



Guide to Schemas for IC-SF

IC-SF Schema Guide

Version 2021-JAN

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Chapter 1 - Introduction

1.1 - Purpose

This is an informative supplement for IC-SF. This guide is generated from the IC-SF Schemas and provides a consolidated reference for the schemas of this specification.

Chapter 2 - Schema Files

2.1 - HashVerification.xsd

```
<xs:schema xmlns="urn:us:gov:ic:sf:hashverification"
            xmlns:xs="http://www.w3.org/2001/XMLSchema"
            xmlns:xhtml="http://www.w3.org/1999/xhtml-StopBrowserRendering"
            elementFormDefault="qualified"
            xml:lang="en"
            ism:compliesWith="USGov USIC"
            ism:ownerProducer="USA"
            ism:classification="U"
            ism:DESVersion="201903.202010"
            ism:ISMCAICESVersion="202010"
            ism:resourceElement="true"
            ism:createDate="2020-11-19"
            targetNamespace="urn:us:gov:ic:sf:hashverification"
            version="202101">
  <xs:annotation>
    <xs:documentation>
      This is a manually created schema fragment for hash verification.
    </xs:documentation>
  </xs:annotation>

  <!-- ***** -->

  <!-- elements -->

  <!-- ***** -->

  <!-- Top level element -->

  <xs:element name="ContentEncodedHashVerification" type="HashVerificationType">
    <xs:annotation>
      <xs:documentation xml:lang="en">
        <xhtml:p ism:ownerProducer="USA" ism:classification="U">
          Represents the hash of the payload in its encrypted state.
          Hash value is not meant to be taken over the Base64-encoded
          state of the payload when used with a Base64Binary payload.

          Used to represent the payload as stored and transmitted: Encrypted and split into chunks as needed.
          Used by tools that need to verify that a payload corresponds to the XML document,
          but which have no reason to further process the payload and may not have access to
          the necessary keys.
        </xhtml:p>
      </xs:documentation>
    </xs:annotation>
  </xs:element>

  <!-- Top level element -->

  <xs:element name="ContentDecodedHashVerification" type="HashVerificationType">
```

```

    <xs:annotation>
      <xs:documentation xml:lang="en">
        <xhtml:p ism:ownerProducer="USA" ism:classification="U">
          Represents the payload in plaintext state.
          Hash value is not meant to be taken over the Base64-encoded
          state of the payload when used with a Base64Binary payload.

          Allows for verification that the payload has been correctly decrypted.
        </xhtml:p>
      </xs:documentation>
    </xs:annotation>
  </xs:element>

  <!-- Top level element -->

  <xs:element name="HashVerification" type="HashVerificationType">
    <xs:annotation>
      <xs:documentation xml:lang="en">
        <xhtml:p ism:ownerProducer="USA" ism:classification="U"> This element represents the
        hash verification of the referenced material. It may be a single hash over the
        entire payload, or a structure representing an ordered set of payload blocks.
        See the HashVerificationType documentation for details.</xhtml:p>
      </xs:documentation>
    </xs:annotation>
  </xs:element>

  <!-- Top level element -->

  <xs:element name="UnblockedHashVerification" type="UnblockedHashVerificationType">
    <xs:annotation>
      <xs:documentation xml:lang="en">
        <xhtml:p ism:ownerProducer="USA" ism:classification="U"> This element represents the
        hash verification of the referenced material that is restricted to only a single hash
        over the entire payload and where payload blocks are not allowed.
        See the UnblockedHashVerificationType documentation for details.</xhtml:p>
      </xs:documentation>
    </xs:annotation>
  </xs:element>

  <xs:element name="BlockHash" type="BlockHashType">
    <xs:annotation>
      <xs:documentation xml:lang="en">
        <xhtml:p ism:ownerProducer="USA" ism:classification="U"> This element represents the
        hash of one block of the referenced material.</xhtml:p>
      </xs:documentation>
    </xs:annotation>
  </xs:element>

  <xs:element name="PayloadHash" type="HashValueType">
    <xs:annotation>
      <xs:documentation xml:lang="en">
        <xhtml:p ism:ownerProducer="USA" ism:classification="U"> This element represents the
        hash of the referenced material.</xhtml:p>
      </xs:documentation>
    </xs:annotation>
  </xs:element>
```

```

    </xs:annotation>
  </xs:element>

  <xs:element name="TotalHash" type="TotalHashType">
    <xs:annotation>
      <xs:documentation xml:lang="en">
        <xhtml:p ism:ownerProducer="USA" ism:classification="U"> This element represents the
        hash of the concatenation of block hashes. </xhtml:p>
      </xs:documentation>
    </xs:annotation>
  </xs:element>

  <!-- ***** -->

<!-- attributes -->

<!-- ***** -->

<xs:attribute name="block" type="BlockType">
  <xs:annotation>
    <xs:documentation xml:lang="en">
      <xhtml:p ism:ownerProducer="USA" ism:classification="U">The hash block.</xhtml:p>
    </xs:documentation>
  </xs:annotation>
</xs:attribute>

<xs:attribute name="blockSize" type="BlockSizeType">
  <xs:annotation>
    <xs:documentation xml:lang="en">
      <xhtml:p ism:ownerProducer="USA" ism:classification="U">The block size of a
      hash.</xhtml:p>
    </xs:documentation>
  </xs:annotation>
</xs:attribute>

<xs:attribute name="hashType" type="HashTypeType">
  <xs:annotation>
    <xs:documentation xml:lang="en">
      <xhtml:p ism:ownerProducer="USA" ism:classification="U">The type of a
      hash.</xhtml:p>
    </xs:documentation>
  </xs:annotation>
</xs:attribute>

<xs:attribute name="totalBlocks" type="TotalBlocksType">
  <xs:annotation>
    <xs:documentation xml:lang="en">
      <xhtml:p ism:ownerProducer="USA" ism:classification="U">The total blocks of a
      hash.</xhtml:p>
    </xs:documentation>
  </xs:annotation>
</xs:attribute>

<!-- ***** -->
```

```
<!-- groups -->

<!-- ***** -->

<xs:group name="BlockedHashGroup">
  <xs:annotation>
    <xs:documentation>
      <xhtml:p ism:classification="U" ism:ownerProducer="USA">
        <xhtml:strong>Tailoring:</xhtml:strong> Not all systems will be willing or able
        to support unbounded lists of blocks. When tailoring maxOccurs here to reflect
        limitations imposed by a CDS or other implementation, that change should also be
        reflected in the definition of a BlockedHashGroup.</xhtml:p>
      </xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element ref="TotalHash" minOccurs="1" maxOccurs="1"/>
      <xs:element ref="BlockHash" minOccurs="2" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:group>

  <!-- ***** -->

<!-- complexTypes -->

<!-- ***** -->

<xs:complexType name="BlockHashType">
  <xs:simpleContent>
    <xs:extension base="HashValueType">
      <xs:attribute ref="block" use="required"/>
    </xs:extension>
  </xs:simpleContent>
</xs:complexType>

<xs:complexType name="HashVerificationType">
  <xs:annotation>
    <xs:documentation>
      <xhtml:p ism:classification="U" ism:ownerProducer="USA"> Hash values to verify
      contents of a payload. </xhtml:p>
      <xhtml:p ism:classification="U" ism:ownerProducer="USA"> For payload types that
      embed the payload in the document, or which otherwise consist of a single
      object, a single hash value must be provided in a PayloadHash child element. If
      the payload is broken into a set of blocks, the PayloadHash element is optional.</xhtml:p>
      <xhtml:p ism:classification="U" ism:ownerProducer="USA"> When referring to a
      ReferenceValuePayload element which uses chunking, the TotalHash child element
      must be a hash of the ordered concatenation of block hashes, using the same
      standard base64 encoding found in the HashBlock elements. That element is
      followed by a sequence of BlockHash elements, each of which must have a block
      attribute indicating which block of the ReferenceValuePayload it matches. These
      hashes must be of the same type as the parent HashVerification element.
    </xhtml:p>
  </xs:documentation>
</xs:annotation>
```



```

    <xs:choice>
      <xs:sequence>
        <xs:element ref="PayloadHash" minOccurs="1" maxOccurs="1"/>
        <xs:group ref="BlockedHashGroup" minOccurs="0" maxOccurs="1"/>
      </xs:sequence>
      <xs:sequence>
        <xs:group ref="BlockedHashGroup" minOccurs="1" maxOccurs="1"/>
      </xs:sequence>
    </xs:choice>
    <xs:attribute ref="hashType" use="required"/>
  </xs:complexType>

  <xs:complexType name="TotalHashType">
    <xs:simpleContent>
      <xs:extension base="HashValueType">
        <xs:attribute ref="blockSize" use="required"/>
        <xs:attribute ref="totalBlocks" use="required"/>
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>

  <xs:complexType name="UnblockedHashVerificationType">
    <xs:complexContent>
      <xs:restriction base="HashVerificationType">
        <xs:choice>
          <xs:element ref="PayloadHash" minOccurs="1" maxOccurs="1"/>
        </xs:choice>
      </xs:restriction>
    </xs:complexContent>
  </xs:complexType>

  <!-- ***** -->

  <!-- simpleTypes -->

  <!-- ***** -->

  <xs:simpleType name="BlockSizeType">
    <xs:annotation>
      <xs:documentation xml:lang="en">
        <xhtml:p ism:classification="U" ism:ownerProducer="USA">
          <xhtml:strong>Tailoring:</xhtml:strong> Implementations that do not support all
          listed block sizes may wish to tailor this list to remove values larger than
          those supported by the service. To preserve compatibility with other
          implementations, new values should not be added. </xhtml:p>
        </xs:documentation>
      </xs:annotation>
      <xs:restriction base="xs:positiveInteger">
        <xs:minInclusive value="134217728"/>
        <xs:maxInclusive value="2147483648"/>
        <xs:enumeration value="134217728"/>
        <xs:enumeration value="268435456"/>
        <xs:enumeration value="536870912"/>
        <xs:enumeration value="1073741824"/>
      </xs:restriction>
    </xs:simpleType>

```

```

        <xs:enumeration value="2147483648"/>
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="BlockType">
    <xs:restriction base="xs:positiveInteger">
        <xs:minInclusive value="1"/>
        <xs:maxInclusive value="4096"/>
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="HashTypeType">
    <xs:annotation>
        <xs:documentation xml:lang="en">
            <xhtml:p ism:ownerProducer="USA" ism:classification="U">
                The algorithm used to calculate the associated hash value, also known as a message digest.
                Valid values identify approved secure hash algorithms defined in FIPS 180-4 and FIPS 202.
                Current information on these algorithms, including specifications and guidance as to algorithm choice,
                can be found at the NIST hash function project page, https://csrc.nist.gov/projects/hash-functions.
                NIST special publications 800-57 "Recommendation for Key Management" also provides guidance on algorithm choice.
                SHA-1 is approved only for legacy processing and SHA-224, SHA-512/224, and SHA3-224 are only approved through 2030.
            </xhtml:p>
        </xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:string">
        <xs:enumeration value="SHA-1"/>
        <xs:enumeration value="SHA-224"/>
        <xs:enumeration value="SHA-256"/>
        <xs:enumeration value="SHA-384"/>
        <xs:enumeration value="SHA-512"/>
        <xs:enumeration value="SHA-512/224"/>
        <xs:enumeration value="SHA-512/256"/>
        <xs:enumeration value="SHA3-224"/>
        <xs:enumeration value="SHA3-256"/>
        <xs:enumeration value="SHA3-384"/>
        <xs:enumeration value="SHA3-512"/>
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="HashValueType">
    <xs:restriction base="xs:hexBinary">
        <xs:minLength value="16"/>
        <xs:maxLength value="128"/>
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="TotalBlocksType">
    <xs:restriction base="xs:nonNegativeInteger">
        <xs:minInclusive value="2"/>
        <xs:maxInclusive value="4096"/>
    </xs:restriction>
</xs:simpleType>

</xs:schema>
```

2.2 - IC-SF.xsd

```
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:icsfhashv="urn:us:gov:ic:sf:hashverification"
  xmlns:xhtml="http://www.w3.org/1999/xhtml1-StopBrowserRendering"
  targetNamespace="urn:us:gov:ic:sf"
  attributeFormDefault="qualified"
  elementFormDefault="qualified"
  xml:lang="en"
  ism:compliesWith="USGov USIC"
  ism:resourceElement="true"
  ism:createDate="2020-11-20"
  ism:DESVersion="201903.202010"
  ism:ISMCACTCESVersion="202010"
  ism:classification="U"
  ism:ownerProducer="USA"
  version="202101">
  <xs:annotation>
    <xs:documentation>
      <xhtml:h1 ism:ownerProducer="USA" ism:classification="U">
        Intelligence Community Specification Framework (IC-SF.XML)</xhtml:h1>
      </xs:documentation>

      <xs:documentation>
        <xhtml:h2 ism:ownerProducer="USA" ism:classification="U">Notices</xhtml:h2>
        <xhtml:p ism:ownerProducer="USA" ism:classification="U">
          Distribution Notice:
          This document has been approved for Public Release and is available for use without restriction.
        </xhtml:p>
        </xs:documentation>
        <xs:documentation>
          <xhtml:h2 ism:ownerProducer="USA" ism:classification="U">Description</xhtml:h2>
          <xhtml:p ism:ownerProducer="USA" ism:classification="U">
            W3C XML Schema for the Intelligence Community Specification Framework (IC-SF.XML).
          </xhtml:p>
          </xs:documentation>
          <xs:documentation>
            <xhtml:h2 ism:ownerProducer="USA" ism:classification="U">Introduction</xhtml:h2>
            <xhtml:p ism:ownerProducer="USA" ism:classification="U"> This XML Schema file is one
              component of the XML Data Encoding Specification (DES). Please see the document
              titled <xhtml:i>
                <xhtml:a href="../../Documents/IC-SF/DesSfIcXml.pdf">Intelligence Community Specification Framework</xhtml:a>
              </xhtml:i> for a complete description of the encoding as well as list of all
              components. </xhtml:p>
            <xhtml:p ism:ownerProducer="USA" ism:classification="U"> It is envisioned that this
              schema or its components, as well as other parts of the DES may be overridden for
              localized implementations. Therefore, permission to use, copy, modify and distribute
              this XML Schema and the other parts of the DES for any purpose is hereby granted in
              perpetuity. </xhtml:p>
            <xhtml:p ism:ownerProducer="USA" ism:classification="U"> Please reference the preceding
              two paragraphs in all copies or variations. The developers make no representation
              about the suitability of the schema or DES for any purpose. It is provided "as is"
              without expressed or implied warranty. </xhtml:p>
```

```

    <xhtml:p ism:ownerProducer="USA" ism:classification="U"> If you modify this XML Schema
    in any way label your schema as a variant of IC-SF.XML. </xhtml:p>
    <xhtml:p ism:ownerProducer="USA" ism:classification="U"> Please direct all questions,
    bug reports,or suggestions for changes to the points of contact identified in the
    document referenced above. </xhtml:p>
  </xs:documentation>
  <xs:documentation>
    <xhtml:h2 ism:ownerProducer="USA" ism:classification="U">Implementation Notes</xhtml:h2>
    <xhtml:p ism:ownerProducer="USA" ism:classification="U">
      No implementation notes at this time.
    </xhtml:p>
  </xs:documentation>
  <xs:documentation>
    <xhtml:h2 ism:ownerProducer="USA" ism:classification="U">Creators</xhtml:h2>
    <xhtml:p ism:ownerProducer="USA" ism:classification="U">Office of the Director of National Intelligence
    Intelligence Community Chief Information Officer</xhtml:p>
  </xs:documentation>
</xs:annotation>

<!-- ***** -->

<!-- Imports -->

<!-- ***** -->

<xs:import schemaLocation="./HashVerification.xsd"
           namespace="urn:us:gov:ic:sf:hashverification"/>

<!-- ***** -->

<!-- Attributes -->

<!-- ***** -->

<xs:attribute name="DESVersion">
  <xs:annotation>
    <xs:documentation xml:lang="en">
      <xhtml:p ism:ownerProducer="USA" ism:classification="U">The version number of the DES</xhtml:p>
    </xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:pattern value="[0-9]{6}(\.[0-9]{6})?(\-{1,23})?" />
    </xs:restriction>
  </xs:simpleType>
</xs:attribute>

  <xs:annotation>
    <xs:documentation>
      <xhtml:h2 ism:ownerProducer="USA" ism:classification="U">Formal Change List</xhtml:h2>
      <xhtml:table ism:ownerProducer="USA" ism:classification="U" id="ChangeHistory">
        <xhtml:caption>Change History</xhtml:caption>
        <xhtml:thead>
          <xhtml:tr>
```

```

        <th>Version</th>
        <th>Date</th>
        <th>By</th>
        <th>Description</th>
    </xhtml:tr>
</xhtml:thead>
<xhtml:tbody>
    <xhtml:tr>
        <xhtml:td>2021-JAN</xhtml:td>
        <xhtml:td>2020-11-20</xhtml:td>
        <xhtml:td>ODNI/OCIO/ICEA</xhtml:td>
        <xhtml:td>
            For changes to schema as of and after 2021-JAN, reference the change history in the CES.
        </xhtml:td>
    </xhtml:tr>
</xhtml:tbody>
</xhtml:table>
</xs:documentation>
</xs:annotation>
</xs:schema>
```