Creation of Cryptographic Checksums with Operating System on-board Tools
## For MS-Windows, MacOS, GNU/Linux and BSD/Unix

Humans are complex living beings. Fingerprints are often created for their quick and uncomplicated identification. Computer files can be identified according to the same principle: By generating an "electronic fingerprint," the so-called cryptographic checksum, a number that is always constant. Standardized procedures can be used to quickly check the integrity and authenticity of files of any kind. Human fingerprints are created with ink pads, electronic ones with a checksum program.

Cryptographic checksums are based on hash functions that return hash values for arbitrary files as a result. This value is also called hash code or hash.

A file and identical copies of it always have the same hash checksum. However, if even a single bit or character changes due to damage or manipulation, a completely different hash code should result.

Changing the file name does not change the cryptographic checksum.

Human

File

35183fdd5a591331696c50535c6446d49f48e1fa

Fingerprint

Fingerprint of a File
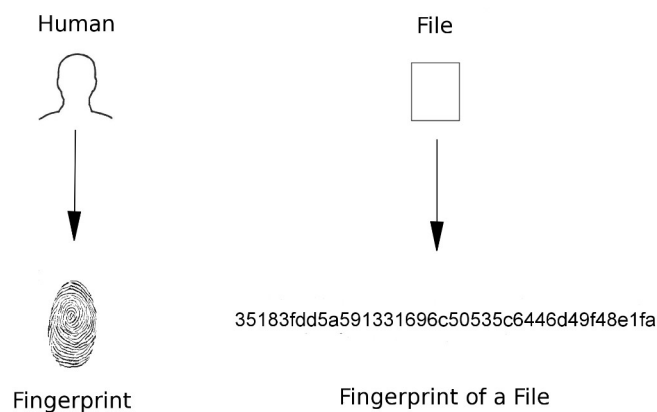
MS-Windows: PowerShell

Tryout example: Place any file document on your desktop, for example an image file or a text document such as letter.txt. At the bottom left of the Windows search box, type: PowerShell. Click on the first entry that appears, on "Windows PowerShell App" This opens the on-board command line window. 1. Write, here always without quotes, "*cd Desktop*" and press the enter key. 2. Now write "*ls*" and press enter, whereupon all your folders and files are listed, which are in the directory "Desktop", among them also your sample file. 3. Now build the checksum to your file, with the PowerShell command *Get-FileHash [filename]*, here in the example: *Get-FileHash letter.txt*. The default algorithm used, the cryptographic checksum and the file path appear.

```
PS C:\Users\chef\Desktop> Get-FileHash letter.txt
```

GNU/Linux and BSD/Unix as well as MacOS: Shasum

Under unix operating systems you also open a command line environment and use one of the almost always already preinstalled shasum programs, for example sha256, sha256sum or sha512 or sha512sum among others. Example: *sha256sum* followed by the file name: *sha256sum letter.txt*.

Imprint