File signature verification

Cloud Volumes ONTAP

NetApp
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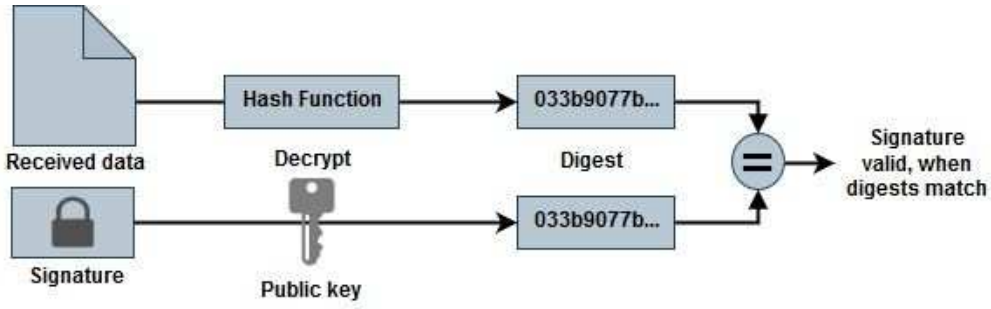
The Azure image verification process will generate a digest from the VHD file with the leading 1MB and ending 512B striped by using hash function. To match the signing procedure, SHA256 is used to hash. You need to remove the leading 1MB and final 512B from the VHD file and then verify the remaining portion of the VHD file.

File signature verification workflow summary

The following is an overview of the file signature verification workflow process.



- Download the Azure Image Digest file from the NetApp Support Site and extract the digest file(.sig), public key certificate file(.pem) and chain certificate file(.pem).

  Refer to the Download the Azure Image Digest File for more information.

- Verify the chain of trust.
- Extract the public key(.pub) from the public key certificate(.pem).
- The extracted public key is used to decrypt the digest file. The result is then compared against a new unencrypted digest of the temporary file created from the image file with leading 1MB and ending 512 bytes removed.

  This step is achieved through the following openssl command.

  - The general CLI statement appears as follows:

    ```
    openssl dgst -verify <public_key> -keyform <form> <hash_function>
    -signature <digest_file> -binary <temporary_file>
    ```

  - OpenSSL CLI tool gives a "Verified OK" message if both the files match and "Verification Failure" if they do not match.

File signature verification on Linux

You can verify an exported VHD file signature for Linux by following the steps below.

Steps

1. Download the Azure Image Digest file from the NetApp Support Site and extract the digest file(.sig), public key certificate file(.pem) and chain certificate file(.pem).

   Refer to the Download the Azure Image Digest File for more information.

2. Verify the chain of trust.

```
% openssl verify -CAfile Certificate-Chain-9.15.0P1_azure.pem
Certificate-9.15.0P1_azure.pem
Certificate-9.15.0P1_azure.pem: OK
```

3. Remove the leading 1MB (1048576 Bytes) and ending 512 Bytes of VHD file.

   If 'tail' is used, the option '-c +K' outputs bytes starting with the Kth bytes of the specified file. Hence, 1048577 is passed to 'tail -c'.

```
% tail -c +1048577 ./9150.01000024.05090105.vhd > ./sign.tmp.tail
% head -c -512 ./sign.tmp.tail > sign.tmp
% rm ./sign.tmp.tail
```

4. Use openssl to extract public key from certificate and verify the striped file(sign.tmp) with the signature file and public key.

   If the input file passes the verification, the command will display
   "Verification OK". Otherwise, "Verification Failure" will display.

```
% openssl x509 -pubkey -noout -in ./Certificate-9.15.0P1_azure.pem >
./Code-Sign-Cert-Public-key.pub

% openssl dgst -verify Code-Sign-Cert-Public-key.pub -keyform PEM
-sha256 -signature digest.sig -binary ./sign.tmp
Verification OK

% openssl dgst -verify Code-Sign-Cert-Public-key.pub -keyform PEM
-sha256 -signature digest.sig -binary ./another_file_from_nowhere.tmp
Verification Failure
```

5. Clean up the workspace.

```
% rm ./9150.01000024.05090105.vhd ./sign.tmp
% rm *.sig *.pub *.pem
```

File signature verification on Mac OS

You can verify an exported VHD file signature for Mac OS by following the steps below.

Steps

1. Download the Azure Image Digest file from the NetApp Support Site and extract the digest file(.sig), public key certificate file(.pem) and chain certificate file(.pem).

   Refer to the Download the Azure Image Digest File for more information.

2. Verify the chain of trust.

```
% openssl verify -CAfile Certificate-Chain-9.15.0P1_azure.pem
Certificate-9.15.0P1_azure.pem
Certificate-9.15.0P1_azure.pem: OK
```

3. Remove the leading 1MB(1048576 Bytes) and ending 512 Bytes of VHD file.

   If 'tail' is used, the option '-c +K' outputs bytes starting with the Kth bytes of the specified file. Hence, 1048577 is passed to 'tail -c'. It takes around 13m for the tail command to complete on Mac OS.

```
% tail -c +1048577 ./9150.01000024.05090105.vhd > ./sign.tmp.tail
% head -c -512 ./sign.tmp.tail > sign.tmp
% rm ./sign.tmp.tail
```

4. Use openssl to extract public key from certificate and verify the striped file(sign.tmp) with the signature file and public key.

   If the input file passes the verification, the command will display "Verification OK". Otherwise, "Verification Failure" will display.

```
% openssl x509 -pubkey -noout -in ./Certificate-9.15.0P1_azure.pem >
./Code-Sign-Cert-Public-key.pub

% openssl dgst -verify Code-Sign-Cert-Public-key.pub -keyform PEM
-sha256 -signature digest.sig -binary ./sign.tmp
Verified OK

% openssl dgst -verify Code-Sign-Cert-Public-key.pub -keyform PEM
-sha256 -signature digest.sig -binary ./another_file_from_nowhere.tmp
Verification Failure
```

5. Clean up the workspace.

```
% rm ./9150.01000024.05090105.vhd ./sign.tmp
% rm *.sig *.pub *.pem
```

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