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Frequently Asked Questions

What is Digital Signature / Hashing / Hash Code?

Hashing in general is the process of mapping a large amount of electronic data into a single, large number using a secure algorithm. This large number, called the hash value, is like a secure signature or fingerprint for that electronic data.

When the data is forensic evidence, "…Hashing is used to guarantee the authenticity of an original data set and can be used as a digital equivalent of the Bates stamp used in paper document production." The smallest change in the original data produces a large, random change in the hash value. Check the hash value to determine if the data has been modified.

Electronic data that is authenticated with industry-standard hashing algorithms has been accepted in courts around the world.
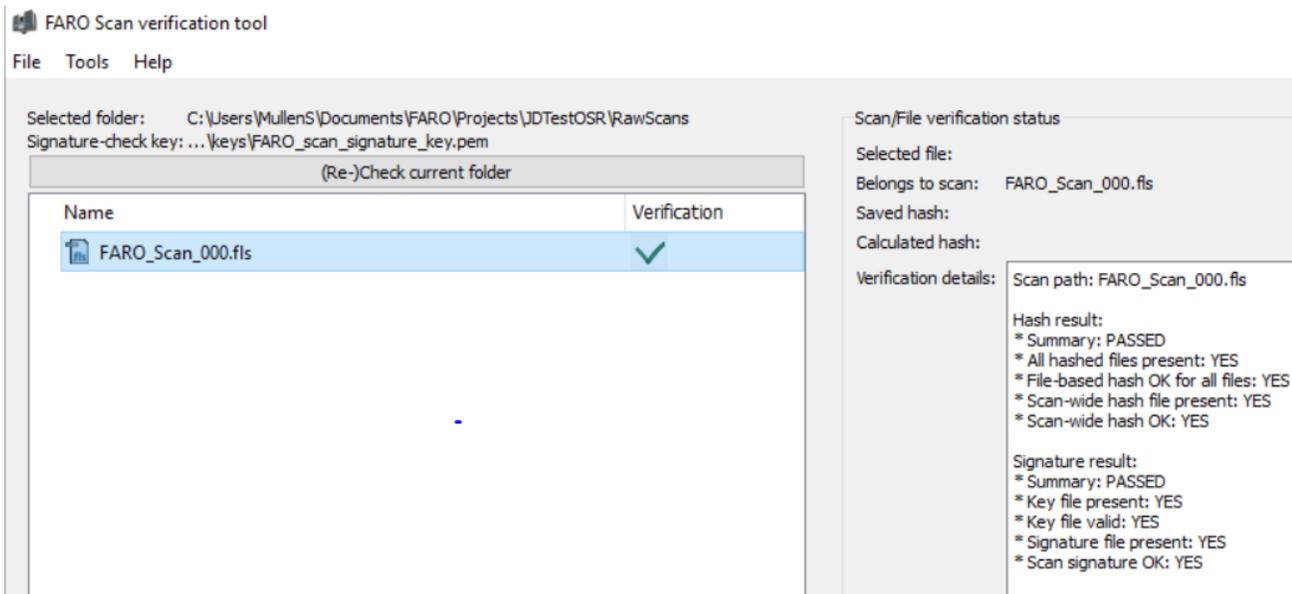
Did FARO invent hashing?

No! Digital hashing has been in use world-wide for many years.

Is there a difference between "Digital Signature and Hashing or Hash Code?

A digital signature is given to the key file by the private key on the laser scanner. The encrypted code ("hash code") along with other information, such as the hashing algorithm is the digital signature.

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Why do Public Safety professionals want a digital signature for scans?

It is well known that electronic data can be modified – even scans. Increasingly, having a hash value created at the time of acquisition is becoming critical for admissibility of electronic data.

"The hash value is one of the critical elements that carries through the entire chain of custody, through every step of the discovery process. If at some point there is an objection to the chain of custody record, the hash value of the file being offered as evidence in court — if it is identical to the hash value of the file originally collected (…) will provide one of the necessary foundational elements for admissibility."

Hash Values allow FARO customers to verify that scans being presented in court have not been altered since captured.

Does FARO hold a patent on hashing of scan data?

No. FARO has submitted a US patent on the complete process of securing scan data from the scene through the chain of custody.

What is Chain of Custody?

A Chain of Custody ensures that the data presented in court is "as originally acquired" and has not been altered prior to admission into evidence.

With digital hashing, ONLY FARO customers can show that their raw scan data has not been altered from the time the scans were captured.

Only applies to raw scans. Raw scans cannot be changed within SCENE software, the raw scans will remain unchanged in the folder structure.

Is hashing accepted by courts today as a method to verify that electronic data has not been modified?

YES. Effective Dec 1, 2017, the US Federal Rule of Evidence 902 was amended: "…Today, data copied from electronic devices, storage media, and electronic files are ordinarily authenticated by "hash value." …. This amendment allows self-authentication by a certification of a qualified person that she checked the hash value of the proffered item and that it was identical to the original."

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Effective 1/1/18, the State of Arizona amended Rule 902, Arizona Rules of Evidence to match the Federal Rule.

In India, verification of a digital hash is required for ALL electronic data files, including photographs and scans, to prove they have not been modified. In the year 2000, India passed the Information Technology Act 2000 4.

Rules 3, 4 & 5 provide the use of hash functions to authenticate electronic records.

Rule 6 recognizes the MD5 & SHA-2 as accepted, standard digital hash algorithms.

Does using digital signatures for scans guarantee the scan data will be accepted as evidence in court?

While using digital signatures is one critical step for admissibility of evidence, it is not a guarantee. All best practices for chain of custody of evidence must be followed in addition to using digital signatures.

Has FARO digital signatures been used at trial?

As this feature newly adapted to be used with laser scanning technology: No, not yet.

What FARO laser scanners have digital signatures included?

Effective with firmware Update 6.3.1 released Mid-October: All M and S series scanners will automatically apply a digital signature (hash value) to every scan captured.

Existing M and S series users can all receive this update.

How do I turn on/activate the Digital Signature feature in my laser scanner?

Calculating the hash value is AUTOMATIC, it takes about one second and cannot be turned off. You can't forget to apply this feature or make a mistake.

What if I forget to turn on hashing before I start scanning a scene?

On FARO laser scanners running firmware, scan data is automatically hashed when it is captured. This is not an option that users could forget to turn on.

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I'm an existing M / S laser scanner user. Where can I get the update?

FARO Knowledge Base at: https://knowledge.faro.com/Hardware/3D_Scanners/Focus

How can I verify the digital signature and the data have not been modified?

The FARO Scan Verification Tool (FSVT) allows you to check the entire digital signature and its individual hash values for any scan folder and compare it to the values calculated at the time of capture.

Anyone can download the Scan Verification Tool from the 3D App Center at:
https://3d-apps.faro-europe.com/product/faro-scan-verification-tool

Or, from the FARO Knowledge Base at:
https://knowledge.faro.com/Hardware/3D_Scanners/Focus/Scan_Verification_Tool_Download_and_Manual

FARO uses a "private key" to create a digital signature that is unique to the calculated hash values and that key.

A "public key" is installed that can be used to verify the hashes are those that have been calculated and signed by the Scanner firmware

Where do I get the Scan Verification Tool App?

The Scan Verification Tool is available in FARO Knowledge Base at:
https://knowledge.faro.com/Hardware/3D_Scanners/Focus/Scan_Verification_Tool_Download_and_Manuall

How much does the Verification Tool App costs?

The App is free of charge.

If there is a small change in the data, like one pixel changed in a photograph, is it difficult to see if the hash value has changed?

A tiny change in the data file causes the hash value to be completely different for that file. You can't miss it.

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If I make modifications to a project in SCENE, will that change the hash value?

Changes made in SCENE could certainly affect the hash value of the data. Therefore, you only want to compare hash values of the RAW SCANS.

Does moving a file or changing the name of a file affect its hash value?

No, since the data in the file is not changed, the hash remains the same.

Could someone copy the Scan Verification report to a document and edit that document to make it look like the hash values were verified to be the same?

Yes, this is possible, just like it is possible to modify any text report. The way to ensure this is not an issue is to run the FARO Scan Verification Tool when the data is presented, such as in court. Then it is obvious there is no way the report could have been modified.

Does the FARO Scan Verification Tool (FSVT) provide a report of the results?

Yes, in the FSVT, access the Tools menu and select Show Verification Report. The verification of each file in the folder is shown by displaying the original "Saved hash," as calculated by the scanner, with the "Calculated hash" that was just calculated by the FSVT.

How to Create a Scan Verification Tool Report?

User Manual for the Scan Verification Tool:
https://faro.app.box.com/s/o4py3pnhu8ny0xj3rf7dmditbpy1noa7/file/311557087620

- Use it to verify a folder of raw scans that were captured with firmware 6.3 (or later)
- Under the Tools Menu, choose to view the Verification Report.
- See the hash value calculated at this time and the "Saved Hash" that was calculated when the scan was taken.

Only applies to RAW SCANS.

Frequently Asked Questions

Is there training available?

There will be training videos and a self-paced, free, training course available on FARO Academy.

Further Information:

Federal Rules of Evidence: https://www.rulesofevidence.org/