147.jpg	51b9c27f865c01e3881509717912b4be493e8f69bc69113ee9ad51f4cd767585
	Pixel_04_fromAndroid-13-SM-S515DL_1403868743825621012.jpg	7e4fad0f23f5348ca5b039da2b31845a00539a9a240d68403d49709bcc50c44a
	Pixel_04_fromAndroid-15-pixel7pro_1403862431540973699.jpg	7e4fad0f23f5348ca5b039da2b31845a00539a9a240d68403d49709bcc50c44a
	Pixel_04_fromIOS-15-8-4_1403865980626538659.jpg	29ce206fbd864f5a58ee0607901527fd9d1de9b7648de555720bd1d7b16a468
5a	Pixel_05.jpg	6ecfe42d12944c4d6052d82d8d66ccd0a66a721de25bea5553aeec26cbc417d4
Upload Prep. Cache	temp_6428270609769883234.jpeg	da39d52769079211c98903ff4744d3e14c70dd04aa0811e807ab612c9b6ae2a2
	Pixel_05_fromAndroid-15-pixel7pro.jpg	da39d52769079211c98903ff4744d3e14c70dd04aa0811e807ab612c9b6ae2a2
Image Prev. Cache	hZ7NocUjoK0345SDJZrwRUWypO0.cnt	3c2c7daee00d66a2baaf887047a76be7b8a14f8211c44b0c30109b74ad457e97
	GsPNHH5i1vh5FgH-OqDQqAZEKCCQ.cnt	3c2c7daee00d66a2baaf887047a76be7b8a14f8211c44b0c30109b74ad457e97
	D9-pYKP6hFMRlqpnok09ljV0Uw.cnt	60365b4aae9463dab92b3be2bc4baeb55886bf87a1ba2d43651afbc23e8b80aa
	j3MvQ-2PgRR04G00TxzUW-CFQDo.cnt	60365b4aae9463dab92b3be2bc4baeb55886bf87a1ba2d43651afbc23e8b80aa
	0-wQRfjBSjggDNGnU5pkfJqcBl.cnt	40c671c5778963356454a7aa97b226df699c99e8ffcd678f9ae0571500b429b
Discord CDN Downloads	Pixel_05_fromChrome_1403870306808107069.jpg	6ecfe42d12944c4d6052d82d8d66ccd0a66a721de25bea5553aeec26cbc417d4
	Pixel_05_fromWindows_1403872401455976571.jpg	6ecfe42d12944c4d6052d82d8d66ccd0a66a721de25bea5553aeec26cbc417d4
	Pixel_05_fromAndroid-13-SM-S515DL_1403868715019272245.jpg	da39d52769079211c98903ff4744d3e14c70dd04aa0811e807ab612c9b6ae2a2
	Pixel_05_fromAndroid-15-pixel7pro_1403862397923627078.jpg	da39d52769079211c98903ff4744d3e14c70dd04aa0811e807ab612c9b6ae2a2
	Pixel_05_fromIOS-15-8-4_1403866019247951985.jpg	897293f016ff27b41a4e2d9b33abe89dd15425ddce20bb43a6553a826a6a606d4

Table 42. Continued

	Filename	Stream Hash
6a Upload Prep. Cache	Samsung_01.jpg	e82376a7a767be0ba0d2c0157755b111d0abe5e85f2e113740466685b22fa08
	temp_1288890560375571699.jpeg	c5026612cb56f36ba6f1ae0c307dfd5ce9cbb873ab197174709fd2e2610f8df7
	Samsung_01_fromAndroid-15-pixel7pro.jpg	c5026612cb56f36ba6f1ae0c307dfd5ce9cbb873ab197174709fd2e2610f8df7
Image Prev. Cache	xba7-w9ln89xjmm-3Q3TYu3rxyE.cnt	439f3f3d95c5fa69cdad481b3fbcdf011d9d937ef2547b383d4f6ec1497d292c
	fxMrYsiAyKk-2-iRD2Fxnq8PXZM.cnt	439f3f3d95c5fa69cdad481b3fbcdf011d9d937ef2547b383d4f6ec1497d292c
	TUx_VhcApf9oEZjCKIpHB5nUXBY.cnt	689bb5d96aa56a91e990be224bddff9676e967506c6c0168790ef6ba34eb94d7
	HS5wE0EAoB7slYC2ILsfc436RxA.cnt	689bb5d96aa56a91e990be224bddff9676e967506c6c0168790ef6ba34eb94d7
	mHeJM9QT0Nb1yAwFMCGUzfbkiiE.cnt	de0a3854019666bd0f4f285aea57c20c8815b1181d1777cc9a2c1f34d17950323
	Samsung_01_fromChrome_1403870354811785349.jpg	e82376a7a767be0ba0d2c0157755b111d0abe5e85f2e113740466685b22fa08
Discord CDN Downloads	Samsung_01_fromWindows_1403872435933024297.jpg	e82376a7a767be0ba0d2c0157755b111d0abe5e85f2e113740466685b22fa08
	Samsung_01_fromAndroid-13-SM-S515DL_1403868170313400411.jpg	c5026612cb56f36ba6f1ae0c307dfd5ce9cbb873ab197174709fd2e2610f8df7
	Samsung_01_fromAndroid-15-pixel7pro_1403862568363233300.jpg	c5026612cb56f36ba6f1ae0c307dfd5ce9cbb873ab197174709fd2e2610f8df7
	Samsung_01_fromIOS-15-8-4_1403866103628959754.jpg	b096475af1179c2c96b70d40e22e9cacf96a15b16526f702d92d48e23c7f9b90c
	Samsung_02.jpg	3faacfea55d2b81d5941f9924f343d282407954001255844f26c53f44e2484b4
	temp_6365898303479530728.jpeg	fe67017a0876b1d0a820ab34e0c5f4f9563c86b4a5d975c557d0f28e106345f3
7a Upload Prep. Cache	Samsung_02_fromAndroid-15-pixel7pro.jpg	fe67017a0876b1d0a820ab34e0c5f4f9563c86b4a5d975c557d0f28e106345f3
	rWz0r7DvOlfw1DgLe5Bmw1aiTXvY.cnt	0b09cf9e4d0c1d60929bbcbdb13952c879407e5f2d5ae8c83145a6527e0f49dd9
	ima5CXyxBalOq35SkfCIv0RhDNQ.cnt	0b09cf9e4d0c1d60929bbcbdb13952c879407e5f2d5ae8c83145a6527e0f49dd9
Image Prev. Cache	pdHi8hulQISRIISYYWh0LtlU5bE.cnt	9def05a450ab1bec76576e4521918908353a0b35236401a5eeda21fa1598f503
	InNpHg1YtZPvPMqNSn0GW2jpro0.cnt	9def05a450ab1bec76576e4521918908353a0b35236401a5eeda21fa1598f503
	LAcks6SFzNedrYkjFF8911oBgxU.cnt	73f36f3ed32729c749666fedf3279a07350f10d45d3a64bb1e27200197b1019
	Samsung_02_fromChrome_1403870418363879465.jpg	3faacfea55d2b81d5941f9924f343d282407954001255844f26c53f44e2484b4
Discord CDN Downloads	Samsung_02_fromWindows_1403872522453258282.jpg	3faacfea55d2b81d5941f9924f343d282407954001255844f26c53f44e2484b4
	Samsung_02_fromAndroid-13-SM-S515DL_1403868680068005939.jpg	fe67017a0876b1d0a820ab34e0c5f4f9563c86b4a5d975c557d0f28e106345f3
	Samsung_02_fromAndroid-15-pixel7pro_1403862357972881458.jpg	fe67017a0876b1d0a820ab34e0c5f4f9563c86b4a5d975c557d0f28e106345f3
	Samsung_02_fromIOS-15-8-4_1403866197316861972.jpg	974df0ec558a1ead59e73fa8f285e017bb6b6b3df72e74f6f6fbefb0e51aef7ff5a

Table 42. Continued

	Filename	Stream Hash
8a Upload Prep. Cache	Samsung_03.jpg	7eb7394edd018c776379026ea51036d07a86147f686f613a0cd88a41b899b1ac
	temp_1065039717974559616.jpeg	be7ffb5feb807e245156ed99744709b93f3cfd2de016191a53a9473c24dec502
	Samsung_03_fromAndroid-15-pixel7pro.jpg	be7ffb5feb807e245156ed99744709b93f3cfd2de016191a53a9473c24dec502
Image Prev. Cache	Joi-9UQ0xC12-g9l8nqesG5Tyw.cnt	68c1167b27d1cadb5b52c40f6fef66a421afdd24fa9d7402ebd0f1dc6df93332
	CS9Abyrn2LecK4Gss3efmOf_DmbA.cnt	68c1167b27d1cadb5b52c40f6fef66a421afdd24fa9d7402ebd0f1dc6df93332
	wLQAxK2eUwmlyz7Tt282FSnoyk.cnt	318405d02e20101edb638f749c9a4e033fbbd47f2f75b32c2f320e3e2e391ff7
	r2AkXPhCluWDeFDetwVB8hPZtM.cnt	318405d02e20101edb638f749c9a4e033fbbd47f2f75b32c2f320e3e2e391ff7
	duj6rCZkTo9aaILjNF02cfpsS9Q.cnt	cd11b0cc132f3b863cee6c03a8b1034296e23af5e3ce7a55e0263183e08fc6f
Discord CDN Downloads	Samsung_03_fromChrome_140387051133885201.jpg	7eb7394edd018c776379026ea51036d07a86147f686f613a0cd88a41b899b1ac
	Samsung_03_fromWindows_1403872600907841546.jpg	7eb7394edd018c776379026ea51036d07a86147f686f613a0cd88a41b899b1ac
	Samsung_03_fromAndroid-13-SM-S515DL_1403868288987041893.jpg	be7ffb5feb807e245156ed99744709b93f3cfd2de016191a53a9473c24dec502
	Samsung_03_fromAndroid-15-pixel7pro_1403862133309177937.jpg	be7ffb5feb807e245156ed99744709b93f3cfd2de016191a53a9473c24dec502
	Samsung_03_fromIOS-15-8-4_1403866317135548447.jpg	2fb8abf45760f4d0293c2282eb558d184902b20f9b406f3866d1c19f22a9d0f1
9a	Samsung_04.jpg	275e341b6c079d262eb36dd3a62541d09c6b232f3c64ac4e86dee9816bbba17
Upload Prep. Cache	temp_5186182783069744061.jpeg	da4b43945bd07bb6558e3bd4c700762b59d3a9af7541dc04e9e51f5e5de27c20
	Samsung_04_fromAndroid-15-pixel7pro.jpg	da4b43945bd07bb6558e3bd4c700762b59d3a9af7541dc04e9e51f5e5de27c20
Image Prev. Cache	NJHmWD3jS4Wrqht4bc_89Aqi1c.cnt	422b493574fc5b13be0360b1420d0f002d8fd8456866674b4fb2c71e2d93c6d
	lMigdiPUhOXbS-LbNLPGaBW0nCY.cnt	b28efbaa199452662b4d5a1f6bf9c879d9768abdfbe5acf068e26caf30eb08a5
	zl6jPQbEhhk78NpeCnBY5_qCKko.cnt	b28efbaa199452662b4d5a1f6bf9c879d9768abdfbe5acf068e26caf30eb08a5
	bWv8jS2M1eZYD_yISHZKgR6pKOg.cnt	42c8b783f95fb6084b0f5c396eeb54de1048486eb6821fcd35fb406650ffe9e2
	-RQ1v2TiQyIRxPIOwhPvoMO4lo.cnt	42c8b783f95fb6084b0f5c396eeb54de1048486eb6821fcd35fb406650ffe9e2
Discord CDN Downloads	Samsung_04_fromChrome_1403870579731333230.jpg	275e341b6c079d262eb36dd3a62541d09c6b232f3c64ac4e86dee9816bbba17
	Samsung_04_fromWindows_1403872679672549507.jpg	275e341b6c079d262eb36dd3a62541d09c6b232f3c64ac4e86dee9816bbba17
	Samsung_04_fromAndroid-13-SM-S515DL_1403869001381183580.jpg	da4b43945bd07bb6558e3bd4c700762b59d3a9af7541dc04e9e51f5e5de27c20
	Samsung_04_fromAndroid-15-pixel7pro_1403862059178786879.jpg	da4b43945bd07bb6558e3bd4c700762b59d3a9af7541dc04e9e51f5e5de27c20
	Samsung_04_fromIOS-15-8-4_1403866431568740372.jpg	c365ec2dfb96ec444705c20cfaf709e515abf9240854c98d9bcb44f25e5adb40

Table 42. Continued

	Filename	Stream Hash
10a Upload Prep. Cache	iPhone_01.JPG	df0418dc849ad6441a28788dff58d2599a22a67660add75f357f8d38865ff72a
	temp_4264285267606407443.jpeg	a7839dbcc44e3ef8cdc3cd5589d4290b4b1a2c83f4c15f134043e5b74387060e
	iPhone_01_fromAndroid-15-pixel7pro.JPG	a7839dbcc44e3ef8cdc3cd5589d4290b4b1a2c83f4c15f134043e5b74387060e
Image Prev. Cache	ZLce22ECjxhGl9EczLW2mRhenO8.cnt	9a01762d3f9298c0770540450beabea9cdf746054f1dfb9435793322ad4e499b
	ZN0w69Qq0uQZhwqLdSCF-mq7aT0.cnt	9a01762d3f9298c0770540450beabea9cdf746054f1dfb9435793322ad4e499b
	xx65-dwVVMooj5nr0EvYTw5NyDQ.cnt	b5ac9d5a22acc38509fea96884141abc8f579d8ae32e7a4fe3b15be64c499f67
	nj9ohCrpSvY9zpeQ1lfalmapZ1c.cnt	b5ac9d5a22acc38509fea96884141abc8f579d8ae32e7a4fe3b15be64c499f67
	2kZBBMjQg_SAvYRL1GOHsDQITKY.cnt	ec4d029522e876f7edca7f0894fe22ccf178c933da0e12439f3776ada0ca4d32
	iPhone_01_fromChrome_1403869734113644574.JPG	df0418dc849ad6441a28788dff58d2599a22a67660add75f357f8d38865ff72a
Discord CDN Downloads	iPhone_01_fromWindows_1403871900702343309.JPG	df0418dc849ad6441a28788dff58d2599a22a67660add75f357f8d38865ff72a
	iPhone_01_fromAndroid-13--SM-S515DL_1403869148508852294.jpg	a7839dbcc44e3ef8cdc3cd5589d4290b4b1a2c83f4c15f134043e5b74387060e
	iPhone_01_fromAndroid-15-pixel7pro_1403862785015812146.jpg	a7839dbcc44e3ef8cdc3cd5589d4290b4b1a2c83f4c15f134043e5b74387060e
	iPhone_01_fromIOS-15-8-4_1403865453868355714.jpg	ddfdb0c94892e075d247d3c4f9affc35d8386b132031ab0c8599b497d1c54c0
	iPhone_02.JPG	855b3c90601cb70c35f4bcb37dc65d88043873ce23b5be836e4df9ea7f72e7
11a Upload Prep. Cache	temp_8227339423207926490.jpeg	10fb09fe2e77f34f5e029b2ea65c9fee9075ecb834a59fd574158a6a689a0204
	iPhone_02_fromAndroid-15-pixel7pro.JPG	10fb09fe2e77f34f5e029b2ea65c9fee9075ecb834a59fd574158a6a689a0204
	lqO6VVqj1SPe0WLaoBJIW9fFEJo.cnt	62d39249368195fdac660ea4f3b4c7e337884d9dc87b379336f95d0debc9cef
Image Prev. Cache	ZVParmxKG0AfTg1LpMF-rt4w8pQ.cnt	62d39249368195fdac660ea4f3b4c7e337884d9dc87b379336f95d0debc9cef
	OrheafFEWIHMKgU8xppkpbNizZ0.cnt	482486566b77b4581f0ce0d4bedfa104cc90cd1a3e7576d06fd1d0ab5af73620
	7AwciqpGzZ9AH4R2bHdmn0vyFWU.cnt	482486566b77b4581f0ce0d4bedfa104cc90cd1a3e7576d06fd1d0ab5af73620
	y4zheuUaKf2WK_pd_4My8_EQyFw.cnt	09eea78d774180ec5287397fb1a45e95088c579fae48977ae7204a76e6833d33
Discord CDN Downloads	iPhone_02_fromChrome_1403869897880240240.JPG	855b3c90601cb70c35f4bcb37dc65d88043873ce23b5be836e4df9ea7f72e7
	iPhone_02_fromWindows_1403871985871880374.JPG	855b3c90601cb70c35f4bcb37dc65d88043873ce23b5be836e4df9ea7f72e7
	iPhone_02_fromAndroid-13--SM-S515DL_1403869088601604106.jpg	10fb09fe2e77f34f5e029b2ea65c9fee9075ecb834a59fd574158a6a689a0204
	iPhone_02_fromAndroid-15-pixel7pro_1403862697317240894.jpg	10fb09fe2e77f34f5e029b2ea65c9fee9075ecb834a59fd574158a6a689a0204
	iPhone_02_fromIOS-15-8-4_1403865561863032882.jpg	7e0ec1d8f4f3a01cd666783c900ae34ffb1d60523a577956ac67b917c61e0d7

Table 42. Continued

	Filename	Stream Hash
12a	iPhone_03.JPG	8d0aeb8465f1201c77ebfd1648f5b5a69eecd18c2a69c0327446abb1b2cf984c
Upload Prep. Cache	temp_6490266918944429555.jpeg	c16e275f3e76adbf16c89b0c39a3ea66ff06eb2fbc7de3678fd4619d6eb9bc5
	iPhone_03_fromAndroid-15-pixel7pro.JPG	c16e275f3e76adbf16c89b0c39a3ea66ff06eb2fbc7de3678fd4619d6eb9bc5
	Vigib39j0uVrtS_BGKfpsytytu-o.cnt	dcc15b0f0891048dfcd11f47993421381c79e8b83984d11a86bebb9dec1f809e
	Mws4lYNNvT1bbgG2LQCgR0w_UWfY.cnt	dcc15b0f0891048dfcd11f47993421381c79e8b83984d11a86bebb9dec1f809e
Image Prev. Cache	5EvTc7yZLYPZ3szWXR02AKXJ9DM.cnt	cfee5efc142a60fa9e6c3632b22c0a4f6cc5f89e69529aa08ba12579c7331763
	2PVx0N4sR5RfEXXZMEDVy_e7BA.cnt	4ffc181905eb432b6d3cda51b71597aa7233fa7e60440c7d4811bf5ea4749206
	cABzTJwsYyjcJk3_wLrNox6Qco.cnt	4ffc181905eb432b6d3cda51b71597aa7233fa7e60440c7d4811bf5ea4749206
	iPhone_03_fromChrome_1403869961381875853.JPG	8d0aeb8465f1201c77ebfd1648f5b5a69eecd18c2a69c0327446abb1b2cf984c
Discord CDN Downloads	iPhone_03_fromWindows_1403872046982893689.JPG	8d0aeb8465f1201c77ebfd1648f5b5a69eecd18c2a69c0327446abb1b2cf984c
	iPhone_03_fromAndroid-13-SM-S515DL_1403868612397109440.jpg	c16e275f3e76adbf16c89b0c39a3ea66ff06eb2fbc7de3678fd4619d6eb9bc5
	iPhone_03_fromAndroid-15-pixel7pro_1403862232722313340.jpg	c16e275f3e76adbf16c89b0c39a3ea66ff06eb2fbc7de3678fd4619d6eb9bc5
	iPhone_03_fromIOS-15-8-4_1403865641517318314.jpg	61118e69e38c94b79bdf3c5d4417e53245591e69cdab7132d576da32f155348d
13a	iPhone_04.JPG	37d5c6f534f12a07334023259f38332156fb682b921aa7fb4c977b033c4d339
Upload Prep. Cache	temp_8994793780160134940.jpeg	cac670067eb080e93ae951c850cdcc2ee1d63b9a0ed1c914c2adedd8f0ea6b96
	iPhone_04_fromAndroid-15-pixel7pro.JPG	cac670067eb080e93ae951c850cdcc2ee1d63b9a0ed1c914c2adedd8f0ea6b96
Image Prev. Cache	SNURu75U3DlzbRV2lCnJVxGURBA.cnt	f50b45879d98cc2b36b15af9087bb97269d16dc347e7b3f931d32497655c1b63
	flgsyXoLQBJB6qfpKpH8sNdv1NM.cnt	521c62390ff7ae1402de7daf7718fa5327b09c76e34ee7d33fad96734c55366d
	2NEyRUMpGwWloU8wXWAnBqOnJdDI.cnt	521c62390ff7ae1402de7daf7718fa5327b09c76e34ee7d33fad96734c55366d
	WN8fNI7s8fDxeVVT2VLhMFA_bsk.cnt	7ceeb834c3bad52e7f18cf6e733f12f488eb8638bc345d63f588aa5b0061ed0
Discord CDN Downloads	BX363BmkYdO3BwIC9obi0c-MltU.cnt	7ceeb834c3bad52e7f18cf6e733f12f488eb8638bc345d63f588aa5b0061ed0
	iPhone_04_fromChrome_1403870043086913566.JPG	37d5c6f534f12a07334023259f38332156fb682b921aa7fb4c977b033c4d339
	iPhone_04_fromWindows_1403872137093320847.JPG	37d5c6f534f12a07334023259f38332156fb682b921aa7fb4c977b033c4d339
	iPhone_04_fromAndroid-13-SM-S515DL_1403868885425455184.jpg	cac670067eb080e93ae951c850cdcc2ee1d63b9a0ed1c914c2adedd8f0ea6b96
Discord CDN Downloads	iPhone_04_fromAndroid-15-pixel7pro_1403861913485705309.jpg	cac670067eb080e93ae951c850cdcc2ee1d63b9a0ed1c914c2adedd8f0ea6b96
	iPhone_04_fromIOS-15-8-4_1403865730000359434.jpg	acac317f765d46aea3055cea13f34977b7d0b19375d18657d70972a6d5865070

Table 43. JPEG – From Filesystem – IQAs

	Filename	SSIM	PCC	% Similar Pixels
1a	Pixel_01.jpg			
Upload Prep. Cache	temp_979787337308724475.jpeg	0.942848775	0.998887649	1.819246579
	Pixel_01_fromAndroid-15-pixel7pro.jpg	0.942848775	0.998887649	1.819246579
Image Prev. Cache	RUEVVX5LG-dS3_nl7YSbhO4oQPE.cnt	N/A (Resized to ≤ 1080px)		
	QTVPaFTJthu7vP45XZ1gh7EbpEA.cnt			
	3bdazJvOXat7cZ2JUyGTVIhi3Fs.cnt			
	TIzIVdhnZDJfAzt4XRbhDwK1Tjg.cnt			
	bWF-2TnFilfJD-78f9ftD7pNFo.cnt			
Discord CDN Downloads	Pixel_01_fromChrome_1403870164965130320.jpg	1	1	100
	Pixel_01_fromWindows_1403872276096614504.jpg	1	1	100
	Pixel_01_fromAndroid-13-SM-S515DL_1403868205675446362.jpg	0.942848775	0.998887649	1.819246579
	Pixel_01_fromAndroid-15-pixel7pro_1403862596465066184.jpg	0.942848775	0.998887649	1.819246579
	Pixel_01_fromIOS-15-8-4_1403865860522774630.jpg	0.95879898	0.999313873	9.032652612
2a	Pixel_02.jpg			
Upload Prep. Cache	temp_3200348265416227744.jpeg	0.930330457	0.998417248	3.013205933
	Pixel_02_fromAndroid-15-pixel7pro.jpg	0.930330457	0.998417248	3.013205933
Image Prev. Cache	YbVrYTmpvJr-9ic-F7aSPYbdQgo.cnt	N/A (Resized to ≤ 1080px)		
	Rmo3qvft2JjM0y1ulrY33-CIs8M.cnt			
	dkGC1QcP9bvamS55YQesda9nZdA.cnt			
	RLvDce8i7eCYB3y3I298iGXvAJM.cnt			
	m4wDtwNCUmyQL0In8dCFkh9Y50E.cnt			
Discord CDN Downloads	Pixel_02_fromChrome_1403870202608881735.jpg	1	1	100
	Pixel_02_fromWindows_1403872308656865321.jpg	1	1	100
	Pixel_02_fromAndroid-13-SM-S515DL_1403868028025700492.jpg	0.930330457	0.998417248	3.013205933
	Pixel_02_fromAndroid-15-pixel7pro_1403862502928027759.jpg	0.930330457	0.998417248	3.013205933
	Pixel_02_fromIOS-15-8-4_1403865899219423322.jpg	0.941923424	0.998854987	8.838209763

Table 43. Continued

	Filename	SSIM	PCC	% Similar Pixels
3a	Pixel_03.jpg			
Upload Prep. Cache	temp_7306773415079783223.jpeg	0.950191156	0.998741071	4.570176866
	Pixel_03_fromAndroid-15-pixel7pro.jpg	0.950191156	0.998741071	4.570176866
Image Prev. Cache	XxOFD51FXZgv5Pug_lmS9UVd8M.cnt	N/A (Resized to ≤ 1080 px)		
	wgz520TU918JBHfMqWGAmIoUe8.cnt			
	BAN93RaV_IYmo5zDDe0UMQWIY6E.cnt			
	BA6eMDwBQjJAuDT9luQdXmOTtEM.cnt			
	ZQE3gaIrBoYq_PZKSUjjmGsHh8o.cnt			
Discord CDN Downloads	Pixel_03_fromChrome_1403870240898678844.jpg	1	1	100
	Pixel_03_fromWindows_1403872341515309197.jpg	1	1	100
	Pixel_03_fromAndroid-13-SM-S515DL_1403868776541458523.jpg	0.950191156	0.998741071	4.570176866
	Pixel_03_fromAndroid-15-pixel7pro_1403862462297673809.jpg	0.950191156	0.998741071	4.570176866
	Pixel_03_fromIOS-15-8-4_1403865933520568330.jpg	0.957436852	0.999085138	14.48811849
4a	Pixel_04.jpg			
Upload Prep. Cache	temp_3512395594810084901.jpeg	0.93539654	0.998899114	2.650441687
	Pixel_04_fromAndroid-15-pixel7pro.jpg	0.93539654	0.998899114	2.650441687
Image Prev. Cache	aGkov5aU3BGsYlHYi9Bd34aXe_Y.cnt	N/A (Resized to ≤ 1080 px)		
	g7Ny0dDMhlesn9vB5fMr84u8w9Q.cnt			
	g1sbBplN3PcHlwGfDKT99Yqqqc4.cnt			
	_sKL5tTsQ_DYtnRux8Kta-g4bjs.cnt			
	anb1YI_NrFNfAg-fo2d7s3d6OqL.cnt			
Discord CDN Downloads	Pixel_04_fromChrome_1403870280761344010.jpg	1	1	100
	Pixel_04_fromWindows_1403872375748952147.jpg	1	1	100
	Pixel_04_fromAndroid-13-SM-S515DL_1403868743825621012.jpg	0.93539654	0.998899114	2.650441687
	Pixel_04_fromAndroid-15-pixel7pro_1403862431540973699.jpg	0.93539654	0.998899114	2.650441687
	Pixel_04_fromIOS-15-8-4_1403865980626538659.jpg	0.952939768	0.999275326	7.54297992

Table 43. Continued

	Filename	SSIM	PCC	% Similar Pixels
5a	Pixel_05.jpg			
Upload Prep. Cache	temp_6428270609769883234.jpeg	0.93650449	0.999020782	3.760108698
	Pixel_05_fromAndroid-15-pixel7pro.jpg	0.93650449	0.999020782	3.760108698
Image Prev. Cache	hZ7NocUjoK0345SDJZrwRUWypO0.cnt	N/A (Resized to ≤ 1080 px)		
	GsPNHH5i1vh5FgH-OqDQqAZEKCQ.cnt			
	D9-pYKP6hFMRlqpnoK09I9jV0Uw.cnt			
	j3MvQ-2PgRR04G00TxzUW-CFQDo.cnt			
	0-wQRfJBSjggDNGnU5pkifJqcBI.cnt			
Discord CDN Downloads	Pixel_05_fromChrome_1403870306808107069.jpg	1	1	100
	Pixel_05_fromWindows_1403872401455976571.jpg	1	1	100
	Pixel_05_fromAndroid-13-SM-S515DL_1403868715019272245.jpg	0.93650449	0.999020782	3.760108698
	Pixel_05_fromAndroid-15-pixel7pro_1403862397923627078.jpg	0.93650449	0.999020782	3.760108698
	Pixel_05_fromIOS-15-8-4_1403866019247951985.jpg	0.946162137	0.999286857	11.94083818
6a	Samsung_01.jpg			
Upload Prep. Cache	temp_1288890560375571699.jpeg	0.900995928	0.999173758	1.897366667
	Samsung_01_fromAndroid-15-pixel7pro.jpg	0.900995928	0.999173758	1.897366667
Image Prev. Cache	xba7-w9ln89xjmm-3Q3TYu3rxyE.cnt	N/A (Resized to ≤ 1080 px)		
	fxMrYsiAyKk-2-iRD2FxNq8PXZM.cnt			
	TUx_VhcApf9oEZjCKIpHB5nUXBY.cnt			
	HS5wE0EAoB7sIYC2ILsfc436RxA.cnt			
	mHeJM9QT0Nb1yAwFMCGUzfbkiiE.cnt			
Discord CDN Downloads	Samsung_01_fromChrome_1403870354811785349.jpg	1	1	100
	Samsung_01_fromWindows_1403872435933024297.jpg	1	1	100
	Samsung_01_fromAndroid-13-SM-S515DL_1403868170313400411.jpg	0.900995928	0.999173758	1.897366667
	Samsung_01_fromAndroid-15-pixel7pro_1403862568363233300.jpg	0.900995928	0.999173758	1.897366667
	Samsung_01_fromIOS-15-8-4_1403866103628959754.jpg	0.92516992	0.999426381	4.747955556

Table 43. Continued

	Filename	SSIM	PCC	% Similar Pixels
7a	Samsung_02.jpg			
Upload Prep. Cache	temp_6365898303479530728.jpeg	0.915760645	0.998667293	2.135433333
	Samsung_02_fromAndroid-15-pixel7pro.jpg	0.915760645	0.998667293	2.135433333
Image Prev. Cache	rWz0r7DvOIw1DgLe5Bmw1aiTXvY.cnt	N/A (Resized to ≤ 1080 px)		
	ima5CXyxBalOq35sKfCIv0RhDNQ.cnt			
	pdHi8hulQISRlI5SYWh0LtU5bE.cnt			
	InNpHg1YtZPvPMqNSn0GW2jpro0.cnt			
	LAcks6SFzNedrYkjFF8911oBgxU.cnt			
Discord CDN Downloads	Samsung_02_fromChrome_1403870418363879465.jpg	1	1	100
	Samsung_02_fromWindows_1403872522453258282.jpg	1	1	100
	Samsung_02_fromAndroid-13-SM-S515DL_1403868680068005939.jpg	0.915760645	0.998667293	2.135433333
	Samsung_02_fromAndroid-15-pixel7pro_1403862357972881458.jpg	0.915760645	0.998667293	2.135433333
	Samsung_02_fromIOS-15-8-4_1403866197316861972.jpg	0.934279436	0.999074529	7.676522222
8a	Samsung_03.jpg			
Upload Prep. Cache	temp_1065039717974559616.jpeg	0.90246563	0.998864819	1.926255556
	Samsung_03_fromAndroid-15-pixel7pro.jpg	0.90246563	0.998864819	1.926255556
Image Prev. Cache	Joj-9UQr0xC12-g9l8nqcsG5Tyw.cnt	N/A (Resized to ≤ 1080 px)		
	CS9Abyrn2LecK4Gss3efmOf_DmbA.cnt			
	wLQAxK2eUwm1yz7TTt282FSnoyk.cnt			
	r2AkXPhCluWDeFDctwrVB8hPZtM.cnt			
	duj6rCZkTo9aaiL1NF02cfpsS9Q.cnt			
Discord CDN Downloads	Samsung_03_fromChrome_1403870511338885201.jpg	1	1	100
	Samsung_03_fromWindows_1403872600907841546.jpg	1	1	100
	Samsung_03_fromAndroid-13-SM-S515DL_1403868288987041893.jpg	0.90246563	0.998864819	1.926255556
	Samsung_03_fromAndroid-15-pixel7pro_1403862133309177937.jpg	0.90246563	0.998864819	1.926255556
	Samsung_03_fromIOS-15-8-4_1403866317135548447.jpg	0.923921988	0.999206607	5.021844444

Table 43. Continued

	Filename	SSIM	PCC	% Similar Pixels
9a	Samsung_04.jpg			
Upload Prep. Cache	temp_5186182783069744061.jpeg	0.896656326	0.999187293	1.800411111
	Samsung_04_fromAndroid-15-pixel7pro.jpg	0.896656326	0.999187293	1.800411111
Image Prev. Cache	NJHmWD3jS4Wrqoht4bc_89Aqi1c.cnt	N/A (Resized to ≤ 1080 px)		
	lMigdiPUhOXbS-LbNLPGaBW0nCY.cnt			
	zl6jPQbEhkh78NpeCnBY5_qCKko.cnt			
	bWv8JS2M1eZYD_ylSHZKgR6pKOg.cnt			
	-RQ1v2TiQylRxPIOwhtPvoMO4lo.cnt			
Discord CDN Downloads	Samsung_04_fromChrome_1403870579731333230.jpg	1	1	100
	Samsung_04_fromWindows_1403872679672549507.jpg	1	1	100
	Samsung_04_fromAndroid-13-SM-S515DL_1403869001381183580.jpg	0.896656326	0.999187293	1.800411111
	Samsung_04_fromAndroid-15-pixel7pro_1403862059178786879.jpg	0.896656326	0.999187293	1.800411111
	Samsung_04_fromIOS-15-8-4_1403866431568740372.jpg	0.922241112	0.99944514	4.836
10a	iPhone_01.JPG			
Upload Prep. Cache	temp_4264285267606407443.jpeg	0.928280345	0.998727968	2.278399786
	iPhone_01_fromAndroid-15-pixel7pro.JPG	0.928280345	0.998727968	2.278399786
Image Prev. Cache	ZLce22ECjxhGl9EcZLW2mRhenO8.cnt	N/A (Resized to ≤ 1080 px)		
	ZN0w69Qq0uQZhwqLdSCF-mq7aT0.cnt			
	xx65-dwVMooj5nr0EvYTWy5NyDQ.cnt			
	nj9ohCrpSvY9zpeQ1lfalmapZ1c.cnt			
	2kZBBMjQg_SAvYRL1GOHsDQITKY.cnt			
Discord CDN Downloads	iPhone_01_fromChrome_1403869734113644574.JPG	1	1	100
	iPhone_01_fromWindows_1403871900702343309.JPG	1	1	100
	iPhone_01_fromAndroid-13-SM-S515DL_1403869148508852294.jpg	0.928280345	0.998727968	2.278399786
	iPhone_01_fromAndroid-15-pixel7pro_1403862785015812146.jpg	0.928280345	0.998727968	2.278399786
	iPhone_01_fromIOS-15-8-4_1403865453868355714.jpg	0.947881868	0.999159444	6.874673577

Table 43. Continued

	Filename	SSIM	PCC	% Similar Pixels
11a	iPhone_02.JPG			
Upload Prep. Cache	temp_8227339423207926490.jpeg	0.927572593	0.998919127	1.905276964
	iPhone_02_fromAndroid-15-pixel7pro.JPG	0.927572593	0.998919127	1.905276964
Image Prev. Cache	1qO6VVqj1SPe0WLaoBJIW9fFEJo.cnt	N/A (Resized to ≤ 1080 px)		
	ZVParmxKG0AfTg1LpMF-rt4w8pQ.cnt			
	OrheafFEWIHMKgU8xppkpbNizZ0.cnt			
	7AwciepGzZ9AH4R2bHdmn0vyFWU.cnt			
	y4zheuUaKf2WK_pd_4My8_EQyFw.cnt			
Discord CDN Downloads	iPhone_02_fromChrome_1403869897880240240.JPG	1	1	100
	iPhone_02_fromWindows_1403871985871880374.JPG	1	1	100
	iPhone_02_fromAndroid-13-SM-S515DL_1403869088601604106.jpg	0.927572593	0.998919127	1.905276964
	iPhone_02_fromAndroid-15-pixel7pro_1403862697317240894.jpg	0.927572593	0.998919127	1.905276964
	iPhone_02_fromIOS-15-8-4_1403865561863032882.jpg	0.947900309	0.999298927	6.104971406
12a	iPhone_03.JPG			
Upload Prep. Cache	temp_6490266918944429555.jpeg	0.946341175	0.998905498	2.887432944
	iPhone_03_fromAndroid-15-pixel7pro.JPG	0.946341175	0.998905498	2.887432944
Image Prev. Cache	VigiB39j0uVrtS_BGKfpsyytu-o.cnt	N/A (Resized to ≤ 1080 px)		
	Mws4IYNvT1bbgG2LQCgR0w_UWIFY.cnt			
	5EvTc7yZLYPZ3szWXR02AKXJ9DM.cnt			
	2PVx0N4sR5RfEXXZMEDVy__e7BA.cnt			
	cABzTJwsYyjcJk3_wLrNox6Qco.cnt			
Discord CDN Downloads	iPhone_03_fromChrome_1403869961381875853.JPG	1	1	100
	iPhone_03_fromWindows_1403872046982893689.JPG	1	1	100
	iPhone_03_fromAndroid-13-SM-S515DL_1403868612397109440.jpg	0.946341175	0.998905498	2.887432944
	iPhone_03_fromAndroid-15-pixel7pro_1403862232722313340.jpg	0.946341175	0.998905498	2.887432944
	iPhone_03_fromIOS-15-8-4_1403865641517318314.jpg	0.961636406	0.999295804	8.109421913

Table 43. Continued

	Filename	SSIM	PCC	% Similar Pixels
13a	iPhone_04.JPG			
Upload Prep. Cache	temp_8994793780160134940.jpeg	0.937103277	0.998947517	2.248636241
	iPhone_04_fromAndroid-15-pixel7pro.JPG	0.937103277	0.998947517	2.248636241
Image Prev. Cache	SNUru75U3DlbzRV2lCnJVxGURBA.cnt	N/A (Resized to ≤ 1080 px)		
	flgsyXoLQBjB6qfpKpH8sNdvlNM.cnt			
	2NEyRUMpGWloU8wXWAnBqOnJdDI.cnt			
	WN8fNI7s8fDxevVT2VLhMFA_bsk.cnt			
	BX363BmkYdO3BwlC9obi0c-MltU.cnt			
Discord CDN Downloads	iPhone_04_fromChrome_1403870043086913566.JPG	1	1	100
	iPhone_04_fromWindows_1403872137093320847.JPG	1	1	100
	iPhone_04_fromAndroid-13-SM-S515DL_1403868885425455184.jpg	0.937103277	0.998947517	2.248636241
	iPhone_04_fromAndroid-15-pixel7pro_1403861913485705309.jpg	0.937103277	0.998947517	2.248636241
	iPhone_04_fromIOS-15-8-4_1403865730000359434.jpg	0.954097022	0.999314114	6.680074615

Table 44. JPEG – From Native Camera Roll – Stream Hash Values

	Filename	Stream Hash
1b	PXL_20250731_230921599.jpg	ad563456f3ed19d6ce6ba0e5a13eb9e36739d13a2a9712548c8dced85f7dd7
Upload Prep. Cache	temp_8861759060769438446.jpeg	20fbf04b59ef99ba2b7ea90ab2b2ee9a7d229b5d4162f8b107304ced1d78e97d
	PXL_20250731_230921599.jpg	20fbf04b59ef99ba2b7ea90ab2b2ee9a7d229b5d4162f8b107304ced1d78e97d
Discord CDN Download	PXL_20250731_230921599_1403861590176043028.jpg	20fbf04b59ef99ba2b7ea90ab2b2ee9a7d229b5d4162f8b107304ced1d78e97d
2b	PXL_20250801_151320088.jpg	06e25333b8856fb57ed073680042d2482dcdcc4b0312aa326f12be9022b2783e
Upload Prep. Cache	temp_2987549690174747510.jpeg	b38ee874f1cc37f3619cbf99552af093041e72b413d5e7834aeacdaf6bfa424a
	PXL_20250801_151320088.jpg	b38ee874f1cc37f3619cbf99552af093041e72b413d5e7834aeacdaf6bfa424a
Discord CDN Download	PXL_20250801_151320088_1403861638905462976.jpg	b38ee874f1cc37f3619cbf99552af093041e72b413d5e7834aeacdaf6bfa424a
3b	PXL_20250802_151025664.jpg	12b0694420958bb7b70f522298f004f356d5d11081c56f1ac4c5d19347fd899c
Upload Prep. Cache	temp_495486876826357207.jpeg	54493622f8df5f14db0f68b0265b3fcf773652ecb4681ed99e1ff992f33de812
	PXL_20250802_151025664.jpg	54493622f8df5f14db0f68b0265b3fcf773652ecb4681ed99e1ff992f33de812
Discord CDN Download	PXL_20250802_151025664_1403861682102734918.jpg	54493622f8df5f14db0f68b0265b3fcf773652ecb4681ed99e1ff992f33de812
4b	PXL_20250803_151636753.jpg	51b9c27f865c01e3881509717912b4bc493c8f69bc69113ee9ad51f4cd767585
Upload Prep. Cache	temp_3376460583291147237.jpeg	7e4fad0f23f5348ca5b039da2b31845a00539a9a240d68403d49709bce50c44a
	PXL_20250803_151636753.jpg	7e4fad0f23f5348ca5b039da2b31845a00539a9a240d68403d49709bce50c44a
Discord CDN Download	PXL_20250803_151636753_1403861721071882382.jpg	7e4fad0f23f5348ca5b039da2b31845a00539a9a240d68403d49709bce50c44a

Table 44. Continued

	Filename	Stream Hash
5b	PXL_20250804_140922041.jpg	6ecfe42d12944c4d6052d82d8d66cd0a66a721de25bea5553aeec26cbc417d4
Upload Prep. Cache	temp_375826457147251324.jpeg	da39d52769079211c98903ff4744d3e14c70dd04aa0811e807ab612c9b6ae2a2
	PXL_20250804_140922041.jpg	da39d52769079211c98903ff4744d3e14c70dd04aa0811e807ab612c9b6ae2a2
Discord CDN Download	PXL_20250804_140922041_1403861751740629122.jpg	da39d52769079211c98903ff4744d3e14c70dd04aa0811e807ab612c9b6ae2a2
6b	20250724_175734.jpg	e82376a7a767be0ba0d2c0157755b111d0abe5e85f2e113740466685b22faf08
Discord CDN Download	20250724_175734_1403867830184706078.jpg	c5026612cb56f36ba6f1ae0c307dfd5ce9cbb873ab197174709fd2e2610f8df7
7b	20250725_072910.jpg	3faacfea55d2b81d5941f9924f343d282407954001255844f26c53f44c2484b4
Discord CDN Download	20250725_072910_1403867874233159710.jpg	fe67017a0876b1d0a820ab34e0c5f4f9563c86b4a5d975c557d0f28e106345f3
8b	20250726_075828.jpg	7eb7394ed018c776379026ea51036d07a86147f686ff613a0cd88a41b899b1ac
Discord CDN Download	20250726_075828_1403867910304301186.jpg	be7ffb5feb807e245156ed99744709b93f3cfd2de016191a53a9473c24dec502
9b	20250727_082046.jpg	275e341b6c079d262eb36dd3a62541d09c6b232f3c64acb4e86dee9816bbba17
Discord CDN Download	20250727_082046_1403867947075895387.jpg	da4b43945bd07bb6558e3bd4c700762b59d3a9af7541dc04e9e51fbc5de27c20
10b	IMG_0001.jpg	df0418dc849ad6441a28788dff58d2599a22a67660add75f357f8d38865ff72a
Discord CDN Download	IMG_0001_1403865249240842250.jpg	e329aa4dc518d981f9e15b148457657103e6d7824e2319f88db876789cbc9e25
11b	IMG_0002.jpg	855b3c90601cb70e35f4bcb37dc65d88043873ce23b5b836c4adff9ea7f72c7
Discord CDN Download	IMG_0002_1403865278332403944.jpg	7e0ec1d8f4f3a011cd666783c900ae34ffb1d60523a577956ac67b917c61e0d7
12b	IMG_0003.jpg	8d0aeb8465f1201c77ebfd1648f5b5a696eec18c2a69c0327446abb1b2cf984c
Discord CDN Download	IMG_0003_1403865296300933240.jpg	61118e69e38c94b79bdf3c5d4417e53245591e69cdabd7132d576da32f155348d

Table 44. Continued

	Filename	Stream Hash
13b	IMG_0004.jpg	37d5c6f534f12a07334023259f38332156fb682bf921aa7fb4c977b033c4d339
Discord CDN	IMG_0004_1403865322578247740.jpg	ea878aa9025a49aa19b9eef1f990e92f64585c704ca2bafbb619104828f4b9c7
Download		

Table 45. JPEG – From Native Camera Roll – IQAs

	Filename	SSIM	PCC	% Similar Pixels
1b	PXL_20250731_230921599.jpg			
Upload Prep. Cache	temp_8861759060769438446.jpeg	0.942848775	0.998887649	1.819246579
	PXL_20250731_230921599.jpg	0.942848775	0.998887649	1.819246579
Discord CDN Download	PXL_20250731_230921599_1403861590176043028.jpg	0.942848775	0.998887649	1.819246579
2b	PXL_20250801_151320088.jpg			
Upload Prep. Cache	temp_2987549690174747510.jpeg	0.930330457	0.998417248	3.013205933
	PXL_20250801_151320088.jpg	0.930330457	0.998417248	3.013205933
Discord CDN Download	PXL_20250801_151320088_1403861638905462976.jpg	0.930330457	0.998417248	3.013205933
3b	PXL_20250802_151025664.jpg			
Upload Prep. Cache	temp_495486876826357207.jpeg	0.950191156	0.998741071	4.570176866
	PXL_20250802_151025664.jpg	0.950191156	0.998741071	4.570176866
Discord CDN Download	PXL_20250802_151025664_1403861682102734918.jpg	0.950191156	0.998741071	4.570176866
4b	PXL_20250803_151636753.jpg			
Upload Prep. Cache	temp_3376460583291147237.jpeg	0.93539654	0.998899114	2.650441687
	PXL_20250803_151636753.jpg	0.93539654	0.998899114	2.650441687
Discord CDN Download	PXL_20250803_151636753_1403861721071882382.jpg	0.93539654	0.998899114	2.650441687
5b	PXL_20250804_140922041.jpg			
Upload Prep. Cache	temp_375826457147251324.jpeg	0.93650449	0.999020782	3.760108698
	PXL_20250804_140922041.jpg	0.93650449	0.999020782	3.760108698
Discord CDN Download	PXL_20250804_140922041_1403861751740629122.jpg	0.93650449	0.999020782	3.760108698

Table 45. Continued

	Filename	SSIM	PCC	% Similar Pixels
6b	20250724_175734.jpg			
Discord CDN Download	20250724_175734_1403867830184706078.jpg	0.900995928	0.999173758	1.897366667
7b	20250725_072910.jpg			
Discord CDN Download	20250725_072910_1403867874233159710.jpg	0.915760645	0.998667293	2.135433333
8b	20250726_075828.jpg			
Discord CDN Download	20250726_075828_1403867910304301186.jpg	0.90246563	0.998864819	1.926255556
9b	20250727_082046.jpg			
Discord CDN Download	20250727_082046_1403867947075895387.jpg	0.896656326	0.999187293	1.800411111
10b	IMG_0001.jpg			
Discord CDN Download	IMG_0001_1403865249240842250.jpg	0.948671178	0.999182422	7.925353783
11b	IMG_0002.jpg			
Discord CDN Download	IMG_0002_1403865278332403944.jpg	0.947900309	0.999298927	6.104971406
12b	IMG_0003.jpg			
Discord CDN Download	IMG_0003_1403865296300933240.jpg	0.961636406	0.999295804	8.109421913
13b	IMG_0004.jpg			
Discord CDN Download	IMG_0004_1403865322578247740.jpg	0.95468589	0.999326532	7.145768705

Table 46. JPEG – Orientation Metadata – From Filesystem – Stream Hash Values

	Filename	Stream Hash
14a	Samsung_05_90CW.jpg	8921ca1804b77fb727ececce454bb5392759332cc0b176f07db3af4a0f31d4a3
Upload Prep. Cache	temp_829570153949690592.jpeg	cebd04a4f4dbd6807242014bf95ad84c4a44d086250a10c2232bbdda055ba294
	Samsung_05_90CW_fromAndroid-15-pixel7pro.jpg	cebd04a4f4dbd6807242014bf95ad84c4a44d086250a10c2232bbdda055ba294
Discord CDN Downloads	Samsung_05_90CW_fromAndroid-13-SM-S515DL_1403868940261916782.jpg	cebd04a4f4dbd6807242014bf95ad84c4a44d086250a10c2232bbdda055ba294
	Samsung_05_90CW_fromAndroid-15-pixel7pro_1403861971220037743.jpg	cebd04a4f4dbd6807242014bf95ad84c4a44d086250a10c2232bbdda055ba294
	Samsung_05_90CW_fromChrome_1403870686879027250.jpg	bf9aa54cae5ccd04597f97aafa2268d1912cda1805369bf65d86dbb77e62733e
	Samsung_05_90CW_fromIOS-15-8-4_1403866476976279736.jpg	c7bc37efdabbe550fcaafd5e2e53024aaf41d98ae571918d533cd056d1de1633
	Samsung_05_90CW_fromWindows_1403872768625344573.jpg	bf9aa54cae5ccd04597f97aafa2268d1912cda1805369bf65d86dbb77e62733e
15	Samsung_05_rotationRemoved.jpg	97d106b3fd7727ed60669237ac66d09cd25df1ac11c436ac00fa8868f22f4094
Upload Prep. Cache	temp_7140780228255582343.jpeg	847c8fa3cc89d4883380044a5e639f9ab8d6e1fe2cbe72ecb9815fc699401ee3
	Samsung_05_rotationRemoved_fromAndroid-15-pixel7pro.jpg	847c8fa3cc89d4883380044a5e639f9ab8d6e1fe2cbe72ecb9815fc699401ee3
Discord CDN Downloads	Samsung_05_rotationRemoved_fromAndroid-13-SM-S515DL_1403868914030612573.jpg	847c8fa3cc89d4883380044a5e639f9ab8d6e1fe2cbe72ecb9815fc699401ee3
	Samsung_05_rotationRemoved_fromAndroid-15-pixel7pro_1403861942699032676.jpg	847c8fa3cc89d4883380044a5e639f9ab8d6e1fe2cbe72ecb9815fc699401ee3
	Samsung_05_rotationRemoved_fromChrome_1403870712200036372.jpg	97d106b3fd7727ed60669237ac66d09cd25df1ac11c436ac00fa8868f22f4094
	Samsung_05_rotationRemoved_fromIOS-15-8-4_1403866517547913336.jpg	bfde5ae5f1133dee838a9ac40d966928a9dctf0babd7dbd9f8270c94706679ab51
	Samsung_05_rotationRemoved_fromWindows_1403872802779430943.jpg	97d106b3fd7727ed60669237ac66d09cd25df1ac11c436ac00fa8868f22f4094

Table 46. Continued

	Filename	Stream Hash
16a	iPhone_05_90CW.JPG	1899795b273b7487fc8cc4c90e097a67bad307dc4408d9da4568da0b20a38fa9
Upload Prep. Cache	temp_1433282618025738898.jpeg	ff5b125c41805fa2635a71241e9e8a521df19db7af773cc01959fe3774dc723e
	iPhone_05_90CW_fromAndroid-15-pixel7pro.jpg	ff5b125c41805fa2635a71241e9e8a521df19db7af773cc01959fe3774dc723e
	iPhone_05_90CW_fromAndroid-13-SM-S515DL_1403868817591107614.jpg	ff5b125c41805fa2635a71241e9e8a521df19db7af773cc01959fe3774dc723e
Discord CDN Downloads	iPhone_05_90CW_fromAndroid-15-pixel7pro_1403863686644367552.jpg	ff5b125c41805fa2635a71241e9e8a521df19db7af773cc01959fe3774dc723e
	iPhone_05_90CW_fromChrome_1403870106987003984.JPG	826f4f40b7d4dfe9e9d8b1362fdcfcbfdeddd511ff407c0c683261ed5cfb2e99
	iPhone_05_90CW_fromIOS-15-8-4_1403865767379861524.jpg	d9df21a28732b64dff3af1e911efbda523bfd471ada84315831f2ac367f5383
	iPhone_05_90CW_fromWindows_1403872207914139658.JPG	826f4f40b7d4dfe9e9d8b1362fdcfcbfdeddd511ff407c0c683261ed5cfb2e99
	iPhone_05_rotationRemoved.JPG	cd36ee00adeb6a5de2ee24e475331d2e1526585b35822b3b772696d315a6de0e1
Upload Prep. Cache	temp_1433282618025738898.jpeg	5fa4259478856a205cfd40f84f14ead286628abce4c1eb4fdab4fbeb6006fc5
	iPhone_05_rotationRemoved_fromAndroid-15-pixel7pro.jpg	5fa4259478856a205cfd40f84f14ead286628abce4c1eb4fdab4fbeb6006fc5
Discord CDN Downloads	iPhone_05_rotationRemoved_fromAndroid-13-SM-S515DL_1403869185179648060.jpg	5fa4259478856a205cfd40f84f14ead286628abce4c1eb4fdab4fbeb6006fc5
	iPhone_05_rotationRemoved_fromAndroid-15-pixel7pro_1403863659297505431.jpg	5fa4259478856a205cfd40f84f14ead286628abce4c1eb4fdab4fbeb6006fc5
	iPhone_05_rotationRemoved_fromChrome_1403870131851100280.JPG	cd36ee00adeb6a5de2ee24e475331d2e1526585b35822b3b72696d315a6de0e1
	iPhone_05_rotationRemoved_fromIOS-15-8-4_1403865809276895382.jpg	ad7c77744b9a8bd7ce4b74ebb6326d014a3c4bd581cf425d8a32861855eb8e65f
	iPhone_05_rotationRemoved_fromWindows_1403872237441781792.JPG	cd36ee00adeb6a5de2ee24e475331d2e1526585b35822b3b72696d315a6de0e1

Table 47. JPEG – Orientation Metadata – From Filesystem – IQAs

	Filename	SSIM	PCC	% Similar Pixels
14a	Samsung_05_90CW.jpg			
Upload Prep. Cache	temp_829570153949690592.jpeg	0.947423095	0.998346407	2.838055556
	Samsung_05_90CW_fromAndroid-15-pixel7pro.jpg	0.947423095	0.998346407	2.838055556
Discord CDN Downloads	Samsung_05_90CW_fromAndroid-13-SM-S515DL_1403868940261916782.jpg	0.947423095	0.998346407	2.838055556
	Samsung_05_90CW_fromAndroid-15-pixel7pro_1403861971220037743.jpg	0.947423095	0.998346407	2.838055556
	Samsung_05_90CW_fromChrome_1403870686879027250.jpg	0.996049368	0.999914857	69.06666667
	Samsung_05_90CW_fromIOS-15-8-4_1403866476976279736.jpg	0.966189968	0.99902403	10.74108889
	Samsung_05_90CW_fromWindows_1403872768625344573.jpg	0.996049368	0.999914857	69.06666667
15	Samsung_05_rotationRemoved.jpg			
Upload Prep. Cache	temp_7140780228255582343.jpeg	0.950548563	0.998426235	2.989633333
	Samsung_05_rotationRemoved_fromAndroid-15-pixel7pro.jpg	0.950548563	0.998426235	2.989633333
Discord CDN Downloads	Samsung_05_rotationRemoved_fromAndroid-13-SM-S515DL_1403868914030612573.jpg	0.950548563	0.998426235	2.989633333
	Samsung_05_rotationRemoved_fromAndroid-15-pixel7pro_1403861942699032676.jpg	0.950548563	0.998426235	2.989633333
	Samsung_05_rotationRemoved_fromChrome_1403870712200036372.jpg	1	1	100
	Samsung_05_rotationRemoved_fromIOS-15-8-4_1403866517547913336.jpg	0.966488521	0.999020445	11.20866667
	Samsung_05_rotationRemoved_fromWindows_1403872802779430943.jpg	1	1	100

Table 47. Continued

	Filename	SSIM	PCC	% Similar Pixels
16a	iPhone_05_90CW.JPG			
Upload Prep. Cache	temp_1433282618025738898.jpeg	0.941372155	0.998615038	2.42752097
	iPhone_05_90CW_fromAndroid-15-pixel7pro.jpg	0.941372155	0.998615038	2.42752097
Discord CDN Downloads	iPhone_05_90CW_fromAndroid-13-SM-S515DL_1403868817591107614.jpg	0.941372155	0.998615038	2.42752097
	iPhone_05_90CW_fromAndroid-15-pixel7pro_1403863686644367552.jpg	0.941372155	0.998615038	2.42752097
	iPhone_05_90CW_fromChrome_1403870106987003984.JPG	0.997053743	0.999952236	77.61541104
	iPhone_05_90CW_fromIOS-15-8-4_1403865767379861524.jpg	0.956328066	0.999074265	7.519883918
	iPhone_05_90CW_fromWindows_1403872207914139658.JPG	0.997053743	0.999952236	77.61541104
17	iPhone_05_rotationRemoved.JPG			
Upload Prep. Cache	temp_1433282618025738898.jpeg	0.941341633	0.998616519	2.433729568
	iPhone_05_rotationRemoved_fromAndroid-15-pixel7pro.jpg	0.941341633	0.998616519	2.433729568
Discord CDN Downloads	iPhone_05_rotationRemoved_fromAndroid-13-SM-S515DL_1403869185179648060.jpg	0.941341633	0.998616519	2.433729568
	iPhone_05_rotationRemoved_fromAndroid-15-pixel7pro_1403863659297505431.jpg	0.941341633	0.998616519	2.433729568
	iPhone_05_rotationRemoved_fromChrome_1403870131851100280.JPG	1	1	100
	iPhone_05_rotationRemoved_fromIOS-15-8-4_1403865809276895382.jpg	0.956901961	0.999077877	8.041356975
	iPhone_05_rotationRemoved_fromWindows_1403872237441781792.JPG	1	1	100

Table 48. JPEG – Orientation Metadata – From Native Camera Roll – Stream Hash Values

	Filename	Stream Hash
14b	20250728_110418.jpg	8921ca1804b77fb727eebce454bb5392759332cc0b176f07db3af4a0f31d4a3
Discord CDN Download	20250728_110418_1403867989836562442.jpg	cebd04a4f4dbd6807242014b95ad84c4a44d086250a10c2232bbdda055ba294
16b	IMG_0005.jpg	1899795b273b7487fc8cc4e90e097a67bad307dc4408d9da4568da0b20a38fa9
Discord CDN Download	IMG_0005_1403865343608488068.jpg	2bfad77fc225795f3a6f69b44ef74df022b2444195543ee6fb1345dd38e4de8

Table 49. JPEG – Orientation Metadata – From Native Camera Roll – IQAs

	Filename	SSIM	PCC	% Similar Pixels
14b	20250728_110418.jpg			
Discord CDN Download	20250728_110418_1403867989836562442.jpg	0.947423095	0.998346407	2.838055556
16b	IMG_0005.jpg			
Discord CDN Download	IMG_0005_1403865343608488068.jpg	0.956853632	0.999084732	8.061819925

Table 50. JPEG – In-App Photo – Stream Hash Values

	Filename	Stream Hash
18	eb107a35-cd25-4a81-a3cb-c92d2e7e65c8.jpg	d2e5c0ba236a8690f8e2a271d82038ad0cdcbbf2bb97fcb5c3a18af0aaf0ea8d
Discord CDN Download	rn_image_picker_lib_temp_eb1----cd25-4a81-a3cb-c92d2e7e65c8_1403869572154527814.jpg	36fad9cbb2ae656bed0dd73f4b0e8c39274835b63a6192275a5a65f4380a977
19	IMG_0007.JPG	575dde0c44fc864ceacd75f18f9b8b8d28959f6ada2fa3240b87d124476a32f
Discord CDN Download	IMG_0007_1403866710242627754.jpg	9886a4ff8e92bed90f6c9256704f0979a4771c5c7a15053a1a3a4940bc95a4b0

Table 51. JPEG – In-App Photo – IQAs

	Filename	SSIM	PCC	% Similar Pixels
18	eb107a35-cd25-4a81-a3cb-c92d2e7e65c8.jpg			
Discord CDN Download	rn_image_picker_lib_temp_eb1----cd25-4a81-a3cb-c92d2e7e65c8_1403869572154527814.jpg	0.972424658	0.999125311	9.919322222
19	IMG_0007.JPG			
Discord CDN Download	IMG_0007_1403866710242627754.jpg	0.949657481	0.998828869	5.336294433

Table 52. JPEG – Orientation Metadata – In-App Photo – Stream Hash Values

	Filename	Stream Hash
20	884fa8eb-58dd-430b-9288-235e4a56702b.jpg	2d06ca0c31b08b01f32698022019c611ab7ea67257d46ac592b01897eacf7884
Upload Prep. Cache	rn_image_picker_lib_temp_884fa8eb-58dd-430b-9288-235e4a56702b.jpg	fe6117abec65733d11131ebc8bb6b8f4b9ff77ec13795011f736a2f9b7c7f0b
Discord CDN Download	rn_image_picker_lib_temp_884----58dd-430b-9288-235e4a56702b_1403863910938972250.jpg	573ffe98d0d5445138c8e086717a293d55089b5a75420a91999fa49517f47bbc
21	12938f97-224a-48dd-9f99-8f2d634e31ed.jpg	ab2453a200aec81fcf7b222aa54c1c5a6afd12e48b8b669a122f21300be9f50
Discord CDN Download	rn_image_picker_lib_temp_129----224a-48dd-9f99-8f2d634e31ed_1403869518937194627.jpg	53dfc679f3a570aa00d17e77fc53cb0d778d87b809bd0cb5c8a82fced9f3f53b
22	IMG_0006.JPG	2514650f97ec542180aaac90555e8e171fa01bd8e9b9f2fee921b51e9a428a543
Discord CDN Download	IMG_0006_1403866641024159846.jpg	0c22f8012f2b50bd50c98076b71e828cf0350046f6c92eccf74ea8d1e9f785a9

Table 53. JPEG – Orientation Metadata – In-App Photo – IQAs

	Filename	SSIM	PCC	% Similar Pixels
20	884fa8eb-58dd-430b-9288-235e4a56702b.jpg			
Upload Prep. Cache	rn_image_picker_lib_temp_884fa8eb-58dd-430b-9288-235e4a56702b.jpg	0.976540281	0.998961437	8.214765561
Discord CDN Download	rn_image_picker_lib_temp_884----58dd-430b-9288-235e4a56702b_1403863910938972250.jpg	0.976436218	0.998968667	8.319482741
21	12938f97-224a-48dd-9f99-8f2d634e31ed.jpg			
Discord CDN Download	rn_image_picker_lib_temp_129----224a-48dd-9f99-8f2d634e31ed_1403869518937194627.jpg	0.970145847	0.999233092	9.635033333
22	IMG_0006.JPG			
Discord CDN Download	IMG_0006_1403866641024159846.jpg	0.947447408	0.999020272	5.556892414

PNG

Table 54. PNG – Stream Hash Values

	Filename	Stream Hash
1 Upload Prep. Cache Image Prev. Cache	Samsung_01.png	06d6c4e55dd9e2578e89464b29aecd79abbece66752061d00fb836aed4a9aba0
	temp_1307386123484951736.png	06d6c4e55dd9e2578e89464b29aecd79abbece66752061d00fb836aed4a9aba0
	dQpz2KduGaRWc2qjflW803U-fxg.cnt	bb298e0191f1b14fca8e22a92a78eb71f52a9c8ffe8a0809f39d22fb734d299e
	sl4QO6EvrQ6fJyEk4eznoOVDNyc.cnt	bb298e0191f1b14fca8e22a92a78eb71f52a9c8ffe8a0809f39d22fb734d299e
	i-9NyKfVGaCVK8GwbdbWXmuBduQo.cnt	bb298e0191f1b14fca8e22a92a78eb71f52a9c8ffe8a0809f39d22fb734d299e
	jXTvZEuxrsp46xJGoqlt-6m4AT4.cnt	bb298e0191f1b14fca8e22a92a78eb71f52a9c8ffe8a0809f39d22fb734d299e
Discord CDN Downloads	CaThUxR7IDXwZGgb88-GFMnedWcg.cnt	bb298e0191f1b14fca8e22a92a78eb71f52a9c8ffe8a0809f39d22fb734d299e
	Samsung_01_fromAndroid-13-SM-S515DL_1403868133260787904.png	06d6c4e55dd9e2578e89464b29aecd79abbece66752061d00fb836aed4a9aba0
	Samsung_01_fromAndroid-15-pixel7pro_1403862544162230342.png	06d6c4e55dd9e2578e89464b29aecd79abbece66752061d00fb836aed4a9aba0
	Samsung_01_fromChrome_1403870390379348100.png	06d6c4e55dd9e2578e89464b29aecd79abbece66752061d00fb836aed4a9aba0
	Samsung_01_fromIOS-15-8-4_1403866073433899038.png	06d6c4e55dd9e2578e89464b29aecd79abbece66752061d00fb836aed4a9aba0
	Samsung_01_fromWindows_1403872494263337122.png	06d6c4e55dd9e2578e89464b29aecd79abbece66752061d00fb836aed4a9aba0
2 Upload Prep. Cache Image Prev. Cache	Samsung_02.png	fc3e80fddc22399acaa96f37ca30eba95670b40bd2aeb81a28627f4fe0b3a963
	temp_3694028040541910088.png	fc3e80fddc22399acaa96f37ca30eba95670b40bd2aeb81a28627f4fe0b3a963
	WlddbAcyqlj7c3fEH3f39Yk1aBg.cnt	864435eb02588ef1c96e0d34abeb79288eac803cda002ffce9f9c971e9262d200
	IUwm8JdlArb5vRxeH7YMKbPq0.cnt	864435eb02588ef1c96e0d34abeb79288eac803cda002ffce9f9c971e9262d200
	noEJjQ5I_gYIFMYHemFbYm3nkPo.cnt	864435eb02588ef1c96e0d34abeb79288eac803cda002ffce9f9c971e9262d200
	0Kf677zOnm2ZzNPndfVgZRMxz88.cnt	864435eb02588ef1c96e0d34abeb79288eac803cda002ffce9f9c971e9262d200
Discord CDN Downloads	rrEvJFDnABWP7i62NB1si21sZwY.cnt	864435eb02588ef1c96e0d34abeb79288eac803cda002ffce9f9c971e9262d200
	Samsung_02_fromAndroid-13-SM-S515DL_1403868657540534453.png	fc3e80fddc22399acaa96f37ca30eba95670b40bd2aeb81a28627f4fe0b3a963
	Samsung_02_fromAndroid-15-pixel7pro_1403862328667017299.png	fc3e80fddc22399acaa96f37ca30eba95670b40bd2aeb81a28627f4fe0b3a963
	Samsung_02_fromChrome_1403870479948709948.png	fc3e80fddc22399acaa96f37ca30eba95670b40bd2aeb81a28627f4fe0b3a963
	Samsung_02_fromIOS-15-8-4_1403866150743314442.png	fc3e80fddc22399acaa96f37ca30eba95670b40bd2aeb81a28627f4fe0b3a963
	Samsung_02_fromWindows_1403872561439441026.png	fc3e80fddc22399acaa96f37ca30eba95670b40bd2aeb81a28627f4fe0b3a963

Table 54. Continued

	Filename	Stream Hash
3	Samsung_03.png	4972919e061bf1c81585eb72f0e9088dd01c32f07f480b935d22faa023e0998b
Upload Prep. Cache	temp_6926615467988509048.png	4972919e061bf1c81585eb72f0e9088dd01c32f07f480b935d22faa023e0998b
Image Prev. Cache	iJvSlwB0w-tlkHcs8EcSZl081GE.cnt	55c5b224d2783fd6b95a1943c80de76dc447cf628702730f83c8225ca9125acc3
	QBeOIVXwHB0fngLgEwKNPHKiljU.cnt	55c5b224d2783fd6b95a1943c80de76dc447cf628702730f83c8225ca9125acc3
	HM3udOXPNQ5JqGy38kmAjlJ-A.cnt	55c5b224d2783fd6b95a1943c80de76dc447cf628702730f83c8225ca9125acc3
	12GOAYg7rsvo-R1ziFrQF3jCZh8.cnt	55c5b224d2783fd6b95a1943c80de76dc447cf628702730f83c8225ca9125acc3
	SwwAx4xvXhuvfkBEpBrN4ufPR-0.cnt	55c5b224d2783fd6b95a1943c80de76dc447cf628702730f83c8225ca9125acc3
	Samsung_03_fromAndroid-13-SM-S515DL_1403868262827163788.png	4972919e061bf1c81585eb72f0e9088dd01c32f07f480b935d22faa023e0998b
Discord CDN Downloads	Samsung_03_fromAndroid-15-pixel7pro_1403862109464428544.png	4972919e061bf1c81585eb72f0e9088dd01c32f07f480b935d22faa023e0998b
	Samsung_03_fromChrome_1403870550727594004.png	4972919e061bf1c81585eb72f0e9088dd01c32f07f480b935d22faa023e0998b
	Samsung_03_fromiOS-15-8-4_1403866267256881265.png	4972919e061bf1c81585eb72f0e9088dd01c32f07f480b935d22faa023e0998b
	Samsung_03_fromWindows_1403872641055592459.png	4972919e061bf1c81585eb72f0e9088dd01c32f07f480b935d22faa023e0998b
	Samsung_03_fromWindows_1403870550727594004.png	4972919e061bf1c81585eb72f0e9088dd01c32f07f480b935d22faa023e0998b
	Samsung_04.png	97995ca98019d4d5366cd83f379e7ef938f477652fa6a08efd1153c4c24ab240
Upload Prep. Cache	temp_8912395682210009333.png	97995ca98019d4d5366cd83f379e7ef938f477652fa6a08efd1153c4c24ab240
Image Prev. Cache	0S3tCaF52Ub3w619qfTdOo7-jzM.cnt	70dd25ba19d52017fc5f71b3222eb25c1812965657de2e9e461ab1d21d43adb62
	YGD-jNT2CukMn1agJipgphr593Y.cnt	70dd25ba19d52017fc5f71b3222eb25c1812965657de2e9e461ab1d21d43adb62
	uCw0n-ThOg7dRWkNSDATHaQgYok.cnt	70dd25ba19d52017fc5f71b3222eb25c1812965657de2e9e461ab1d21d43adb62
	RluHxTZW6jve3qlpUqp9oj5POEL.cnt	70dd25ba19d52017fc5f71b3222eb25c1812965657de2e9e461ab1d21d43adb62
	NkuNivZDUGMV_O6_IDtGz_dGlio.cnt	70dd25ba19d52017fc5f71b3222eb25c1812965657de2e9e461ab1d21d43adb62
	Samsung_04_fromAndroid-13-SM-S515DL_1403868977196826654.png	97995ca98019d4d5366cd83f379e7ef938f477652fa6a08efd1153c4c24ab240
Discord CDN Downloads	Samsung_04_fromAndroid-15-pixel7pro_1403862019316387861.png	97995ca98019d4d5366cd83f379e7ef938f477652fa6a08efd1153c4c24ab240
	Samsung_04_fromChrome_1403870651902595173.png	97995ca98019d4d5366cd83f379e7ef938f477652fa6a08efd1153c4c24ab240
	Samsung_04_fromiOS-15-8-4_1403866376665567405.png	97995ca98019d4d5366cd83f379e7ef938f477652fa6a08efd1153c4c24ab240
	Samsung_04_fromWindows_1403872732243824711.png	97995ca98019d4d5366cd83f379e7ef938f477652fa6a08efd1153c4c24ab240
	Samsung_04_fromWindows_1403872732243824711.png	97995ca98019d4d5366cd83f379e7ef938f477652fa6a08efd1153c4c24ab240
	Samsung_04_fromWindows_1403872732243824711.png	97995ca98019d4d5366cd83f379e7ef938f477652fa6a08efd1153c4c24ab240

Table 54. Continued

	Filename	Stream Hash
5 Upload Prep. Cache Image Prev. Cache	iPhone_01.png	dc35af4e53f9196084e71dfaf1674b74460cac22184baa873b77d76bcdcd9fb2
	temp_4229346607321202929.png	dc35af4e53f9196084e71dfaf1674b74460cac22184baa873b77d76bcdcd9fb2
	qXjpJs0i-H74AzVF6ym2Lia6UqE.cnt	b70ae83019016aa49676ff4736997f7a032f1da6e64d799529f2f7e1629348b
	R0kTao1BBG6x5MM3bn3cwSw0NDY.cnt	b70ae83019016aa49676ff4736997f7a032f1da6e64d799529f2f7e1629348b
	qfdHtcKDe4S-W09ZWnXffHr1Cjc.cnt	b70ae83019016aa49676ff4736997f7a032f1da6e64d799529f2f7e1629348b
	ZTApLCcm6l7ZK-yh5oZt0dfM0v_M.cnt	b70ae83019016aa49676ff4736997f7a032f1da6e64d799529f2f7e1629348b
Discord CDN Downloads	pM-lcmgEPpW1926Zl2qvTX8zomA.cnt	b70ae83019016aa49676ff4736997f7a032f1da6e64d799529f2f7e1629348b
	iPhone_01_fromAndroid-13-SM-S515DL_1403869120302289048.png	dc35af4e53f9196084e71dfaf1674b74460cac22184baa873b77d76bcdcd9fb2
	iPhone_01_fromAndroid-15-pixel17pro_1403862756687478784.png	dc35af4e53f9196084e71dfaf1674b74460cac22184baa873b77d76bcdcd9fb2
	iPhone_01_fromChrome_1403869837104517230.png	dc35af4e53f9196084e71dfaf1674b74460cac22184baa873b77d76bcdcd9fb2
	iPhone_01_fromIOS-15-8-4_1403865422607941712.png	dc35af4e53f9196084e71dfaf1674b74460cac22184baa873b77d76bcdcd9fb2
	iPhone_01_fromWindows_1403871968184500245.png	dc35af4e53f9196084e71dfaf1674b74460cac22184baa873b77d76bcdcd9fb2
6 Upload Prep. Cache Image Prev. Cache	iPhone_03.png	5ae6f944ecb4b489b48d46c32c2d105bdf8a719cdce7b3e8788f31529f75b6ad
	temp_8937250687771882506.png	5ae6f944ecb4b489b48d46c32c2d105bdf8a719cdce7b3e8788f31529f75b6ad
	61KEnoPuokG9ze7KGAhF8gbGXzw.cnt	73f2e4f034b7e07042d02f3eab4327f20f787a30d352ace245ad2f17c53da044
	cW7oh2Abd_9BKKCzsNatdbDQE.cnt	73f2e4f034b7e07042d02f3eab4327f20f787a30d352ace245ad2f17c53da044
	QGdl22Ufe2WVG9zR-3puUSaF8RVw.cnt	73f2e4f034b7e07042d02f3eab4327f20f787a30d352ace245ad2f17c53da044
	UsnrM0VXmcUNx607JZn9MzkmXrw.cnt	73f2e4f034b7e07042d02f3eab4327f20f787a30d352ace245ad2f17c53da044
Discord CDN Downloads	61WDqd8tbacM_vKZlSeIDT9bk2U.cnt	73f2e4f034b7e07042d02f3eab4327f20f787a30d352ace245ad2f17c53da044
	iPhone_03_fromAndroid-13-SM-S515DL_1403868587214766232.png	5ae6f944ecb4b489b48d46c32c2d105bdf8a719cdce7b3e8788f31529f75b6ad
	iPhone_03_fromAndroid-15-pixel17pro_1403862185918201906.png	5ae6f944ecb4b489b48d46c32c2d105bdf8a719cdce7b3e8788f31529f75b6ad
	iPhone_03_fromChrome_1403870009746260028.png	5ae6f944ecb4b489b48d46c32c2d105bdf8a719cdce7b3e8788f31529f75b6ad
	iPhone_03_fromIOS-15-8-4_1403865598341025822.png	5ae6f944ecb4b489b48d46c32c2d105bdf8a719cdce7b3e8788f31529f75b6ad
	iPhone_03_fromWindows_1403872085641789583.png	5ae6f944ecb4b489b48d46c32c2d105bdf8a719cdce7b3e8788f31529f75b6ad

Table 54. Continued

	Filename	Stream Hash
7	iPhone_04.png	377f7841d35541a7f293cf0fc92b10f373f0b9422491414e0c8adb9e417d66a1
Upload Prep. Cache	temp_5316052926623920583.png	377f7841d35541a7f293cf0fc92b10f373f0b9422491414e0c8adb9e417d66a1
Image Prev. Cache	yShqE0ajS9UcFYhOSBtAR9ma3s.cnt	78cc3237cf3283c15da2bab78bb3bb1c6033208bf40dda4477a75bb08a6329cc
	gr37xZXklXK3cSEURBiIH9Jjv8.cnt	78cc3237cf3283c15da2bab78bb3bb1c6033208bf40dda4477a75bb08a6329cc
	W3Tmmn-yzbxK1t0IMZCaaKCwH4U.cnt	78cc3237cf3283c15da2bab78bb3bb1c6033208bf40dda4477a75bb08a6329cc
	x-1TH8nD4oldu_x5ollad-ZFBqM.cnt	78cc3237cf3283c15da2bab78bb3bb1c6033208bf40dda4477a75bb08a6329cc
	2qjiX5TXYtrTjZBN3klqXq4wFM.cnt	377f7841d35541a7f293cf0fc92b10f373f0b9422491414e0c8adb9e417d66a1
	iPhone_04_fromAndroid-13-SM-S515DL_1403868852965867520.png	377f7841d35541a7f293cf0fc92b10f373f0b9422491414e0c8adb9e417d66a1
Discord CDN Downloads	iPhone_04_fromAndroid-15-pixel7pro_1403861881902334062.png	377f7841d35541a7f293cf0fc92b10f373f0b9422491414e0c8adb9e417d66a1
	iPhone_04_fromChrome_1403870075206766742.png	377f7841d35541a7f293cf0fc92b10f373f0b9422491414e0c8adb9e417d66a1
	iPhone_04_fromIOS-15-8-4_1403865689282056314.png	377f7841d35541a7f293cf0fc92b10f373f0b9422491414e0c8adb9e417d66a1
	iPhone_04_fromWindows_1403872179216715938.png	377f7841d35541a7f293cf0fc92b10f373f0b9422491414e0c8adb9e417d66a1
	iPhone_02.png	87adba3123c67965bb98edfc8410885dbd56ad9f3d70217751cbb5c69e2a3807
8 (Not Uploaded; Too Large)		
Upload Prep. Cache	temp_4360015640938392269.png	87adba3123c67965bb98edfc8410885dbd56ad9f3d70217751cbb5c69e2a3807

Table 55. PNG – IQAs

	Filename	SSIM	PCC	% Similar Pixels
1	Samsung_01.png			
Upload Prep. Cache	temp_1307386123484951736.png	1	1	100
Image Prev. Cache	dQpz2KduGaRWe2qjflW803U-fxg.cnt	N/A (Resized to ≤ 1080 px)		
	sI4QO6EvtQ6fJyEk4eznoOVDNyc.cnt			
	i-9NyKfVGaCVK8GwbdWXmuBduQo.cnt			
	jXTvZEuxrsp46xJGoqlt-6m4AT4.cnt			
	CaThUxR7IDXwZGb88-GFMnedWcg.cnt			
Discord CDN Downloads	Samsung_01_fromAndroid-13-SM-S515DL_1403868133260787904.png	1	1	100
	Samsung_01_fromAndroid-15-pixel7pro_1403862544162230342.png	1	1	100
	Samsung_01_fromChrome_1403870390379348100.png	1	1	100
	Samsung_01_fromIOS-15-8-4_1403866073433899038.png	1	1	100
	Samsung_01_fromWindows_1403872494263337122.png	1	1	100
2	Samsung_02.png			
Upload Prep. Cache	temp_3694028040541910088.png	1	1	100
Image Prev. Cache	Wlddbacyqlj7c3fEH3f39Yk1aBg.cnt	N/A (Resized to ≤ 1080 px)		
	lUwm8JdIArb5vRxeHYH7yMKbPq0.cnt			
	noEJjQ5I_gYIFMYHemFbYm3nkPo.cnt			
	0Kf677zOnm2ZzNPNdfVgZRMxz88.cnt			
	rrEvJFDnABWP7i62NB1si21sZwY.cnt			
Discord CDN Downloads	Samsung_02_fromAndroid-13-SM-S515DL_1403868657540534453.png	1	1	100
	Samsung_02_fromAndroid-15-pixel7pro_1403862328667017299.png	1	1	100
	Samsung_02_fromChrome_1403870479948709948.png	1	1	100
	Samsung_02_fromIOS-15-8-4_1403866150743314442.png	1	1	100
	Samsung_02_fromWindows_1403872561439441026.png	1	1	100

Table 55. Continued

	Filename	SSIM	PCC	% Similar Pixels
3	Samsung_03.png			
Upload Prep. Cache	temp_6926615467988509048.png	1	1	100
Image Prev. Cache	iJvSlwB0w-tlkhCs8EcSZI081GE.cnt	N/A (Resized to ≤ 1080 px)		
	QBeOIVXwHB0frgLgEwKNPHKiljU.cnt			
	HM3udOXP0NQ5JqGy38kmAjLJ-JA.cnt			
	I2GOAYg7rsvo-R1ziFrQF3jCZh8.cnt			
	SwwAx4xvXhuvfkBEpBrN4ufPR-0.cnt			
Discord CDN Downloads	Samsung_03_fromAndroid-13-SM-S515DL_1403868262827163788.png	1	1	100
	Samsung_03_fromAndroid-15-pixel7pro_1403862109464428544.png	1	1	100
	Samsung_03_fromChrome_1403870550727594004.png	1	1	100
	Samsung_03_fromIOS-15-8-4_1403866267256881265.png	1	1	100
	Samsung_03_fromWindows_1403872641055592459.png	1	1	100
4	Samsung_04.png			
Upload Prep. Cache	temp_8912395682210009333.png	1	1	100
Image Prev. Cache	0S3tCaF52Ub3w619qfTdOo7-jzM.cnt	N/A (Resized to ≤ 1080 px)		
	YGD-jNT2CukMn1agJjpgphr593Y.cnt			
	uCw0n-ThOg7dRWkNSDATHaQgYok.cnt			
	RluHxTZW6jve3qlpUqp9oj5POEI.cnt			
	NkuNtvZDUGMV_O6_IDtGz_dG1io.cnt			
Discord CDN Downloads	Samsung_04_fromAndroid-13-SM-S515DL_1403868977196826654.png	1	1	100
	Samsung_04_fromAndroid-15-pixel7pro_1403862019316387861.png	1	1	100
	Samsung_04_fromChrome_1403870651902595173.png	1	1	100
	Samsung_04_fromIOS-15-8-4_1403866376665567405.png	1	1	100
	Samsung_04_fromWindows_1403872732243824711.png	1	1	100

Table 55. Continued

	Filename	SSIM	PCC	% Similar Pixels
5	iPhone_01.png			
Upload Prep. Cache	temp_4229346607321202929.png	1	1	100
Image Prev. Cache	qXjpJs0i-H74AzVF6ym2Lia6UqE.cnt	N/A (Resized to ≤ 1080 px)		
	R0kTao1BBG6x5MM3bn3cwSw0NDY.cnt			
	qfdHtcKDe4S-W09ZWnXfFhr1Cjc.cnt			
	ZTApLCcm6l7ZKyh5oZt0dfM0v_M.cnt			
	pM-JcmgEPpW1926Zl2qvTX8zomA.cnt			
Discord CDN Downloads	iPhone_01_fromAndroid-13-SM-S515DL_1403869120302289048.png	1	1	100
	iPhone_01_fromAndroid-15-pixel7pro_1403862756687478784.png	1	1	100
	iPhone_01_fromChrome_1403869837104517230.png	1	1	100
	iPhone_01_fromIOS-15-8-4_1403865422607941712.png	1	1	100
	iPhone_01_fromWindows_1403871968184500245.png	1	1	100
6	iPhone_03.png			
Upload Prep. Cache	temp_8937250687771882506.png	1	1	100
Image Prev. Cache	61KENoPuokG9ze7KGAhF8gbGXzw.cnt	N/A (Resized to ≤ 1080 px)		
	cW7oh2Abd__9BKKCzsNatdbDtQE.cnt			
	QGdl22Ufe2WG9zR-3puUSaF8RVw.cnt			
	UsnrM0VXmcUNx607JZn9MzkmXrw.cnt			
	6lWDqd8tbacM_vKZlSeIDT9bk2U.cnt			
Discord CDN Downloads	iPhone_03_fromAndroid-13-SM-S515DL_1403868587214766232.png	1	1	100
	iPhone_03_fromAndroid-15-pixel7pro_1403862185918201906.png	1	1	100
	iPhone_03_fromChrome_1403870009746260028.png	1	1	100
	iPhone_03_fromIOS-15-8-4_1403865598341025822.png	1	1	100
	iPhone_03_fromWindows_1403872085641789583.png	1	1	100

Table 55. Continued

	Filename	SSIM	PCC	% Similar Pixels
7	iPhone_04.png			
Upload Prep. Cache	temp_5316052926623920583.png	1	1	100
Image Prev. Cache	yShqE0ajS9tJcFYhOSBtAR9ma3s.cnt	N/A (Resized to ≤ 1080px)		
	gr37xZXklXk3cSEUkBilH9J3jv8.cnt			
	W3Tmmn-yzbxK1t0IMZCaaKCwH4U.cnt			
	x-1TH8nD4oldu_x5oIlad-ZFBqM.cnt			
	2qjjiX5TXytrTjZBN3kJqXq4wFM.cnt			
Discord CDN Downloads	iPhone_04_fromAndroid-13-SM-S515DL_1403868852965867520.png	1	1	100
	iPhone_04_fromAndroid-15-pixel7pro_1403861881902334062.png	1	1	100
	iPhone_04_fromChrome_1403870075206766742.png	1	1	100
	iPhone_04_fromIOS-15-8-4_1403865689282056314.png	1	1	100
	iPhone_04_fromWindows_1403872179216715938.png	1	1	100
8 (Not Uploaded; Too Large)	iPhone_02.png			
Upload Prep. Cache	temp_4360015640938392269.png	1	1	100