eCH-0113: SuisseID specification

<table>
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<tr>
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<td>eCH-0113</td>
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<tr>
<td>Autoren</td>
<td>Die vorliegende Version der SuisseID Spezifikation wurde durch die &quot;Arbeitsgruppe Spezifikation&quot; des &quot;Trägerschaftsverein SuisseID&quot; erstellt. Die Autoren waren: Michael Doujak, Die Schweizerische Post (Editor); Gerhard Hassenstein, Berner Fachhochschule; Markus Limacher, Swisscom; Marcel Vinzens, AdNovum Informatik; Marc Zweiacker, Zweiacker IT Management; Thomas Moretti, QuoVadis; Urs Bürg, Urs Bürg Beratung GmbH</td>
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</tr>
<tr>
<td></td>
<td><a href="http://www.ech.ch">www.ech.ch</a> / <a href="mailto:info@ech.ch">info@ech.ch</a></td>
</tr>
</tbody>
</table>
Summary

The SuisseID is the first standardized product for an electronic proof of identity in Switzerland that can be used for both qualified digital signatures and secure strong authentication.

The SuisseID system provides three functions:

- Strong authentication
- Qualified digital signature
- Electronic identity provider

The components required to provide these functions are defined in this specification.

SuisseID incorporates the ability to create qualified digital signatures according to Swiss digital signature law. All aspects related to the creation or validation of qualified digital signatures are governed by Swiss digital signature law and are considered as integral part of this specification. In case of differences, Swiss digital signature law will override this specification in this aspect and without implications on the remainder of this specification.

The SuisseID is available nation-wide since May 2010 in the form of a smart card or as a token.

Acknowledgements

There would be no SuisseID without the relentless effort, dedication and determination of those who contributed to the success of this specification. Special thanks go to:

Rudolf Brügger, Urs Bürgi, Christof Dornbierer, René Eberhard, Nick Hangartner, Manuel Hilty, Freddy Kaiser, Peter Keller, Markus Limacher, Daniel Markwalder, Igor Metz, Thomas Moretti, Rolf Oppliger Carl Rosenast, Stephan Röthlisberger, Benjamin Schnell, Tom Sprenger, Marcel Vinzens, Hans-Peter Waldegger, Andreas Zürcher, Marc Zweiacker, Reto Zwyssig

Contributing organisations include: AdNovum, AWK Group, Bundesamt für Informatik und Telekommunikation, Enlight-It, Glue Engineering, Keyon AG, QuoVadis, Schweizerische Post, Swisscom, Urs Bürgi Beratung GmbH, Zweiacker IT Management.
1 About this Specification

1.1 SuisseID Specifications
This document embraces the specification of two digital certificates along with a service framework in which those certificates can be used for the delivery of personal information by the user.

Chapter 3 is a detailed technical specification of the SuisseID identity and authentication certificate and the SuisseID qualified certificate.

Chapter is a detailed technical specification of the core infrastructure services which comprise the identity provider service (IdP) and the claim assertion service (CAS). Using the core infrastructure services, users can submit personal data in a secure and reliable fashion to the Service Providers that require them. On the other hand, Service Providers can verify the origin and integrity of personal data they obtain from users.

1.2 Privacy and Data Protection
The design of the SuisseID specification was guided by stringent privacy and data protection requirements all along:

- SuisseID certificates contain a minimum of personal data stored on-card;
- SuisseID certificates are exclusively issued by Certificate Authorities which are accredited providers according to ZertES;
- Storage of personal data by the Certificate Authorities follows current practice in accordance to ZertES;
- A subset of the personal data from the identification document (e.g. a passport) is stored in the identity provider service (IdP) operated by the Certificate Authority. The only way to retrieve that data is by strong authentication with the IdP using the appropriate SuisseID authentication certificate;
- Using the IdP, the user will always explicitly acknowledge the submission of personal data to a Service Provider (SP) and he or she can always prevent those data from being submitted.

1.3 Notation of Requirement Levels
The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this specification are to be interpreted as described in [RFC 2119]. These keywords are thus capitalized when used to unambiguously specify requirements over protocol and application features and behavior that affect the interoperability and security of implementations. When these words are not capitalized, they are meant in their natural-language sense.

1.4 Disclaimer
This specification was developed by a voluntary group whose aim was to establish an industry standard for a digital authentication and signature token in a purely self-regulatory manner. This specification is published as-is, neither the publisher nor any of the group members have any liability or responsibility of any kind for any errors or omissions in this page or any term of these specifications.
provide warranties and they do not assume any liabilities with respect to the use of this specification.
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2 Document

The present document has been approved by the eCH committee of experts. It has normative power in the defined domain.
3 SuisseID Digital Certificates Specification

3.1 Purpose of this Chapter

This chapter specifies the profiles of the SuisseID qualified digital certificate QC and the rules pertaining to the issuance and management of the (non-qualified) SuisseID identification and authentication certificate IAC.

3.2 Basic Principles

Unless stated otherwise, the guidelines in the TAV-ZertES [3] apply to the specification of both the QC and the IAC.

The following guidelines are complementary to the specifications in TAV-ZertES when dealing with the issuance and administration of SuisseID certificates.

For the issuance and life cycle management of the SuisseID IAC, the Certification Service Provider (CSP) **MUST** adhere to the same organizational and operational procedures and use the same technical infrastructure as they would with the ZertES-compliant qualified certificate.

CSPs issuing digital certificates according to the SuisseID specifications **MUST** be registered with the directory of accredited providers at least for the following standards: ZertES [1], VZertES [2] and TAV-ZertES [3].

3.3 Definitions

3.3.1 SuisseID Number

The SuisseID number is a novel concept to identify certificate owners easily. The following is a list of properties of the SuisseID number:

a) The SuisseID number is a unique number assigned by the CSP to one person exclusively, the certificate owner;

b) The SuisseID number is unique within the scope of all SuisseID certificates;

c) The SuisseID number is assigned to the certificate owner regardless of what other attributes there are in the SuisseID certificate (like organisation unit, for example);

d) A SuisseID certificate set – one QC and one IAC – is always assigned a common SuisseID number;

e) If the certificate owner obtains another SuisseID certificate set, he can ask for one of his SuisseID numbers to be re-allocated to the new certificate set;

f) The certificate owner can ask for several SuisseID certificate sets, each having a different SuisseID number to allow usage of SuisseIDs in different contexts;

g) Renewal of an existing SuisseID certificate set means to re-use the SuisseID number from that set.

The SuisseID Number is provided using RDN `serialNumber` of the Subject DN in the SuisseID QC / SuisseID IAC. It **MUST** be provided in the following format:

---

1 Since August 2011 TAV-ZertES refers to RFC 5280.

Verein eCH, Mainaustrasse 30, Postfach, 8034 Zürich
T 044 388 74 64, F 044 388 71 80
info@ech.ch
www.ech.ch
SuisseID Number Format:
cspId[0-9]{4}-part1[0-9]{4}-part2[0-9]{4}-part3[0-9]{4}
Example: 1100-4567-8901-2345

A user may ask for more than one SuisseID and he may ask for them to have equal SuisseID numbers. When this happens, the CSP **MUST** issue the requested certificate sets using a common SuisseID number allocated to all of them.

Certificate owners switching to another SuisseID vendor (CSP) may ask for their current SuisseID number to be transferred to the new CSP. The CSP issuing the new set **MUST** ensure that the number was assigned to the right person beyond doubt in an auditable fashion.

<table>
<thead>
<tr>
<th>cspId</th>
<th>Unique number assigned to the CSP. Within the scope of this specification, cspIds are assigned to the CSPs as follows³:</th>
</tr>
</thead>
<tbody>
<tr>
<td>cspId CSP URL</td>
<td></td>
</tr>
<tr>
<td>1100 Swisscom (Schweiz) AG <a href="http://www.swissdigicert.ch">www.swissdigicert.ch</a></td>
<td></td>
</tr>
<tr>
<td>1200 QuoVadis Trustlink Schweiz AG <a href="http://www.quovadisglobal.ch">www.quovadisglobal.ch</a></td>
<td></td>
</tr>
<tr>
<td>1300 SwissSign AG <a href="http://www.swisssign.com">www.swisssign.com</a></td>
<td></td>
</tr>
<tr>
<td>1400 Bundesamt f. Informatik und Telekommunikation BIT <a href="http://www.pki.admin.ch">www.pki.admin.ch</a></td>
<td></td>
</tr>
</tbody>
</table>

| part1-part2-part3 | Unique number: Three blocks of four digits [0-9] each, separated by a dash sign ("-"). The number is assigned by the issuing CSP. |

### 3.3.2 Certificate Properties

Certificate properties are defined in the RDN **CN** or in RDN **pseudonym** of the subject DN of a SuisseID certificate as follows:

| SuisseID QC | (Qualified Signature) |
| SuisseID IAC | (Authentication) |

The property is appended to the last character of the certificate owner's name with a leading blank character. For example:

```
CN=Hans Muster (Qualified Signature)
CN=Hans Muster (Authentication)
pseudonym=Roger Rabbit (Qualified Signature)
pseudonym=Roger Rabbit (Authentication)
```

### 3.3.3 Names

#### 3.3.3.1 Subject DN

With the exception of a certificate's **property**, Subject DN is identical in both certificates of the set. It consists at least of the certificate owner's name and SuisseID number or the certificate owner's pseudonym and SuisseID number.

---

² RFC 3739 [9], chapter 3.1.2. SuisseID certificates use the *serialNumber* attribute solely for the SuisseID number.
³ Order of appearance acc. to the directory of certified bodies that comply with ZertES (Bundesgesetz über die elektronische Signatur). See http://www.seco.admin.ch/sas/00229/00251/index.html?lang=en
The name is provided in RDN CN⁴, the pseudonym in RDN pseudonym⁵, and SuisseID number in RDN serialNumber⁶. Additional RDNs can be added according to the guidelines of the CSPs. They can appear in any order.

Example certificate set 1:

CN=Hans Muster (Qualified Signature), serialNumber=1000-9384-9341-8453
CN=Hans Muster (Authentication), serialNumber=1000-9384-9341-8453

Example certificate set 2:

pseudonym=Roger Rabbit (Qualified Signature),
serialNumber=1000-2948-2300-0077

pseudonym=Roger Rabbit (Authentication),
serialNumber=1000-2948-2300-0077

Example certificate set 3:

CN=Hans Muster (Qualified Signature),
serialNumber=1000-2284-9341-8489,
C=CH, O=Fabro SA, emailAddress=muster@mail.ch

CN=Hans Muster (Authentication),
serialNumber=1000-2284-9341-8489,
C=CH, O=Fabro SA, emailAddress=muster@mail.ch

3.3.3.2 Email Addresses

Usage of the email address is OPTIONAL. If they are used, email information MUST be identical in both certificates of the set as far as naming, quantity and coding are concerned. They MAY be written into RDN emailAddress⁷ within Subject DN (deprecated) and / or as a rfc822Name within subjectAltName (recommended).

3.3.4 Dealing with Representatives

If the certificate owner happens to be a representative of a legal body or organisation according to article 5, paragraph 2 of VZertES [2], then the CSP MUST make sure that the legal entity specified in the appropriate attributes is capable of revoking the SuisseID certificates at any time.

Note that other SuisseID certificate sets having the same SuisseID number as the revoked one are not affected by the revocation.

3.4 Technical and Administrative Guidelines for the SuisseID QC

Restrictions, amendments and extensions stated in this chapter apply to the SuisseID QC.

3.4.1 CA Hierarchy – Issuing CA of the SuisseID QC

The CSP MAY issue the SuisseID QC using an issuing CA that has been issuing qualified certificates according to ZertES [1] before.

Alternatively, the CSP MAY issue SuisseID QC using a separate issuing CA just for that purpose. If so, the issuing CA MUST NOT issue anything but SuisseID QC and designated

⁴ OID = 2.5.4.3
⁵ OID = 2.5.4.65
⁶ OID = 2.5.4.5
⁷ OID=1.2.840.113549.1.9.1
OCSP responder certificates\(^8\). In this case the issuing CA's certificate object identifier for CertPolicyId is anyPolicy\(^9\).

### 3.4.2 SuisseID QC Format

**Amendment to chapter 3.4.2, paragraph b) of TAV-ZertES [3] (“Format der Zertifikate der Inhaberinnen und Inhaber”)**

According to article 7, ZertES [1] and RFC 5280 [6], chapter 4.1, the CSP **MUST** append the fields below to the tbsCertificate sequence:

<table>
<thead>
<tr>
<th>Description</th>
<th>Field</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validity of the certificate</td>
<td>validity</td>
<td>According to RFC 5280 [6], chapter 4.1.2.5: a maximum of three years.</td>
</tr>
<tr>
<td>Name or pseudonym</td>
<td>subject</td>
<td>According to RFC 3739 [9], chapter 3.1.2. See also 3.3.3.1 for certificate properties (qualified signature).</td>
</tr>
<tr>
<td>SuisseID number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>specific attributes about the owner, if required</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 3.4.3 Tagging of the SuisseID QC

SuisseID QC issued on the basis of the guidelines in this document **MUST** provide the following explicitText in the field UserNotice of PolicyInformation:

```
SuisseID qualified certificate
```

as either an ASN.1 IA5String or an ASN.1 VisibleString.

The object identifier for CertPolicyId\(^10\) is managed by the organisation responsible of governing SuisseID\(^10\) and usage of it is restricted to identify SuisseID QC\(_s\) that comply with the guidelines in this document.

\[\text{OID} = 2.16.756.5.26.1.1.1\]

The CSP **MAY** add more PolicyInformation to CertificatePolicies.

### 3.4.4 SuisseID QC Format Extensions (REQUIRED)

**Amendment to chapter 3.4.2, paragraph c) of TAV-ZertES [3] (“Format der Zertifikate der Inhaberinnen und Inhaber”)**

According to RFC 5280 [8], chapter 4.2, the CSP **MUST** add the following to the tbsCertificate sequence:

---

\(^8\) According to RFC 2560, chapter 4.2.2.2  
\(^9\) OID=2.5.29.32.0  
\(^10\) By the time of this writing, SECO is that organisation
### 3.4.5 SuisseID QC Format Extensions (OPTIONAL)

According to RFC 5280 [8], chapter 4.2, the CSP MAY append the fields below to the tbsCertificate sequence:

<table>
<thead>
<tr>
<th>Description</th>
<th>Critical</th>
<th>Extension Name</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email Address</td>
<td>no</td>
<td>subjectAltName</td>
<td>According to RFC 5280 [6], chapter 4.2.1.6: rfc822Name {0..n}</td>
</tr>
<tr>
<td>Admission</td>
<td>no</td>
<td>admission</td>
<td>According to Common PKI Specification V2.0 [5], chapter 3.1, Table 29b: admission {0, 1} Usage of this extension is defined in 3.4.6</td>
</tr>
</tbody>
</table>

The CSP MAY append other extensions.

The CSP MUST verify the content of each extension in an auditable fashion.

### 3.4.6 Admission

The SuisseID QC MAY contain an admission. It MUST NOT contain more than one admission. It is up to the admission authority to define the appropriate attributes.

The specification of these attributes MUST be published at no charge.
3.4.6.1 Admission Authority

The certificate owner's admission **MUST** be confirmed by a competent body, the admission authority. The admission authority **MUST** appear in directoryName of the admissionAuthority attribute (see [5], Table 29b, #4) using the following attributes in the order listed below:

- `organizationName`: Name of admission authority;
- `countryName`: Country of the admission authority;
- `postalAddress`: Address of the admission authority.

The admission authority **MAY** define additional attributes.

3.4.6.2 Admission

The certificate owner's admission **MUST** be provided as an UTF8String using the professionItems attribute (see [5], Table 29b, #16) within directoryName. Additionally, the admission's OID **MUST** be provided using the profession0IDs attribute (see [5], Table 29b, #17)

The admission authority **MAY** define additional attributes.

3.4.6.3 Dealing with outdated admissions

In order to handle outdated admissions the CSP **MUST** make sure that the admission authority specified in the appropriate attributes is capable of revoking the SuisseID certificates at any time.
3.4.7 Example

The following is a sample extract of a SuisseID QC using ASN.1. The certificate owner is a notary. The admission is approved by an admission authority called Sample Notary Admission.

```
SEQUENCE {
  OBJECT IDENTIFIER admission (1 3 36 8 3 3)
  --id-commonpki-at-admission
  OCTET STRING, encapsulates {
    SEQUENCE {
      admissionAuthority, directoryName [4]
      [4] {
        SEQUENCE {
          --Name of the admission authority
          SEQUENCE {
            OBJECT IDENTIFIER organizationName (2 5 4 10)
            UTF8String 'Sample Notary Admission'
          }
        }
        SET {
          --Country of the admission authority
          SEQUENCE {
            OBJECT IDENTIFIER countryName (2 5 4 6)
            PrintableString 'CH'
          }
        }
        SET {
          --Address of the admission authority
          SEQUENCE {
            OBJECT IDENTIFIER postalAddress (2 5 4 16)
            SEQUENCE {
              UTF8String 'Strassenname 7'
              UTF8String '8645 Jona'
              UTF8String 'CH'
            }
          }
        }
      }
    }
  }
}
```
3.5.1 Audit

Amendment to chapter 3.2, paragraph d) of TAV-ZertES [3] ("Organisation und operative Grundsätze")

Internal audit reports **MUST** capture any deviations from the above documents.

Audit reports **MUST** be archived.

In addition to the documents listed in TAV-ZertES [3] chapter 3.2 paragraph c), the CSP **MUST** include the technical and administrative guidelines into their yearly internal compliance audits. Detected shortcomings **MUST** be corrected using adequate measures.

Audit reports including all references may be demanded by the organisation responsible of governing SuisseID\(^\text{12}\) at any time.

3.5.2 Secure Signature Creation Device

Supersedes chapter 3.3.3, paragraph b) of TAV-ZertES [3] ("Sichere Signaturerstellungseinheiten")

Certification of a secure signature creation device requires either

- conformance to FIPS 140-1 [10] or FIPS 140-2 [11], level 3 or above;
- or alternatively, cover examination level EAL 4 of ISO/IEC 15408:2005 [12], increased by the vulnerability assessment element AVA_MSU.3 (vulnerability assessment, analysis and testing of insecure states) and AVA_VLA.4 (vulnerability assessment, highly resistant);
- or alternatively, cover examination level E3 high of ITSEC [13];
- or alternatively, comply with the guidelines of article 6, paragraph 2 of ZertES [1], along with the guidelines defined in chapter 3.3.3, paragraph a) of TAV-ZertES [3] in an auditable fashion.

3.5.3 CA Hierarchy – Issuing CA of the SuisseID IAC

The CSP issues the SuisseID IAC using a SuisseID IAC issuing CA. That SuisseID IAC issuing CA **MUST NOT** issue anything but SuisseID IAC and designated OCSP responder certificates\(^\text{13}\). The issuing CA's certificate object identifier for CertPolicyId is anyPolicy\(^\text{14}\).

The CSP **MAY** add more PolicyInformation to CertificatePolicies.

3.5.4 SuisseID IAC Format

Amendment to chapter 3.4.2, paragraph b) of TAV-ZertES [3] ("Format der Zertifikate der Inhaberinnen und Inhaber")

According to article 7, ZertES [1] and RFC 5280 [6], chapter 4.1, the CSP **MUST** append the fields below to the tbsCertificate sequence:

---

\(^{12}\) By the time of this writing, SECO is that organization.

\(^{13}\) According to RFC 2560, section 4.2.2.2

\(^{14}\) OID=2.5.29.32.0
<table>
<thead>
<tr>
<th>Description</th>
<th>Field</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object identifier of the signing algorithm used for signing the certificate</td>
<td>signature</td>
<td>According to RFC 5280 [6], chapter 4.1.2.3 and RFC 3279 [7]: sha-1WithRSAEncryption or stronger algorithm MUST be used according to RFC 4055 [14], chapter 5.</td>
</tr>
<tr>
<td>Validity of the certificate</td>
<td>validity</td>
<td>According to RFC 5280 [6], chapter 4.1.2.5: a maximum of three years.</td>
</tr>
<tr>
<td>Name or pseudonym</td>
<td>subject</td>
<td>According to RFC 3739 [9], chapter 3.1.2. See also 3.3.3.1 for certificate properties (identification and authentication).</td>
</tr>
<tr>
<td>SuisseID number</td>
<td>subjectPublicKeyInfo</td>
<td>According to RFC 5280 [6], chapter 4.1.2.7 and RFC 3279 [7]: rsaEncryption with a minimal modulus-length of 2048 bit.</td>
</tr>
</tbody>
</table>

### 3.5.5 Tagging of the SuisseID IAC

SuisseID IAC issued on the basis of the guidelines in this document MUST provide the following explicitText in the field UserNotice of PolicyInformation:

SuisseID identity and authentication certificate as either an ASN.1 IA5String or an ASN.1 VisibleString.

The object identifier for CertPolicyId is managed by the organisation responsible of governing SuisseID and usage is restricted to identify SuisseID IACs that comply with the guidelines in this document.

OID = 2.16.756.5.26.1.1.2

The CSP MAY add more PolicyInformation to CertificatePolicies.

### 3.5.6 SuisseID IAC Format Extensions (REQUIRED)

According to RFC 5280 [6], chapter 4.2, the CSP MUST append the fields below to the tbsCertificate sequence:

\^{15} sha256WithRSAEncryption is recommended.

\^{16} By the time of this writing, SECO is that organization.
<table>
<thead>
<tr>
<th>Description</th>
<th>Critical</th>
<th>Extension Name</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key identifier of the CSP's key used to sign the certificate</td>
<td>no</td>
<td>authorityKeyIdentifier</td>
<td>According to RFC 5280 [6], chapter 4.2.1.1.</td>
</tr>
<tr>
<td>Identifier of subject public key</td>
<td>no</td>
<td>subjectKeyIdentifier</td>
<td>According to RFC 5280 [6], chapter 4.2.1.2.</td>
</tr>
<tr>
<td>Certificate scope</td>
<td>yes</td>
<td>keyUsage</td>
<td>According to ITU-T X.509 [7], chapter 8.2.2.3 and RFC 5280 [6], chapter 4.2.1.3: Set bit 0 alone (digital signature).</td>
</tr>
<tr>
<td>Certificate policy and scope, if required</td>
<td>no</td>
<td>certificatePolicies</td>
<td>According to RFC 5280 [6], chapter 4.2.1.4. Use of the certificatePolicies extension is specified in 3.5.5.</td>
</tr>
<tr>
<td>Revoked certificates distribution point</td>
<td>no</td>
<td>cRLDistributionPoints</td>
<td>According to ITU-T X.509 [8], chapter 8.6.2.1 and RFC 5280 [6], chapter 4.2.1.13: Field reasons MUST NOT appear. DistributionPoints MUST specify DistributionPointName of type uniformResourceIdentifier using the HTTP protocol. Field cRLIssuer MUST NOT appear. More DistributionPoints MAY be added.</td>
</tr>
<tr>
<td>CSP certificate access</td>
<td>no</td>
<td>AuthorityInformationAccess</td>
<td>According to RFC 5280 [6], chapter 4.2.2.1.</td>
</tr>
</tbody>
</table>
| Extended certificate scope                                                 | no       | ExtendedKeyUsage         | According to RFC 5280 [6], chapter 4.2.1.3, the following OID MUST be set: id-kp-clientAuth according to RFC 5280 [6], chapter 4.2.1.12  
If a Microsoft UPN for Windows Logon is set in subjectAltName, the following MUST be set: Smart Card Logon\(^\ast\) \{0, 1\} 
The CSP MAY set additional OIDs. |

\(^\ast\) OID = 1.3.6.1.4.1.311.20.2.2
3.5.7 SuisseID IAC Format Extensions (OPTIONAL)

Amendment to chapter 3.4.2, paragraph c) of TAV-ZertES [3] (“Format der Zertifikate der Inhaberinnen und Inhaber”)

According to RFC 5280 [8], chapter 4.2, the CSP MAY append the fields below to the tbsCertificate sequence:

<table>
<thead>
<tr>
<th>Description</th>
<th>Critical</th>
<th>Extension Name</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email Address</td>
<td>no</td>
<td>subjectAltName</td>
<td>According to RFC 5280 [6], chapter 4.2.1.6: rfc822Name {0..n}</td>
</tr>
<tr>
<td>Microsoft UPN for Windows Logon</td>
<td>no</td>
<td>subjectAltName</td>
<td>According to RFC 5280 [6], chapter 4.2.1.6: User Principal Name¹⁸ {0, 1} Usage of User Principal Name extension is specified in 3.5.8</td>
</tr>
</tbody>
</table>

The CSP MAY append other extensions and it MUST verify the content of each extension in an auditable fashion.

3.5.8 Microsoft UPN for Windows Logon

Within this specification the Microsoft UPN for Windows Logon is specified as the concatenation of the SuisseID number (as found in the RDN “Serial” of the Subject DN) and the constant string “@upn.suisseid.ch”.

The CSP MUST NOT use Microsoft User Principal Name in any other way.

The following is an example of a valid Microsoft User Principal Name according to the rules outlined above:

1000-2284-9341-8489@upn.suisseid.ch

The owner of the domain suisseid.ch MUST ensure that there will never be a DNS record of any type for upn.suisseid.ch.

3.6 Administration of the IAC issuing certificate with the CSP

Supersedes chapter 3.4.3, paragraph d) of TAV-ZertES [3] (“Verwaltung des für die Ausstellung qualifizierter Zertifikate verwendeten Zertifikats der CSP”)

With regard to its own certificates, the CSP MUST ensure presence of the following non-critical extensions in the tbsCertificate sequence in compliance with RFC 5280 [6], chapter 4.2:

- authorityKeyIdentifier;
- subjectKeyIdentifier;
- certificatePolicies;
- cRLDistributionPoints.

Supersedes chapter 3.4.3, paragraph e) of TAV-ZertES [3] (“Verwaltung des für die Ausstellung qualifizierter Zertifikate verwendeten Zertifikats der CSP”)
Section e) is not relevant to the SuisseID IAC.
4 Core Infrastructure Services Specification

4.1 Purpose of this Chapter

This chapter specifies the SuisseID core infrastructure, a set of protocols and services to enable users of the SuisseID to authenticate and disclose personal data in a highly secure and reliable way. The core infrastructure is a partial implementation of the SuisseID Claim Assertion Infrastructure CAI.

4.2 SuisseID Claim Assertion Infrastructure

4.2.1 Overview

![Claim Assertion Infrastructure](image)

SuisseID certificates contain only little personal data. In order to provide the particulars of the certificate owner to services and applications in the internet, additional services are required. The SuisseID specifications comprise the definition of a set of protocols and interfaces for the disclosure of personal data, called the *Claim Assertion Infrastructure CAI*.

4.2.2 Building Blocks

The CAI is a framework comprised of four building blocks:

1) The **Core Infrastructure** consists of two distinct services:

   2) *Identity Provider (IdP)*. An authentication authority according to the SAML 2.0 standards [17]. Its purpose is to confirm identity by means of SAML 2.0 assertions;
3) **Claim Assertion Service (CAS).** Attribute authorities according to the SAML 2.0 standards acting as distributors of SAML 2.0 attribute assertions.

4) **Client/User:** Recent browser technology is required to support the web frontend usage pattern (Web SSO and web-based attribute query). Other usage patterns can be applied, such as document signing and *Identity Selectors* that support the information card paradigm using WS-Trust identity and attribute assertions [18];

5) **Applications:** Service Providers integrate services and applications into the CAI, possibly taking advantage of the rich functionality offered by the IdP/CAS. For Web SSO and web-based attribute queries, applications will use SAML 2.0 HTTP POST profile;

6) **Directory- & Assertion Services:** Directory and database providers may introduce additional IdP and CAS services to provide business-relevant assertions about the certificate owner, like “the person is a registered notary” or “the person is a registered medical doctor”.

### 4.2.3 Design Guidelines

A number of basic principles have guided the design of the CAI.

- **User centric approach** – Access to confidential personal data stored in the IdP and CAS is granted to the user exclusively. It is impossible for an application to discover personal data or get access to them without the certificate owner being actively involved in the retrieval process;

- **Use of open standards** – The CAI defines a set of interfaces and protocols with no prescription about the implementation. Protocols and interfaces are based on open standards such as SAML 2.0 [17] and WS-Trust [18];

- **Platform independency** – The CAI is a platform-independent framework. There is no demand for a specific computer system, architecture, processor, or operating system;

- **Decentralised approach** – The CAI is designed to work as a decentralised system with no requirement for a common, central service. This approach is key to the architecture and guarantees maximum decoupling. Clients, applications and directories can join or leave the CAI without breaking it. The providers of the CAI services constitute a loosely coupled system with only few direct links (interfaces and communication channels). Instead, format conventions and trust relations are being used;

- **Extensibility** – The CAI requires at least one IdP/CAS. However, the CAI is designed such that it can incorporate further IdP and CAS providers. They may be integrated freely with no need for accreditation or special validation procedures.

### 4.3 Core Infrastructure

#### 4.3.1 Overview

The core infrastructure comprises one IdP and one CAS. There **MUST** be at least one IdP/CAS. The IdP/CAS **MAY** be shared by several CSPs, each of which supplies the particulars of its customers – the certificate owners – to feed the database. Alternatively, a CSP **MAY** operate a separate IdP/CAS of its own, thus adding another IdP/CAS to the core infrastructure landscape.

*In support of the SuisseID core infrastructure, CSPs issuing qualified certificates according to ZertES probably re-use elements of the PKI they operate to a large extent.*
As of today, each CSP runs a sophisticated infrastructure comprising a Certification Authority (CA), a Registration Authority (RA), LDAP-based directories, a Time Stamping Authority (TSA) and card management processes to handle and release tokens, cards and certificates.

In order for the core infrastructure to function properly, the CSP …

- MUST adapt or extend their RA, CA and card management infrastructure to accomplish full conformance to the specifications in this document;
- MUST run a Certificate Owner Database of its own (see below);
- MUST either operate an IdP of its own (see 4.4) or supply customer data to an IdP operated elsewhere;
- MUST either operate a CAS of its own or supply customer data to a CAS operated elsewhere.

The Certificate Owner Database is used to store the particulars of SuisseID customers – the certificate owners – as a set of attributes. The Certificate Owner Database is the data foundation to feed the core IdP/CAS no matter where the IdP/CAS is being operated.

Information stored in the Certificate Owner Database must be comprehensible and correct. The CSP is responsible of taking appropriate measures to ensure correctness and consistency of the data (see 4.6.3.2).

The core infrastructure (combined IdP/CAS) MUST be supported by the CSP along with compliance to the SuisseID certificate specifications outlined in Chapter 3 of this document. It can do so by operating a separate IdP/CAS of its own or join a shared IdP/CAS.

### 4.3.2 Core Components

The core Identity Provider (IdP)

- MUST be based on SAML 2.0;
- MUST provide SAML tokens (SAML 2.0 assertions) that confirm identity;
- REQUIRES the SuisseID IAC to authenticate;
- MUST provide SAML 2.0 Web Browser SSO profile with HTTP POST binding;
- MUST provide a WS-Trust 1.3 Security Token Service (STS).

The core Claim Assertion Service (CAS) …

- MUST be operated in the presence of a core IdP (no stand-alone);
- MUST be based on SAML 2.0;
- MUST provide attribute assertions (SAML tokens to approve certain attributes);
- REQUIRES the SuisseID IAC to authenticate;
- MUST provide SAML 2.0 Web-based attribute authority with HTTP POST binding;
- MUST provide a WS-Trust 1.3 Security Token Service (STS).
The core infrastructure **MUST** support SAML 2.0 Web Browser SSO and a SAML 2.0 Web based attribute authority including the appropriate Web interfaces.

A WS-Trust 1.3 based security token service (STS) **MUST** be provided in addition.

Core IdP and core CAS are two distinct concepts. However, they will most likely be combined into a single service, called the *Extended IdP*.

For both core interfaces, core IdP and core CAS, SuisseID certificates **MUST** be used for authentication.

Core IdP and core CAS **MUST NOT** use anything but the SuisseID IAC for authentication.

The architecture is capable of dealing with a single, shared core IdP instance as well as with many core IdP instances running at the same time.

A shared IdP may serve many CAs. If this is the case, each CSP **MUST** supply the registration data – the particulars of the certificate owners – to the operator of the shared IdP.
4.4 Core Identity Provider (IdP)

This chapter describes a sample IdP component architecture.

4.4.1 Overview

The IdP (Identity Provider) is based on SAML 2.0. As a minimal requirement, it consists of the following sub-components (see figure above):

- **Federation core** – Central federation subcomponent for the creation of SAML assertions and the administration of trust relationships;
- **Web FE** – Web frontend interface for Web-SSO, interactive and non-interactive;
- **STS** – WS-Trust based Security Token Service;
- **AuthN** - Authentication subcomponent used by STS as well as by web frontend;
- **Certificate Owner Data** – The source of all IdP attributes.

An IdP can be combined with a CAS to constitute a so-called **Extended IdP**. In this case the following components are added:

- **Attribute** – attribute subcomponent issuing attribute assertions that can be used by the STS and the web frontend;
- **Other Certificate Owner Data** – one or several databases or directories containing additional verified user information (SuisseID assertion attributes, see 4.6.3).
4.4.2 Functionality

4.4.2.1 Issuance of Authentication Assertions

Authentication assertions are used to authenticate against a Service Provider. The IdP provides authentication assertions using either of the two interfaces below after successful authentication with the SuisseID IAC:

- Web frontend for SAML 2.0 Web Browser SSO
- WS-Trust based STS

In either case, Web frontend for SAML 2.0 Web Browser SSO and WS-Trust based STS, authentication with the SuisseID IAC MUST use SSL/TLS client certificate authentication.

4.4.2.2 Issuance of Combined Assertions

When requesting an authentication assertion, other attributes may be requested in addition. In such a case the IdP sends a combined assertion (see 4.6.1.2). This usage pattern constitutes the Extended IdP.

The core infrastructure MUST support combined assertions.

4.4.3 Authentication Scenario

As a sample use case, let the certificate owner authenticate at a Service Provider that requires additional user data not delivered with the IdP authentication assertion. Working in extended IdP mode, the IdP provides the requested attributes along with the authentication statement to the Service Provider using a combined assertion.

In order to use the assertion, the Service Provider needs to trust the issuing IdP. To every SuisseID certificate there is exactly one IdP capable of providing attribute assertions for it.

In a world where there is one IdP shared by all CSPs, every SuisseID certificate, regardless of the CSP issuing it, is bound to the shared IdP and assertions will always be obtained by this one and there is only one core IdP to trust for the Service Provider.

In the presence of more than one IdP Service Providers are almost forced to trust all of them. Another challenge Service Providers face is to find out which of the IdPs to use for authentication. One option is to let the user specify the IdP (see 4.10.1.2). Another way is to let the user authenticate with the Service Provider in the first place. Doing so will disclose the necessary information from the certificate to find out the appropriate IdP.

The predominant use case is to start the user session with the Service Provider. This is called SP first according to SAML 2.0.

Each core IdP MUST support the SP first scenario.

The user is required to authenticate with the IdP. After authentication with the IdP, the user is re-directed to the URL that was used in the initial service request with the Service Provider. To the user, external authentication with the IdP and re-direction to the Service Provider are handled in a fully transparent way.
4.4.4 Interfaces

4.4.4.1 SAML 2.0 based Web Frontend for Authentication and Combined Assertions
The web frontend MUST present the contents of the assertion to the user and it MUST support SAML 2.0 Web Browser SSO profile with POST binding as a minimal requirement. See 4.9.1 for the technical interface specifications using SAML 2.0 Web Browser SSO.

4.4.4.2 WS-Trust STS for Authentication and Combined Assertions
The WS-Trust service is responsible of providing authentication and combined assertions. See 4.9.2 for technical interface specifications using WS-Trust 1.3 STS.

4.5 Claim Assertion Service (CAS)

4.5.1 Overview
This chapter describes a sample Claim Assertion Service sub-component architecture.

The Claim Assertion Service (CAS) is based on SAML 2.0. As a minimal requirement, it consists of the following sub-components (see figure above):

- **Federation core** – central federation subcomponent for the creation of SAML assertions and the administration of trust relationships;
- **Web FE** – Web frontend interface for interactive Web-SSO;
- **STS** – WS-Trust based Security Token Service;
- **Other certificate owner data** – one or several databases or directories containing user information.
- A CAS is an additional component to the IdP. It can be combined with the IdP to constitute the so-called Extended IdP (see 4.4.1).

4.5.2 Issuance of Attribute Assertions
SAML 2.0 assertions with no authentication statement are called attribute assertions. They are used for the assertion of personal data, such as the date of birth or passport number, or others. Attribute assertions can be derived or aggregated from other information. For example, a derived assertion saying “the user is at least 18 years old” can be deduced from the date of birth and the current date.
4.5.3 Controlling Distribution of Attributes and Profiles

When the Claim Assertion Service (CAS) submits the SAML 2.0 assertion to the Service Provider, the SuisseID number is provided along with the attributes. Generally, the source of attributes is a database or directory accessible by the CAS. In case of the core CAS, those attributes contain the particulars of a person gathered during user registration.

A core CAS **MUST** provide the set of attributes according to chapter 4.6.3 of this document.

Service Providers may request some or all of the attributes available from the CAS. The ultimate decision to deliver them is up to the user (certificate owner). He can acknowledge them all at once or restrict to a smaller set or decline at all.

See 4.10.1.6 for a description of how Service Providers request specific attributes from a CAS, and 4.9.2.3 for the WS-Trust based STS.

In case of Web SSO and web based attribute authority, the core IdP/CAS **MUST** provide an appropriate user web interface for the purpose of controlling what core attributes to submit to the Service Provider and to acknowledge submission (see 4.10.1.4).

4.5.4 Interfaces

4.5.4.1 SAML 2.0 based Web Frontend for Attribute Assertions

The web frontend **MUST** present the contents of the assertion to the user. In addition it **MUST** support SAML 2.0 HTTP POST binding (see 4.9.1, SAML 2.0 Web Browser SSO and Attribute Requests with HTTP POST).

4.5.4.2 WS-Trust STS

The WS-Trust STS (Secure Token Service) of the CAS is expected to provide attribute assertions (see 4.9.2, WS-Trust 1.3 STS for a technical interface specification).

In practice, the WS-Trust STS of the SuisseID core CAS will always be combined with the SuisseID core IdP to provide combined assertions (see 4.9.2, WS-Trust 1.3 STS for a technical interface specification).

4.6 Protocols and Interfaces

4.6.1 SAML 2.0

4.6.1.1 Overview

SAML (Security Assertion Markup Language) is an XML framework for exchanging authentication- and authorisation information. It provides functions for describing and sending security related information.

**OASIS SAML 2.0 is the technological basis of the Claim Assertion Infrastructure.**

4.6.1.2 Types of Assertions

SAML specifies a set of assertion statements that can be issued by a SAML authority (IdP/CAS), including Authentication Statement, Attribute Statement, and Authz Decision Statement. From these assertion statements, new assertion types can be built and combined with a subject. In a SuisseID context, the following assertion types are relevant: authentication assertion, attribute assertion, and combined assertion.
4.6.1.3 Username in the SAML Assertion - NameID Format

An important constituent of SAML assertions is the UserID. SAML 2.0 supports a couple of ways to manage UserID in the IdP and the Service Provider, anonymous and temporary users being among the options. As they are of no use in a SuisseID context they are not elaborated further. Instead, SuisseID specifies its own definition of NameID, based on the "unspecified" NameID format of SAML 2.0.

SuisseID uses a NameID with the following syntax:

XXXX-XXXX-XXXX-XXXX  (for example: 1234-5678-9012-3456)

The term "unspecified" indicates that there is a NameID format agreement between IdPs and Service Providers and that none of the predefined NameID formats (transient, persistent, emailAddress, ...) has been used.

Service Providers operating in a SuisseID environment use the SuisseID number as the user identification in SAML requests.

Usage of NameID is illustrated in the example below:

```xml
<saml:Subject>
  <saml:NameID Format="urn:oasis:names:tc:SAML:1.1:nameid-format:unspecified">
    1234-5678-9012-3456
  </saml:NameID>
</saml:Subject>
```

4.6.2 XML Namespaces

4.6.2.1 Referenced Namespaces

The CAI specifications reference the following prefixes and XML namespaces:
### Table: Referenced XML Namespaces

<table>
<thead>
<tr>
<th>Prefix</th>
<th>XML Namespace</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>eCH-0113</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1">http://www.ech.ch/xmlns/eCH-0113/1</a></td>
<td>Schema of this specification (see)</td>
</tr>
<tr>
<td>ic</td>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity">http://schemas.xmlsoap.org/ws/2005/05/identity</a></td>
<td>Identity Metasystem Interoperability Schema</td>
</tr>
<tr>
<td>icc</td>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims">http://schemas.xmlsoap.org/ws/2005/05/identity/claims</a></td>
<td>Claims Schema</td>
</tr>
<tr>
<td>md</td>
<td>urn:oasis:names:tc:SAML:2.0:metadata</td>
<td>SAML V2.0 metadata namespace</td>
</tr>
<tr>
<td>saml</td>
<td>urn:oasis:names:tc:SAML:2.0:assertion</td>
<td>SAML V2.0 assertion namespace [SAMLCore]</td>
</tr>
<tr>
<td>samlp</td>
<td>urn:oasis:names:tc:SAML:2.0:protocol</td>
<td>SAML V2.0 protocol namespace</td>
</tr>
<tr>
<td>wsa</td>
<td><a href="http://www.w3.org/2005/08/addressing">http://www.w3.org/2005/08/addressing</a></td>
<td>WS-Addressing Schema</td>
</tr>
<tr>
<td>xs</td>
<td><a href="http://www.w3.org/2001/XMLSchema">http://www.w3.org/2001/XMLSchema</a></td>
<td>XML Schema</td>
</tr>
<tr>
<td>xsi</td>
<td><a href="http://www.w3.org/2001/XMLSchema-instance">http://www.w3.org/2001/XMLSchema-instance</a></td>
<td>XML Schema: Structures</td>
</tr>
<tr>
<td>XAdES</td>
<td><a href="http://uri.etsi.org/01903/v1.1.1#">http://uri.etsi.org/01903/v1.1.1#</a></td>
<td>XML Advanced Electronic Signatures Schema</td>
</tr>
</tbody>
</table>

The prefixes listed in the table above are used in the examples of the CAI specifications.

In the example CAI specifications the declarations that map XML namespaces to prefixes have been omitted to improve readability.

### 4.6.2.2 SuisseID XML Namespace

The following XML is applied: http://www.ech.ch/xmlns/eCH-0113/1

The SuisseID XML namespace is referenced as follows: xmlns:eCH-0113=http://www.ech.ch/xmlns/eCH-0113/1
4.6.3 Assertion Attributes

4.6.3.1 Overview

Attributes are used to describe the characteristics of an identity. Attributes have a type and a well-defined syntax and semantic. SuisseID assertion attributes are issued by the IdP/CAS as part of a SAML 2.0 assertion. In order to map them to local attributes, Service Providers rely on the naming convention specified in this section.

4.6.3.2 SuisseID IdP/CAS Core Assertion Attributes

Core assertion attributes represent the following personal data:

- Identity card data (ICD): data found in a Swiss ID card or passport and stored in the Certificate Owner’s Database.
- Registration process data (RPD): a well-known set of additional attributes gathered during the registration process (e.g. email address). These attributes are provided in the CAS and are added to the subject of the SuisseID certificates. The attribute values MUST be identical.

RPD has been introduced in the version 1.5 of the SuisseID specification to support use cases, where SP trust the IdP for authentication. In this case, the SP never receives the IAC of the SuisseID and therefore cannot read the attributes from the certificate through the core CAS.

The core IdP/CAS MUST support all of the core assertion attributes specified in this specification.

Core assertion attributes are divided into three categories:

- Plain core assertion attributes (see 4.6.3.3)
- QC signed core assertion attributes (see 4.6.3.4)
- Derived core assertion attributes (see 4.6.3.5)

Derived core attributes are used to assert properties that are derived from the source attributes, like “IsOver18”. The specifications define five derived core attributes and the core IdP/CAS MUST provide them all.

Each of the non-derived identity card based core assertion attributes MUST be provided in two flavors:

1) As a plain core assertion attribute. For improved interoperability, the attribute value as such is not signed (see 4.6.3.3);
2) As a QC signed core assertion attribute. The attribute value MUST be signed using the CA’s QC (see 4.6.3.4);

As both versions of an attribute originate from the same source, their contents MUST be the same (except for the signature).

The core CAS MAY provide more attributes using an appropriate naming convention.

The following rules apply for the definition of attribute names, namespaces and syntax:
- Names used in applications **MUST** have a well defined type and namespace;
- *FriendlyName* **SHALL** be short and descriptive. It is translated into German, French, and Italian for the display of the core assertion attributes (for example in the IdP attribute selection and confirmation dialog box, see 4.10.1.4). For each attribute there is an additional description available in German, French, Italian, and English;
- For interoperability reasons, attributes are taken from the Identity Metasystem Interoperability (IMI) specification [19], whenever possible;
- There are attributes for which standard practices are established or whose definitions in the eCH standards are different from those in the Identity Metasystem Interoperability standard. Those attributes have been defined redundantly using separate namespaces. "Date of birth" is an example of a redundant attribute;
- Encoding is UTF-8 unless stated otherwise.

### 4.6.3.3 Plain Core Assertion Attributes

The table below defines the plain IdP/CAS core assertion attributes. The referenced XML schema eCH-0113 is attached in the appendix of this document.

<table>
<thead>
<tr>
<th>Friendly Name</th>
<th>Description</th>
<th>Name</th>
<th>Type</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Given Names</td>
<td>Given names</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/givenNames">http://www.ech.ch/xmlns/eCH-0113/1/givenNames</a></td>
<td>eCH-0113:given-NamesType (sequence of xs:string)</td>
<td>ICD</td>
</tr>
<tr>
<td>First Name</td>
<td>Preferred name or first name of a Subject. Every IdP/CAS <strong>MUST</strong> use the first name appearing in givenNames for this purpose.</td>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/givenname">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/givenname</a></td>
<td>icc:StringMaxLength255MinLength1 (xs:string)</td>
<td>ICD</td>
</tr>
<tr>
<td>Last Name</td>
<td>Surname, Family name</td>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/surname">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/surname</a></td>
<td>eCH-0113:stringMaxLength255Type (xs:string)</td>
<td>ICD</td>
</tr>
<tr>
<td>Date of Birth</td>
<td>If the date is only partially known, this attribute <strong>MUST NOT</strong> be returned.</td>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/dateofbirth">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/dateofbirth</a></td>
<td>xs:date</td>
<td>ICD</td>
</tr>
<tr>
<td>Date of Birth</td>
<td>May be returned in any of the following formats: YYYY or YYYY-MM or YYYY-MM-DD</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/dateOfBirthPartiallyKnown">http://www.ech.ch/xmlns/eCH-0113/1/dateOfBirthPartiallyKnown</a></td>
<td>eCH-0113:datePartiallyKnownType (xs:choice)</td>
<td>ICD</td>
</tr>
<tr>
<td>Place of Birth</td>
<td>Place of birth according to an official identification document. This attribute is not applicable for a Swiss citizen.</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/placeOfBirth">http://www.ech.ch/xmlns/eCH-0113/1/placeOfBirth</a></td>
<td>eCH-0113:stringMaxLength255Type (xs:string)</td>
<td>ICD</td>
</tr>
<tr>
<td>Origin</td>
<td>Place of origin according to Swiss ID card or passport(^{19}). Not applicable for foreigners.</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/origin">http://www.ech.ch/xmlns/eCH-0113/1/origin</a></td>
<td>eCH-0113:stringMaxLength255Type (xs:string)</td>
<td>ICD</td>
</tr>
</tbody>
</table>

\(^{19}\) Swiss ID cards and passports issued before 2003 may contain more than one origin. In such a case, the attribute would contain all of them separated by a semicolon, e.g. “Sion VS; Oberems VS”.

---

Verein eCH, Mainaustrasse 30, Postfach, 8034 Zürich
 T 044 388 74 64, F 044 388 71 80
 info@ech.ch www.ech.ch
<table>
<thead>
<tr>
<th>Friendly Name</th>
<th>Description</th>
<th>Name</th>
<th>Type</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>0: unspecified</td>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/gender">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/gender</a></td>
<td>icc:GenderType (xs:token)</td>
<td>ICD</td>
</tr>
<tr>
<td></td>
<td>1: male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2: female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nationality</td>
<td>ISO 3166-1 alpha-3 codes with modifications (use 000 for stateless persons, use RKS for Kosovars)</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/nationality">http://www.ech.ch/xmlns/eCH-0113/1/nationality</a></td>
<td>eCH-0113:countryIdISO3-Type (xs:token)</td>
<td>ICD</td>
</tr>
<tr>
<td>Identification Number</td>
<td>Number of the identification document, limited to 9 characters, in accordance to the machine readable zone MRZ as defined in [22] (trailing filler characters must be removed).</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/identification">http://www.ech.ch/xmlns/eCH-0113/1/identification</a> Number</td>
<td>eCH-0113:string-MaxLength9Type (xs:string, according to [22] the maximum length is 9)</td>
<td>ICD</td>
</tr>
<tr>
<td>Identification NumberFull</td>
<td>Number of the identification document, limited to 24 characters, in accordance to the visual inspection zone VIZ as defined in [22]</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/identificationNumberFull">http://www.ech.ch/xmlns/eCH-0113/1/identificationNumberFull</a></td>
<td>eCH-0113:string-MaxLength24Type (xs:string, according to [22] the maximum length is 24)</td>
<td>ICD</td>
</tr>
<tr>
<td>Identification Kind</td>
<td>0: Passport</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/identificationKind">http://www.ech.ch/xmlns/eCH-0113/1/identificationKind</a></td>
<td>eCH-0113:identificationKindType (xs:token)</td>
<td>ICD</td>
</tr>
<tr>
<td></td>
<td>1: ID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2: Stateless</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issuing Country</td>
<td>Issuing country for the identification document (see Nationality except for 000)</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/issuingCountry">http://www.ech.ch/xmlns/eCH-0113/1/issuingCountry</a></td>
<td>eCH-0113:countryIdISO3-Type</td>
<td>ICD</td>
</tr>
<tr>
<td>Issuing Office</td>
<td>Issuing Office</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/issuingOffice">http://www.ech.ch/xmlns/eCH-0113/1/issuingOffice</a></td>
<td>eCH-0113:string-MaxLength255Type (xs:string)</td>
<td>ICD</td>
</tr>
<tr>
<td>Identification Issued On</td>
<td>Issuance date of the identification document</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/identificationIssuedOn">http://www.ech.ch/xmlns/eCH-0113/1/identificationIssuedOn</a></td>
<td>xs:date</td>
<td>ICD</td>
</tr>
<tr>
<td>Identification Valid Until</td>
<td>Valid-through date of the identification document</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/identificationValidUntil">http://www.ech.ch/xmlns/eCH-0113/1/identificationValidUntil</a></td>
<td>xs:date</td>
<td>ICD</td>
</tr>
</tbody>
</table>

20 There is no ISO 3166-1 alpha-3 code defined for Kosovo.
21 According to [22] chapter 6.6 the document number can have variable length. The following text is an exact quote from [22]:

The number of characters in the VIZ may be variable; however, if the document number has more than 9 characters, the 9 principal characters shall be shown in the MRZ in character positions 6 to 14. They shall be followed by a filler character instead of a check digit to indicate a truncated number. The remaining characters of the document number shall be shown at the beginning of the field reserved for optional data elements (character positions 16 to 30 of the upper machine readable line) followed by a check digit and a filler character.
Table: Plain Core Assertion Attributes

<table>
<thead>
<tr>
<th>Friendly Name</th>
<th>Description</th>
<th>Name</th>
<th>Type</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-mail Address</td>
<td>Validated e-mail address of the subscriber. MUST be the preferred address for the 'To:' field of email to be sent to the subject and MUST match the email information of the corresponding certificate if they are used.</td>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/emailaddress">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/emailaddress</a></td>
<td>icc:STRINGMaxLength-255MinLength1 (xs:string)</td>
<td>RPD</td>
</tr>
<tr>
<td>Organization Name</td>
<td>Authorized name of the organization</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/organizationName">http://www.ech.ch/xmlns/eCH-0113/1/organizationName</a></td>
<td>eCH-0113:STRINGMaxLength255Type (xs:string)</td>
<td>RPD</td>
</tr>
<tr>
<td>Title</td>
<td>Validated title of the subscriber</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/title">http://www.ech.ch/xmlns/eCH-0113/1/title</a></td>
<td>eCH-0113:STRINGMaxLength255Type (xs:string)</td>
<td>RPD</td>
</tr>
</tbody>
</table>

4.6.3.3.1 Example Core Assertion Attribute

The following is an example SAML 2.0 attribute used to assert eCH-0113:identificationNumber:

```xml
  <xs:element name="sp:assertion">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="eCH-0113:identificationNumber">
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:maxLength value="9"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

4.6.3.3.2 Handling of Unknown Values

The core IdP/CAS MUST provide all of the plain core assertion attributes specified in this specification.

If an attribute value is unknown or not applicable, the core IdP/CAS MUST return the defined exceptional value if there is one defined for it, e.g. "0" in case of icc:gender. If there is no such value defined for the attribute, the IdP/CAS MUST omit the AttributeValue element. The following is an overview of the rules that apply to unknown values of plain core assertion attributes:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Exceptional Value</th>
<th>Handling in the IdP</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/givenNames">http://www.ech.ch/xmlns/eCH-0113/1/givenNames</a></td>
<td>The value is always known for this attribute (no exception here).</td>
<td>The IdP MUST always return an attribute value.</td>
</tr>
<tr>
<td>Attribute</td>
<td>Exceptional Value</td>
<td>Handling in the IdP</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/givenname">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/givenname</a></td>
<td>The value is always known for this attribute (no exception here).</td>
<td>The IdP MUST always return an attribute value.</td>
</tr>
<tr>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/surname">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/surname</a></td>
<td>The value is always known for this attribute (no exception here).</td>
<td>The IdP MUST always return an attribute value.</td>
</tr>
<tr>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/dateofbirth">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/dateofbirth</a></td>
<td>-</td>
<td>The IdP MUST omit the AttributeValue if dateofbirth is not known.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/placeOfBirth">http://www.ech.ch/xmlns/eCH-0113/1/placeOfBirth</a></td>
<td>-</td>
<td>The IdP MUST omit the AttributeValue if placeOfBirth is not applicable.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/origin">http://www.ech.ch/xmlns/eCH-0113/1/origin</a></td>
<td>-</td>
<td>The IdP MUST omit the AttributeValue if origin is not applicable.</td>
</tr>
<tr>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/gender">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/gender</a></td>
<td>0: unspecified</td>
<td>The IdP MUST return the exceptional value 0 in the AttributeValue.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/nationality">http://www.ech.ch/xmlns/eCH-0113/1/nationality</a></td>
<td>The value is always known for this attribute (no exception here).</td>
<td>The IdP MUST always return an attribute value.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/identificationNumber">http://www.ech.ch/xmlns/eCH-0113/1/identificationNumber</a></td>
<td>The value is always known for this attribute (no exception here).</td>
<td>The IdP MUST always return an attribute value.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/identificationNumberFull">http://www.ech.ch/xmlns/eCH-0113/1/identificationNumberFull</a></td>
<td>The value is always known for this attribute (no exception here) for all SuisseID issued under version 1.5 or higher.</td>
<td>For all SuisseID issued under version 1.5 or higher, the IdP MUST always return an attribute value. For all SuisseID issued prior to version 1.5, the IdP MUST omit the AttributeValue.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/identificationKind">http://www.ech.ch/xmlns/eCH-0113/1/identificationKind</a></td>
<td>The value is always known for this attribute (no exception here).</td>
<td>The IdP MUST always return an attribute value.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/issuingCountry">http://www.ech.ch/xmlns/eCH-0113/1/issuingCountry</a></td>
<td>The value is always known for this attribute (no exception here).</td>
<td>The IdP MUST always return an attribute value.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/issuingOffice">http://www.ech.ch/xmlns/eCH-0113/1/issuingOffice</a></td>
<td>-</td>
<td>The IdP MUST omit the AttributeValue if issuingOffice is not known.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/identificationIssuedOn">http://www.ech.ch/xmlns/eCH-0113/1/identificationIssuedOn</a></td>
<td>The value is always known for this attribute (no exception here).</td>
<td>The IdP MUST always return an attribute value.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/identificationValidUntil">http://www.ech.ch/xmlns/eCH-0113/1/identificationValidUntil</a></td>
<td>The value is always known for this attribute (no exception here).</td>
<td>The IdP MUST always return an attribute value.</td>
</tr>
</tbody>
</table>
4.6.3.4 QC Signed Core Assertion Attributes

In addition to the core assertion attributes that are provided by the IdP/CAS "as-is", each of the identity card based, non-derived core assertion attributes MUST be provided in terms of a QC signed core assertion attribute. Those attributes are signed by the CA for increased traceability and trust.

For each certificate owner, the CSP delivers the QC signed assertion attributes to the IdP/CAS. The unsigned, plain core assertion attributes are then generated from the signed ones by the IdP/CAS.

The table below defines the mapping of the plain IdP/CAS core assertion attributes to QC signed IdP/CAS core assertion attributes. The referenced XML schema eCH-0113 can be found in the appendix of this document.

<table>
<thead>
<tr>
<th>Name of Plain Attribute</th>
<th>Name of QC Signed Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/givenName">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/givenName</a></td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/givenNameQc">http://www.ech.ch/xmlns/eCH-0113/1/givenNameQc</a></td>
</tr>
<tr>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/surname">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/surname</a></td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/surnameQc">http://www.ech.ch/xmlns/eCH-0113/1/surnameQc</a></td>
</tr>
<tr>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/dateOfBirth">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/dateOfBirth</a></td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/dateOfBirthQc">http://www.ech.ch/xmlns/eCH-0113/1/dateOfBirthQc</a></td>
</tr>
<tr>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/origin">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/origin</a></td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/originQc">http://www.ech.ch/xmlns/eCH-0113/1/originQc</a></td>
</tr>
<tr>
<td><a href="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/gender">http://schemas.xmlsoap.org/ws/2005/05/identity/claims/gender</a></td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/genderQc">http://www.ech.ch/xmlns/eCH-0113/1/genderQc</a></td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/nationality">http://www.ech.ch/xmlns/eCH-0113/1/nationality</a></td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/nationalityQc">http://www.ech.ch/xmlns/eCH-0113/1/nationalityQc</a></td>
</tr>
</tbody>
</table>
Service Providers MAY use either version of the assertion attribute. The QC signed assertion attribute may be considered safer, whereas a plain assertion attribute taken from the Identity Metasystem Interoperability (IMI) specification [19] is certainly better suited for interoperability.

Service Providers having special security needs may not trust the plain attribute although the SAML assertion was signed using the IdP’s advanced certificate. They SHOULD request the QC signed version of the attribute instead of the plain one (e.g. use eCH-0113:identificationValidUntilQc instead of eCH-0113:identificationValidUntil).

### 4.6.3.4.1 Attribute Binding

In order to be verifiable, QC signed core assertion attributes are bound to the appropriate SuisseID number using the following combined data set:

- **name**: Name of the QC core assertion attribute;
- **suisselIDNo**: SuisseID number of the QC;
- **value**: The actual value of the attribute.

Furthermore, QC signed core assertion attributes are linked to the appropriate QC and IAC. Therefore the following information is part of the attribute as well:

- **certIssuerDnQc** and **certSerialNoQc**: A reference to the QC;
- **certIssuerDnIac** and **certSerialNoIac**: A reference to the IAC.

QC signed core assertion attributes contain the actual QC XML signature and a signed timestamp token according to RFC 3161. This timestamp token is used as a proof that the core assertion attribute existed before the time of stamping.

The QC signed core assertion attributes MUST include the X.509 certificate in the <ds:Key-Info> section.
4.6.3.4.2 Example QC Signed Core Assertion Attribute

The following XML document is a sample QC signed core assertion attribute used to assert the eCH-0113:givennameQc attribute:

```xml
<eCH-0113:signedAttribute>
  <eCH-0113:attribute
    certIssuerDnQc="C=CH, O=SECO, OU=QC, CN=SuisseId-CSP"
    certSerialNoQc="123456"
    certIssuerDnIac="C=CH, O=SECO, OU=IAC, CN=SuisseId-CSP"
    certSerialNoIac="123456"
    name="http://www.ech.ch/xmlns/eCH-0113/1/givennameQc"
    suisseIdNo="1234-1234-1234-1234">
    <icc:givenname>Hans</icc:givenname>
  </eCH-0113:attribute>
  <ds:Signature Id="signature1">
    <ds:SignedInfo>
      <ds:CanonicalizationMethod
        Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
      <ds:SignatureMethod
        Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1" />
      <ds:Reference URI=""
        <ds:Transforms>
          <ds:Transform
            Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature" />
        </ds:Transforms>
        <ds:DigestMethod
          Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
      </ds:Reference>
    </ds:SignedInfo>
    <ds:SignatureValue Id="signatureValue1">VGVzdA==</ds:SignatureValue>
    <ds:KeyInfo>
      <ds:X509Data>
        <ds:X509Certificate>
          [base64 encoded QC]
        </ds:X509Certificate>
      </ds:X509Data>
    </ds:KeyInfo>
    <XAdES:QualifyingProperties Target="#signature1"
      xmlns="http://uri.etsi.org/01903/v1.1.1#">
      <XAdES:UnsignedProperties>
        <XAdES:UnsignedSignatureProperties>
          <XAdES:SignatureTimeStamp>
            <XAdES:HashDataInfo uri="#signatureValue1" [base64 encoded RFC 3161 timestamp token]>
          </XAdES:HashDataInfo>
          <XAdES:EncapsulatedTimeStamp>
            [base64 encoded RFC 3161 timestamp]
          </XAdES:EncapsulatedTimeStamp>
        </XAdES:UnsignedSignatureProperties>
      </XAdES:UnsignedProperties>
    </XAdES:QualifyingProperties>
  </ds:Signature>
</eCH-0113:signedAttribute>
```
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference@URI</td>
<td>In this context, URI=&quot;&quot; identifies the node-set (minus any comment nodes) of the element eCH-0113:signedAttribute containing the signature.</td>
</tr>
<tr>
<td>Element ds:X509Certificate</td>
<td>The X509Certificate element contains the base64-encoded QC of the CA used to sign this core assertion attribute.</td>
</tr>
<tr>
<td>Element XAdES:QualifyingProperties</td>
<td>XML advanced electronic signatures (XAdES) [20] defines properties to qualify the whole signature. In case of QC signed core assertion attributes, this is used to incorporate the RFC 3161 timestamp token.</td>
</tr>
<tr>
<td>Element XAdES:SignatureTimeStamp</td>
<td>Encapsulates the timestamp over the ds:SignatureValue element (base64 encoded RFC 3161 timestamp token).</td>
</tr>
</tbody>
</table>

### 4.6.3.4.3 Handling of Unknown Values

The core IdP/CAS **MUST** provide all of the QC signed core assertion attributes specified in this specification.

If the attribute value is unknown or not applicable, the core IdP **MUST always** return a SAML attribute value of type eCH-0113:signedAttributeType for QC signed core assertion attributes, i.e. the attribute value *always* contains an eCH-0113:attribute element. The value contained in that particular eCH-0113:attribute element is as specified in the "Exceptional Value" column in 4.6.3.3.2.

If no exceptional value is defined for an attribute, the core IdP **MUST** provide an empty eCH-0113:attribute element. Hereby the signature and the attribute binding of the QC signed core assertion attribute are retained.

The following example shows how the eCH-0113:attribute element of the QC signed core assertion attribute eCH-0113:placeOfBirthQc is embedded into the saml:AttributeValue element as an empty element:

```xml
<saml:AttributeValue xsi:type="eCH-0113:signedAttributeType">
  <eCH-0113:attribute>
    certIssuerDnQc="C=CH, O=SECO, OU=QC, CN=SuisseId-CSP"
    certIssuerDnIac="C=CH, O=SECO, OU=IAC, CN=SuisseId-CSP"
    certSerialNoQc="123456"
    certSerialNoIac="123456"
    name="http://www.ech.ch/xmlns/eCH-0113/1/placeOfBirthQc"
    suisseIdNo="1234-1234-1234-1234"/>
  </eCH-0113:attribute>
</saml:AttributeValue>
```

For the attribute identificationNumberFull the IdP/CAS **MUST** omit the AttributeValue for all SuisseID issued prior to Version 1.5 of this specification.
4.6.3.4.4 Validation Checks

The IdP/CAS SHOULD check the qualified signature of QC signed core assertion attributes as well as the integrity of the requested attributes based on the QC signed core assertion attributes before issuing attribute assertions. Additionally, it SHOULD check the OID for Cert-PolicyId according to 4.6.3.4.2. Furthermore the IdP/CAS SHOULD check coherence of the QC signed core assertion attribute timestamp and the certificate's ValidFrom date.

If the date coherence check failed or integrity is broken or an invalid certificate was used to sign a QC signed core assertion attribute, the IdP MUST NOT return the assertion.

Service Providers MAY perform the above checks for their own safety.

4.6.3.5 Quality of Core Assertion Attributes

As a basic rule, Service Providers are responsible of their own assessment for evaluating the quality (whatever that means) of the assertions issued by a CAS.

Trustworthiness is enhanced by the fact that for each core attribute, the Service Provider can ask for the QC signed assertion in order to verify the attribute's origin and integrity.

Operators of the core IdP/CAS MUST conclusively ascertain the correct capturing and immutable storage by providing documented, auditable procedures.

Some of the information in an identification document, like a passport, may change over time and there is a possibility that some of the personal data in a core assertion attribute have become outdated (e.g. last name may have changed after the marriage).

Once stored in the IdP/CAS, core assertion attributes cannot be changed as they are bound to the SuisseID certificate set persistently. Users can obtain a new certificate set at any time, which means they will register anew, yielding a new set of core assertion attributes according to their up-to-date identity card or passport.

Note that obtaining a new certificate set does not affect the assertions that the IdP/CAS issues on the basis of an outdated SuisseID certificate set.

4.6.3.6 Derived Core Assertion Attributes

In addition to the core assertion attributes defined in 4.6.3.2 the core IdP/CAS MUST provide the following derived core assertion attributes:

<table>
<thead>
<tr>
<th>Friendly Name</th>
<th>Derived from</th>
<th>Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>eCH-0113:dateOfBirthPartiallyKnown</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/age">http://www.ech.ch/xmlns/eCH-0113/1/age</a></td>
<td>xs:unsignedInt</td>
</tr>
</tbody>
</table>
### Table: Derived Core Assertion Attributes

<table>
<thead>
<tr>
<th>Friendly Name</th>
<th>Derived from</th>
<th>Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>isOver16</td>
<td>eCH-0113:dateOfBirthPartiallyKnown (return true, iff Age &gt;= 16)</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/isOver16">http://www.ech.ch/xmlns/eCH-0113/1/isOver16</a></td>
<td>xs:boolean</td>
</tr>
<tr>
<td>isOver18</td>
<td>eCH-0113:dateOfBirthPartiallyKnown (return true, iff Age &gt;= 18)</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/isOver18">http://www.ech.ch/xmlns/eCH-0113/1/isOver18</a></td>
<td>xs:boolean</td>
</tr>
<tr>
<td>age-18-or-over</td>
<td>eCH-0113:dateOfBirthPartiallyKnown (return true, iff Age &gt;= 18)</td>
<td><a href="http://schemas.informationcard.net/ics/age-18-or-over/2008-11">http://schemas.informationcard.net/ics/age-18-or-over/2008-11</a></td>
<td>xs:token</td>
</tr>
<tr>
<td>isSwissCitizen</td>
<td>eCH-0113:nationality (return true, iff nationality == &quot;CHE&quot;)</td>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/isSwissCitizen">http://www.ech.ch/xmlns/eCH-0113/1/isSwissCitizen</a></td>
<td>xs:boolean</td>
</tr>
</tbody>
</table>

*The following rules apply when computing the derived attribute Age:*

**Age is the number of years between the date of birth and the person's last birthday.**

In case the date of birth is not exactly known, the following rules apply in addition:

- If YYYY and MM have been provided, but not DD, then DD is assumed to be the month's last day on the calendar (either of 28, 29, 30 or 31);
- If YYYY has been provided, but neither MM nor DD, then MM is assumed to be 12 (December) and DD is assumed to be 31.

#### 4.6.3.6.1 Handling of Unknown Values

If a derived core assertion attribute value is not deducible from a corresponding source core assertion attribute because the according value is not known, the IdP/CAS **MUST** return the defined expectional value if one has been defined for it (e.g. "2" in case of ics:age-18-or-over). If there is no such value defined for the derived attribute, the core IdP/CAS **MUST** omit the saml:AttributeValue element.

The following is an overview of the rules that apply to unknown values of derived attributes:
### Attribute

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Exceptional Value</th>
<th>Handling in the IdP</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/age">http://www.ech.ch/xmlns/eCH-0113/1/age</a></td>
<td>-</td>
<td>The IdP <strong>MUST</strong> omit the AttributeValue if the value of the attribute eCH-0013:dateOfBirthPartiallyKnown is not known.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/isOver16">http://www.ech.ch/xmlns/eCH-0113/1/isOver16</a></td>
<td>-</td>
<td>The IdP <strong>MUST</strong> omit the AttributeValue if the value of the attribute eCH-0013:dateOfBirthPartiallyKnown is not known.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/isOver18">http://www.ech.ch/xmlns/eCH-0113/1/isOver18</a></td>
<td>-</td>
<td>The IdP <strong>MUST</strong> omit the AttributeValue if the value of the attribute eCH-0013:dateOfBirthPartiallyKnown is not known.</td>
</tr>
<tr>
<td><a href="http://schemas.informationcard.net/@ics/age-18-or-over/2008-11">http://schemas.informationcard.net/@ics/age-18-or-over/2008-11</a></td>
<td>2: Unknown</td>
<td>The IdP <strong>MUST</strong> return the exceptional value 2 in the AttributeValue if the value of the attribute eCH-0013:dateOfBirthPartiallyKnown is not known.</td>
</tr>
<tr>
<td><a href="http://www.ech.ch/xmlns/eCH-0113/1/isSwissCitizen">http://www.ech.ch/xmlns/eCH-0113/1/isSwissCitizen</a></td>
<td>The value is always known for this attribute (no exception here).</td>
<td>The IdP <strong>MUST</strong> always return an attribute value.</td>
</tr>
</tbody>
</table>

A dash-sign ("-"’) indicates that there is no exceptional value.

### 4.6.3.7 Commonly Used Interoperable Attribute Statement Types

From a Service Provider’s point of view, commonly used attribute statement types can be requested based on interoperable standard core assertion attributes:

- **Proof of name**: Based on icc:givenname and icc:surname
- **Proof of age**: Based on icc:dateOfBirth or isOver16 or isOver18 or ics:age-18-or-over
- **Proof of birthdate**: Based on icc:dateOfBirth
- **Proof of gender**: Based on icc:gender

### 4.7 Security

#### 4.7.1 Digital Signatures in a SAML 2.0 Context

#### 4.7.1.1 Common Requirements

**The core IdP/CAS **MUST** support RSA-SHA1 Signature Suite**
Service Providers **SHOULD** support this algorithm. The core IdP/CAS **MAY** support other signature algorithms.

### 4.7.1.2 SAML 2.0 Assertions

Each QC signed core assertion attribute **MUST** contain a qualified signature of the CA.

This is to increase traceability and trust.

The QC used by the CA to sign the core assertion attributes **MUST** contain a PolicyInformation with the following object identifier for CertPolicyId:

\[
\text{OID} = 2.16.756.5.26.1.1.3
\]

This object identifier for CertPolicyId is managed by the organisation responsible of governing SuisseID\(^{22}\) and usage of it is restricted to identify SuisseID QCs used to sign core assertion attributes.

The CSP **MAY** add more PolicyInformation to CertificatePolicies.

**SAML assertions MUST** be signed by the core IdP/CAS using an advanced signature.

This is to prevent unauthorized modifications.

The advanced certificate used by the IdP/CAS to sign the SAML assertions **MUST** contain a PolicyInformation with the following object identifier for CertPolicyId:

\[
\text{OID} = 2.16.756.5.26.1.1.4
\]

This object identifier for CertPolicyId is managed by the organisation responsible of governing SuisseID\(^{23}\) and usage is restricted to identify advanced certificates used to sign SAML assertions that comply with the guidelines in this document.

The CSP **MAY** add more PolicyInformation to CertificatePolicies.

The IdP/CAS has to include the complete chain of the advanced signature certificate into the signed SAML Assertion for certificate path validation according to RFC 5280 [6].

The IdP/CAS **SHOULD** create the advanced signature on a secure signature creation device according to chapter 3.5.2.

The core IdP/CAS **MUST** protect SAML 2.0 assertions using `<ds:signature>`.

### 4.7.1.3 SAML 2.0 Protocol

SAML 2.0 responses **SHOULD** be signed using `<ds:signature>`.

**Service Providers SHOULD digitally sign SAML 2.0 requests to the IdP/CAS so they can be authenticated.**

SAML 2.0 requests **SHOULD** be protected using `<ds:signature>`.

If the Service Provider's request is unsigned, the IdP/CAS **SHOULD** present an appropriate statement or warning about this to the user (see 4.10.1.4).

---

\(^{22}\) By the time of this writing, SECO is that organisation

\(^{23}\) By the time of this writing, SECO is that organisation
4.7.2 Digital Signatures in a WS-Trust Context

4.7.2.1 WS-Trust Protocol

WS-Trust request security token requests (RST) and WS-Trust request security token responses (RSTR) SHOULD be signed according to the WSS X.509 Certificate Token Profile ([23]).

4.7.2.2 SAML 2.0 Assertions

Issued tokens are SAML 2.0 assertions. See 4.7.1.2 for details on applied signatures.

4.7.3 Encryption

SuisseID requires SSL/TLS secured communication links between the IdP/CAS and the user as well as between the Service Provider and the user.

The core IdP/CAS MUST support the following cipher suites for the TLS protocol:

- DHE-RSA-AES256-SHA
- DHE-RSA-AES128-SHA

Service Providers SHOULD support these algorithms.

Assertions MUST NOT be encrypted.

4.7.4 Assertion Conditions

One time usage. Each assertion may only be used once. SuisseID requires "One Time Use" to be set. As a consequence of this, the Service Provider MUST check the Recipient attribute in the SAML response and make sure that the InResponseTo attribute matches the request of the Service Provider.

Quality of time. SAML assertions contain embedded timestamps to reduce the window of opportunity for attacks. Therefore core IdP/CAS MUST ensure time synchronization. The maximum clock drift from the reference time (together with whose inaccuracy) MUST NOT exceed 1 minute or 10 % of the minimal period of validity of SuisseID core assertions. Service Providers SHOULD ensure time synchronization as well. The use of NTP (Network Time Protocol) is recommended.

Short lifetime. Assertions MUST have limited lifetime, applying the following conventions:

- NotBefore: A maximum of 5 minutes in the past.
- NotOnOrAfter: A maximum of 5 minutes into the future.

The Service Provider MUST check the validity of assertions obtained from the IdP/CAS and refuse them if expired.

4.7.5 SAML 2.0 Metadata of the core IdP/CAS

SuisseID core IdP/CAS services share a common, small-scale set of functions. That set of functions MUST be specified according to SAML 2.0 metadata. The description of it MUST be published using a public URL.

The core IdP/CAS MUST publish the following configuration information as a minimum:

- entityID
- IDPSSODescriptor (IdP)
- AttributeAuthorityDescriptor (CAS)
- Organization

The XML below is a sample metadata description of core IdP/CAS:

```xml
<md:EntityDescriptor entityID="https://a-suisseid-idp.ch/saml-idp">
    <md:IDPSSODescriptor WantAuthnRequestsSigned="true"
        protocolSupportEnumeration="urn:oasis:names:tc:SAML:2.0:protocol">
        <md:KeyDescriptor use="signing">
            <ds:KeyInfo>
                <ds:X509Data>
                </ds:X509Data>
            </ds:KeyInfo>
        </md:KeyDescriptor>
        <md:SingleSignOnService
            Binding="urn:oasis:names:tc:SAML:2.0:bindings:HTTP-POST"
            Location="https://a-suisseid-idp.ch/saml-idp/login/" />
    </md:IDPSSODescriptor>
    <md:AttributeAuthorityDescriptor
        protocolSupportEnumeration="urn:oasis:names:tc:SAML:2.0:protocol">
        <md:KeyDescriptor use="signing">
            <ds:KeyInfo>
                <ds:X509Data>
                </ds:X509Data>
            </ds:KeyInfo>
        </md:KeyDescriptor>
        <md:AttributeService
            Binding="urn:oasis:names:tc:SAML:2.0:bindings:HTTP-POST"
            Location="https://a-suisseid-idp.ch/saml-idp/query/" />
    </md:AttributeAuthorityDescriptor>
    <md:Organization>
        <md:Extensions>
            <eCH-0113:suisseidRessourceUrl>https://a-suisseid-idp.ch/saml-idp/res/</eCH-0113:suisseidRessourceUrl>
        </md:Extensions>
        <md:OrganizationName xml:lang="de">IdP A</md:OrganizationName>
        <md:OrganizationName xml:lang="en">IdP A</md:OrganizationName>
        <md:OrganizationName xml:lang="fr">IdP A</md:OrganizationName>
        <md:OrganizationName xml:lang="it">IdP A</md:OrganizationName>
        <md:OrganizationDisplayName
            xml:lang="de">SuisseID IdP Firma A</md:OrganizationDisplayName>
        <md:OrganizationDisplayName
            xml:lang="en">SuisseID IdP A</md:OrganizationDisplayName>
        <md:OrganizationDisplayName
            xml:lang="fr">SuisseID IdP Entreprise A</md:OrganizationDisplayName>
        <md:OrganizationDisplayName
            xml:lang="it">SuisseID IdP Ditta A</md:OrganizationDisplayName>
    </md:Organization>
    <md:ContactPerson
        contactType="technical">
        <md:Company>A SuisseID IdP Company</md:Company>
        <md:GivenName>Peter</md:GivenName>
        <md:SurName>Muster</md:SurName>
        <md:EmailAddress>pmu@a-suisseid-idp.ch</md:EmailAddress>
        <md:TelephoneNumber>096 743 45 35</md:TelephoneNumber>
    </md:ContactPerson>
</md:EntityDescriptor>
```

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Must match the SAML assertion issuer property.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EntityDescriptor@entityID</td>
<td></td>
</tr>
<tr>
<td>SingleSignOnService@Location</td>
<td>Service Providers shall send auth requests to this URL.</td>
</tr>
</tbody>
</table>
AttributeService@Location
Service Providers shall send attribute requests to this URL.

Element
eCH-0113:suisseidRessourceUrl
IdP specific base URL of SuisseID resources such as the favorite icon.

Element
OrganizationDisplayName
Language-qualified names that are suitable for human consumption (e.g. displayed in the attribute selection/confirmation dialog, see 4.10.1.4).

4.8 Functional Requirements
The tables below provide an overview of the functional requirements imposed on the Identity Provider (IdP) and the Service Provider (SP).

4.8.1 Web Frontend

<table>
<thead>
<tr>
<th>Function</th>
<th>IdP</th>
<th>SP</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAML Web SSO AuthnRequest via HTTP POST</td>
<td>MUST</td>
<td>MUST</td>
<td>4.10.1.3</td>
</tr>
<tr>
<td>SAML AttributeQuery via HTTP POST</td>
<td>MUST</td>
<td>MUST</td>
<td>4.10.1.6</td>
</tr>
<tr>
<td>SAML Response via HTTP POST</td>
<td>MUST</td>
<td>MUST</td>
<td>4.10.1.7</td>
</tr>
<tr>
<td>NameID Format &quot;unspecified&quot; with SuisseID number support</td>
<td>MUST</td>
<td>MUST</td>
<td>4.6.1.3</td>
</tr>
<tr>
<td>Signing of all AuthNRequests and Attribute-Queries</td>
<td>-</td>
<td>SHOULD</td>
<td>4.7.1</td>
</tr>
<tr>
<td>Advanced signing of all SAML assertions</td>
<td>MUST</td>
<td>-</td>
<td>4.7.1</td>
</tr>
<tr>
<td>Signing of the responses</td>
<td>SHOULD</td>
<td>-</td>
<td>4.7.1</td>
</tr>
<tr>
<td>Metadata export/import</td>
<td>MUST</td>
<td>SHOULD</td>
<td>4.7.5</td>
</tr>
<tr>
<td>IdP selector dialog</td>
<td>-</td>
<td>MUST</td>
<td>4.10.1.2</td>
</tr>
<tr>
<td>Attribute selection/confirmation dialog</td>
<td>MUST</td>
<td>-</td>
<td>4.10.1.4</td>
</tr>
</tbody>
</table>

Table: Web Frontend Requirements

4.8.2 WS-Trust Use Cases

<table>
<thead>
<tr>
<th>Function</th>
<th>IdP</th>
<th>SP</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provisioning STS following the WS-Trust 1.3 (provides the same SAML 2.0 assertions as the web frontend)</td>
<td>MUST</td>
<td>-</td>
<td>4.9.2</td>
</tr>
<tr>
<td>NameID Format &quot;unspecified&quot; with support of the SuisseID number</td>
<td>MUST</td>
<td>MUST</td>
<td>4.6.1.3</td>
</tr>
<tr>
<td>Signing of all SecurityTokenRequests (RST)</td>
<td>-</td>
<td>SHOULD</td>
<td>4.7.2</td>
</tr>
<tr>
<td>Advanced signing of all SAML assertions</td>
<td>MUST</td>
<td>-</td>
<td>4.7.1</td>
</tr>
</tbody>
</table>
4.9 Application Profiles

4.9.1 SAML 2.0 Web Browser SSO and Attribute Requests with HTTP POST

4.9.1.1 Overview

SAML 2.0 specifies several ways to exchange SAML requests and assertions between an IdP and a Service Provider.

Service Providers **MUST** support HTTP POST binding for Web Browser SSO and Web-based attribute requests according to *Bindings for the OASIS Security Assertion Markup Language (SAML), V2.0.*

Using POST binding ensures that SAML requests and responses (assertions) are routed through the user’s browser instead of being submitted to the Service Provider directly. This is achieved through XHTML documents containing an automatic HTTP POST request.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The user accesses an online application (operated by the Service Provider) using a web browser to make an online purchase order, for example. This is done using a HTTP request.</td>
</tr>
<tr>
<td>2</td>
<td>The Service Provider discovers that the user has been authenticated before. In our example, the Service Provider requires a specific assertion about the user (e.g. must be over 18). The Service Provider’s answer is a Base-64-encoded SAML request using a XHTML document (see 4.9.1.2). form action contains the core IdP’s address.</td>
</tr>
</tbody>
</table>
The SAML request contained in the HTML (HTTP POST) is transparently forwarded to the IdP/CAS by the browser.

The IdP/CAS performs the necessary checks about the user, whether or not he is over 18, and produces the assertion as a base-64-encoded SAML response. The response is sent in a HTML form of a XHTML document to the browser (see 4.9.1.3).

The browser submits the SAML response as a HTTP POST request to the Service Provider.

From the SAML assertion, the Service Provider has validated that the user is in fact over 18. The order can now be processed further.

An advantage of the HTTP POST binding is the absence of a direct communication link between the Service Provider and the IdP/CAS. Moreover, there is virtually no limit to the size of requests and responses.

Service Providers MUST apply HTTP POST binding for all kinds of web-based communication with the IdP/CAS.

4.9.1.2 XHTML Form with SAML Request

The following is a XHTML document with a base-64-encoded SAML request in a HTML form:

```
HTTP/1.1 200 OK
Date: 08 Dec 2009 14:00:59 GMT
Content-Type: text/html; charset=iso-8859-1

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="de">
<head>
  <title>SAML Authentication Request POSTer</title>
</head>
<body onload="document.forms[0].submit()">
  <form action="https://a-suisseid-idp.ch/saml-idp/login/?lang=de-CH"
    method="post">
    <div>
      <input type="hidden" name="RelayState"
        value="0043beac1b455110dae17004005b13a2b" />
      <input type="hidden" name="SAMLRequest"
        value="<base64 encoded SAML request>" />
    </div>
    <noscript>
      <div>
        <input type="submit" value="Continue" />
      </div>
    </noscript>
  </form>
</body>
</html>
```

The SAML request input parameter contains the base64 encoded SAML request. Examples SAML requests can be found in 4.10.1.5 (combined requests, element `<samlp:AuthnRequest>`) and 4.10.1.6 (requests to the CAS, element `<samlp:AttributeQuery>`).

The Service Provider can retrieve the action URL from the IdP's metadata (see 4.7.5) and SHOULD propagate the user's preferred language to the IdP (using the lang query attribute). If lang is not specified, the IdP MUST use the browser language.
Form encoded messages addressed to the core IdP/CAS **SHOULD** be signed before base64 encoding is applied to the request (see 4.7.1).

If a signature is applied, then the Destination XML attribute in the root SAML element of the protocol message **MUST** contain the URL to which the sender has initially addressed the message.

4.9.1.3 XHTML Form with SAML Response

The following is an XHTML document with base-64-encoded SAML response in a HTML form:

```html
HTTP/1.1 200 OK Date: 08 Dec 2009 14:01:04 GMT
Content-Type: text/html; charset=iso-8859-1

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en">
<head>
  <title>SAML Authentication Response POSTer</title>
</head>
<body onload="document.forms[0].submit()">
  <form action="https://www.a-suisseid-sp.ch/samlconsumer/authenticate"
    method="post">
    <input type="hidden" name="RelayState"
      value="0043bfc1bc45110dae17004005b13a2b" />
    <input type="hidden" name="SAMLResponse"
      value="&lt;base64 encoded SAML response&gt;" />
  </form>
</body>
</html>
```

In a core IdP/CAS response, form-encoded messages **SHOULD** be signed before base64 encoding is applied (see 4.7.1).

4.9.1.4 Relay State

The core IdP/CAS **MUST** support RelayState parameters as indicated in the SAML binding specification.

According to the SAML 2.0 binding specification, RelayState data **MAY** be included in a SAML message submitted using the binding. The value **MUST NOT** exceed 80 bytes in length.

Relay state **SHOULD** be considered a handle from the point of view of the Service Provider and **SHOULD** be integrity protected by the entity creating the message.

Signing is not realistic given the space limitation, but because the value is exposed to third-party tampering, the entity **SHOULD** ensure that the value has not been tampered with by using a checksum, a pseudo-random value, or similar means.

When a SAML request is accompanied by RelayState data, the SAML responder **MUST** put the data it has received with the request into the corresponding RelayState parameter of the response.

---

24 As a user's session always starts with the Service Provider (SP first usage pattern according to SAML 2.0), there is no need to transport data.
If no such value is included with a SAML request, or if the SAML response is being generated without prior request, then the SAML responder **May** include RelayState data.

4.9.1.5 HTTP and Caching

Standard best practices for HTTP and caching apply to the Claim Assertion Infrastructure, therefore HTTP proxies and the user agent intermediary **Should Not** cache SAML protocol messages. HTTP responders **Should** apply the following rules when returning SAML protocol messages using HTTP 1.1:

- Include a Cache-Control header field set to "no-cache, no-store"
- Include a Pragma header field set to "no-cache"

There are no other restrictions on the use of HTTP headers.

4.9.1.6 Error Handling

An IdP/CAS may refuse to accept messages from a Service Provider, e.g. because it is black-listed. When this happens, the IdP **MUST** respond with `samlp:StatusCode set to urn:oasis:names:tc:SAML:2.0:status:RequestDenied`.

```xml
```

HTTP interactions during message exchange **Must Not** use HTTP error status codes to indicate failures in SAML processing, since the user agent does not fully support the SAML protocol.

4.9.2 WS-Trust 1.3 STS

4.9.2.1 Overview

The core IdP/CAS **MUST** provide a WS-Trust 1.3 Security Token Service (STS).
To the Claim Assertion Infrastructure, WS-Trust is the general framework for token exchange based on Security Token Service (STS). The protocol specified in this document is a profile for SAML 2 assertions that use WS-Trust.

The sequence diagram below illustrates how client applications use WS-Trust to obtain STS authentication and attribute assertions.

1. Optional – The consumer contacts the Service Provider requesting metadata for a service, e.g. an order service.
2. Optional – The Service Provider returns a WSDL document with a policy embedded. The policy specifies what assertions the Service Provider needs.
3. The consumer contacts the STS, authenticates and requests the appropriate token (see 4.9.2.3).
4. The STS issues the token and returns it to the consumer (see 4.9.2.4).
5. The consumer forwards the token to the Service Provider.
6. The Service Provider receives the token and carries on with the order.

4.9.2.2 Metadata (Service Policy)

Service policy metadata specify the requirements of a service to the consumer using interoperable description standards WS-PolicyFramework and WS-PolicyAttachment. In order to invoke the service, users adhere to the prescriptions of the service policy embedded in the metadata of the WSDL document.
Figure: Service Policy embedded in WSDL

The policies embedded into the WSDL document describe which part of a service call have to be encrypted and signed and what kind of token is expected. The following is a sample policy of a Service Provider requiring SAML tokens in every call:

```xml
<sp:ProtectionToken>
  <wsp:Policy>
    <wsp:ExactlyOne>
      <wsp:All>
        <sp:IncludeToken>
          <sp:Issuer>
            http://schemas.xmlsoap.org/ws/2005/07/securitypolicy/IncludeToken/AlwaysToRecipient
          </sp:Issuer>
        </sp:IncludeToken>
        <sp:RequestSecurityTokenTemplate>
          <wst:TokenType>urn:oasis:names:tc:SAML:2.0:assertion</wst:TokenType>
          <wst:Claims Dialect="http://schemas.xmlsoap.org/ws/2005/05/identity">
            <ic:ClaimType Uri="http://www.ech.ch/xmlns/eCH-0113/1/identificationValidUntil" Optional="false" />
          </wst:Claims>
          <sp:PrivacyPolicy Url="http://www.ech.ch/xmlns/eCH-0113/1/identificationValidUntil" />
        </sp:RequestSecurityTokenTemplate>
      </wsp:All>
    </wsp:ExactlyOne>
  </wsp:Policy>
</sp:ProtectionToken>
```

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IssuedToken/Issuer</td>
<td>There can be many core IdPs, each of which can only serve owners of SuisseID certificates of its own brand. Therefore, element issuer is not set.</td>
</tr>
<tr>
<td>Claims</td>
<td>Claims are requested SAML attributes, specified using <a href="">ic:ClaimType</a> according to [19]. Attribute dialect MUST be <a href="http://schemas.xmlsoap.org/ws/2005/05/identity">http://schemas.xmlsoap.org/ws/2005/05/identity</a>. This is the only dialect that the STS MUST support in a SuisseID environment.</td>
</tr>
<tr>
<td>PrivacyNotice</td>
<td>Service Providers SHOULD publish the Privacy Policy URL using this element.</td>
</tr>
</tbody>
</table>

4.9.2.3 STS Token Request (RST)
The following is a sample STS request assuming the security policy in:
<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TokenType</td>
<td>Describes the kind of tokens requested. In the example above, a SAML 2.0 assertion is requested. SAML 2.0 assertion is the only token type that MUST be supported in a SuisseID environment.</td>
</tr>
<tr>
<td>EndpointReference</td>
<td>Specifies the entity ID of the Service Provider for whom the assertion is being issued. This is a unique ID that does not reference a genuine WS Endpoint.</td>
</tr>
<tr>
<td>Claims</td>
<td>See</td>
</tr>
</tbody>
</table>
4.9.2.4 STS Token Response (RSTR)

The following is a sample STS response:

```xml
<wst:RequestSecurityTokenResponse>
  <wst:Lifetime>
    <wsu:Created>2010-11-17T04:26:59Z</wsu:Created>
    <wsu:Expires>2010-11-17T04:36:39Z</wsu:Expires>
  </wst:Lifetime>
  <wsp:AppliesTo>
    <wsa:EndpointReference>
      <wsa:Address>https://www.a-suisseid-sp.ch</wsa:Address>
    </wsa:EndpointReference>
  </wsp:AppliesTo>
  <wst:RequestedSecurityToken>
    <saml:Assertion ID="__a367dab9354eeb59a6b0299f1a9b3d73"
      IssueInstant="2010-11-02T09:50:26.902Z"
      Version="2.0">
      <saml:Issuer Format="urn:oasis:names:tc:SAML:2.0:nameid-format:entity">
        https://www.a-suisseid-idp.ch
      </saml:Issuer>
      <saml:Subject>
        <saml:NameID Format="urn:oasis:names:tc:SAML:1.1:nameid-format:unspecified">001-8578-4583-4344</saml:NameID>
      </saml:Subject>
      <saml:Conditions NotBefore="2010-11-17T04:26:59.000Z"
        NotOnOrAfter="2010-11-17T04:36:59.000Z">
        <saml:AudienceRestriction>
          <saml:Audience>https://www.a-suisseid-sp.ch</saml:Audience>
        </saml:AudienceRestriction>
      </saml:Conditions>
      <saml:AuthnStatement
        AuthnInstant="2010-11-17T04:26:58.906Z"
        SessionIndex="_f7d9b353-3457-4c55-acb8-bdasga4f8a944b4570">
        <saml:AuthnContext>
          <saml:AuthnContextClassRef>
            urn:oasis:names:tc:SAML:2.0:ac:classes:SmartcardPKI
          </saml:AuthnContextClassRef>
        </saml:AuthnContext>
      </saml:AuthnStatement>
      <saml:AttributeStatement>
        <saml:Attribute
          Format="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
          Name="http://www.ech.ch/xmlns/eCH-0113/1/identification-ValidUntil"
          NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
          FriendlyName="Identification Valid Until">
          <saml:AttributeValue xsi:type="xs:date">2009-11-10</saml:AttributeValue>
        </saml:Attribute>
      </saml:AttributeStatement>
    </saml:Assertion>
  </wst:RequestedSecurityToken>
</wst:RequestSecurityTokenResponse>
```

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EndpointReference</td>
<td>Specifies the entity ID of the Service Provider for whom the assertion is being issued. This is a unique ID that does not reference a genuine WS Endpoint.</td>
</tr>
<tr>
<td>Assertion</td>
<td>See and 4.10.1.7</td>
</tr>
<tr>
<td>AudienceRestriction</td>
<td>If the request contains a wsp:AppliesTo element, then a saml:AudienceRestriction containing a saml:Audience element MUST be included in the response along with the value of that element.</td>
</tr>
</tbody>
</table>

Verein eCH, Mainaustrasse 30, Postfach, 8034 Zürich
T 044 388 74 64, F 044 388 71 80
info@ech.ch
www.ech.ch
4.9.2.5 Error Handling
Errors use the SOAP Fault mechanism specified by WS-Trust.

4.10 Example Scenarios and Use Cases

4.10.1 Web Login and Attribute Requests using SAML 2.0
This is a step-by-step explanation of the web login using SAML 2.0 attribute requests.

4.10.1.1 Sequence Chart

Chart: Web Login and Attribute Request using SAML 2.0

The relevant steps of the login are explained in greater detail below.

4.10.1.2 Step 2 – Display of the IdP Selection Dialog
In the presence of more than one core IdP/CAS, Service Providers may not know which one to use for authentication and assertion requests. Service Providers MUST provide a way for the user to specify the appropriate IdP/CAS for authentication and attribute requests.

The following is a sample IdP selection dialog provided by the Service Provider:
The Service Provider **SHOULD** use the SAML metadata element `OrganizationDisplayName` from the IdP and display that name along with the IdP’s icon.

IdPs **MUST** provide the icon (favicon.ico, 32x32 pixels) located at the top level within the SuisseID resource directory as specified by SAML metadata (see 4.7.5).

Service Providers **MAY** cache the user’s selection as a way to optimise further requests with the same user (using cookies, for example). If so, the IdP selection dialog will not be needed any longer.

Service Providers **MAY** authenticate the user locally using the SuisseID certificate prior to offering further services. Doing so would result in the exchange of certificate information from which the Service Provider can deduce the IdP-URL, thus find out what IdP to use ("authenticate first"). This is considered best practice in situations where the Service Provider has no urgent need for assertion-only authentication. (Assertion-only authentication is a way to implement SSO independent of smartcard PIN caching).
4.10.1.3  Step 3 – Extended AuthnRequest for Combined Assertions

A combined assertion request uses SAML Web SSO AuthnRequest extended by a SAML extension. The following example of an extended SAML AuthnRequest shows how profile data is demanded with the authentication request:

```
<samlp:AuthnRequest
    Destination="https://a-suisseid-idp.ch/samlprovider/authenticate"
    ProviderName="SuisseID Service Provider AG"
    ForceAuthn="true"
    IsPassive="false"
    IssueInstant="2009-11-21T11:43:08.3344Z"
    Version="2.0">
   <saml:Issuer>https://a-suisseid-sp.ch/saml/acs</saml:Issuer>
   <samlp:Extensions>
    <saml:Attribute
        NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
        Name="http://www.ech.ch/xmlns/eCH-0113/1/identificationNumber"
        eCH-0113:required="true" />
    <ic:PrivacyNotice Version="1">http://a-suisseid-sp.ch/privacy_policy.html</ic:PrivacyNotice>
   </samlp:Extensions>
</samlp:AuthnRequest>
```

Attribute ForceAuthn

In case of an AuthnRequest that is combined with attribute request (as in the example above) the Service Provider MUST set attribute ForceAuthn to true and the IdP MUST enforce usage of it.

In case of a plain AuthnRequest that is not combined with an attribute request, the attribute ForceAuthn MAY be set to false to support SSO.

Element Extensions

The above AuthnRequest shows how attribute request can be packed into a SAML extension using SAML attributes with the XML attribute eCH-0113:required added, yielding a combined assertion issued by the IdP. eCH-0113:required is "false" by default, thus rendering an attribute optional if it is not explicitly set to "true".

SAML extensions are a speciality of SuisseID – there is no SAML specification defining that particular mechanism. If the AuthnRequest does not have the attributes specified in the extension, then the IdP issues a plain authentication assertion.

Token requests **SHOULD** be signed by the Service Provider.

The idea behind this is to allow Service Provider ratings of various kinds for the future, e.g. to give a visual hint of whether the Service Provider is trusted by the IdP. The above example request does not contain a signature for better reading.

The core IdPs/CAS **MAY** reject requests from specific Service Providers.

One day, Service Providers may appear on black lists referenced by the IdP/CAS operators. However, blacklisting is out of scope of the SuisseID specifications.
4.10.1.4 Step 4 – Display / Confirmation of the Requested Attributes

The IdP/CAS **MUST** display a confirmation page showing the requested data in an attribute request to the IdP/CAS (attribute selection and approval dialog).

The confirmation page **MUST** show the name and value of each attribute that was requested. Attributes labelled as "required" cannot be modified, nor waved by the users. In fact, the only choice the user has is to confirm the attributes by pressing OK or dismiss the request entirely by pressing the Cancel button.

In any case the Service Provider **MUST** check completeness of the attributes of type "required".

The following is a sample confirmation dialog provided by the IdP/CAS.

![Figure: IdP Confirmation Dialog](https:///*_my-serviceprovider.ch)

Optional attributes **MUST** be de-selected by default. Users **MAY** select them deliberately one by one.

In case of a plain AuthnRequest that is not combined with an attribute query, only a minimal dialog for the attribute selection/confirmation is displayed. This is to assure user awareness when transmitting the SuisseID number (e.g. in an SSO scenario).

In the attribute selection and confirmation screen, the following **MUST** appear:

- IdP identification header;
- Service Provider identification data, either name or issuer information from the SAML request;
- SuisseID number;
- Name of the SuisseID owner, either the RDN "cn" or the RDN "pseudonym" of the IAC subject DN;
- Privacy policy of the Service Provider (from SAML request);
If a QC signed attribute is requested, the IdP/CAS **SHOULD** display the actual value only. It **MUST** provide a way to dig into the details and view the whole attribute including the QC signature.

When the user presses the Cancel button, the IdP **MUST** return a SAML error response (see 4.9.1.6). The response **SHOULD** contain a second-level `<samlp:StatusCode>` value of http://www.ech.ch/xmlns/eCH-0113/1/abortedByUser. Service Providers **SHOULD** interpret this status code and display a user friendly message.

### 4.10.1.5 Step 6 – SAML Assertion for Combined Requests

The following is a simplified example of a SAML assertion showing the response to an Authn-Request that was combined with a request for profile data.

Note that `<samlp:Response>` and signatures are skipped for better reading.

```xml
<saml:Assertion ID="_896597f4-5abe-4181-b47a-b9c1dce2d82d"
    IssueInstant="2009-08-21T14:11:08.739Z" Version="2.0">
    <saml:Issuer>SUISSE_ID_IDP_xyz</saml:Issuer>
    <saml:Subject>
        <saml:NameID Format="urn:oasis:names:tc:SAML:1.1:nameid-format:unspecified">
            1234-5678-9012-3456
        </saml:NameID>
        <saml:SubjectConfirmation Method="urn:oasis:names:tc:SAML:2.0:cm:bearer">
            <saml:SubjectConfirmationData
                InResponseTo="identifier_1" NotOnOrAfter="2009-08-22T05:11:08.739Z"
                Recipient="https://a-suisseid-sp.ch/saml/acs" />
        </saml:SubjectConfirmation>
    </saml:Subject>
    <saml:Conditions
        NotBefore="2009-08-22T14:01:08.739Z"
        NotOnOrAfter="2009-08-22T14:11:08.739Z">
        <saml:AudienceRestriction>
            <saml:Audience>
                https://a-suisseid-sp.ch/saml/acs
            </saml:Audience>
        </saml:AudienceRestriction>
    </saml:Conditions>
    <saml:AuthnStatement
        AuthnInstant="2009-08-21T14:11:08.739Z"
        SessionIndex="_f7d9353-3457-4c55-acb8-bdasga4f8a944b4570">`
        <saml:AuthnContext>
            <saml:AuthnContextClassRef>
                urn:oasis:names:tc:SAML:2.0:ac:classes:SmartcardPKI
            </saml:AuthnContextClassRef>
        </saml:AuthnContext>
    </saml:AuthnStatement>
    <saml:AttributeStatement>
        <saml:Attribute
            NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
            Name="http://www.ech.ch/xmlns/eCH-0113/1/identificationNumber">
            <saml:AttributeValue
                xmlns:xs="http://www.w3.org/2001/XMLSchema"
                xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                xsi:type="eCH-0113:stringMaxLength9Type">
                C01745261
            </saml:AttributeValue>
        </saml:Attribute>
    </saml:AttributeStatement>
</saml:Assertion>
```

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject</td>
<td>The SuisseID number is part of the subject (see 4.6.3.4)</td>
</tr>
<tr>
<td>Attributes</td>
<td>NotBefore and NotOnOrAfter The values combine to a 10 minutes timespan.</td>
</tr>
</tbody>
</table>
Element AudienceRestriction | The assertion is valid only for a particular Service Provider, the one who initiated the request using HTTP POST.
---|---
Element AuthnStatement | urn:oasis:names:tc:SAML:2.0:ac:classes:Smart-cardPKI is the class to be referenced as SuisseID is the only authentication method.
Element AttributeStatement | AttributeStatement is used to return the requested SuisseID core attributes.

4.10.1.6 Step 9 – SAML Attribute Request to the CAS

The following is a sample attribute request for obtaining the SAML attribute eCH-0113:identificationValidUntil:

```xml
<samlp:AttributeQuery
  ID="acf23494-1743-2155-4334a-fc453464ab56"
  Version="2.0"
  IssueInstant="2009-11-26T20:31:40Z"
  Destination="https://a-suisseid-idp.ch/samlprovider/query">
  <saml:Issuer>https://a-suisseid-sp.ch/saml/acs</saml:Issuer>
  <samlp:Extensions>
    <ic:PrivacyNotice Version="1">http://a-suisseid-sp.ch/privacy_policy.html</ic:PrivacyNotice>
    <eCH-0113:assertionConsumerServiceUrl>https://www.a-suisseid-sp.ch/saml/acs</eCH-0113:assertionConsumerServiceUrl>
  </samlp:Extensions>
  <saml:Subject>
    <saml:NameID Format="urn:oasis:names:tc:SAML:1.1:nameid-format:unspecified">1234-5678-9012-3456</saml:NameID>
  </saml:Subject>
  <saml:Attribute NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri" Name="http://www.ech.ch/xmlns/eCH-0113/1/identificationValidUntil" FriendlyName="Identification Valid Until" eCH-0113:required="true" />
</samlp:AttributeQuery>
```

Element eCH-0113:assertionConsumerServiceUrl

In the SAML authentication request protocol, <AuthnRequest> contains an attribute called AssertionConsumerServiceURL to specify the receiver of the data in <Response>. The SAML assertion query and request protocol does not have such an attribute, mostly because it is normally used for synchronous bindings. However, user centricity requires that asynchronous front channel binding can be done. For that purpose eCH-0113:assertionConsumerServiceUrl has been introduced as a SuisseID-specific assertion query/request profile within the Extensions element of <AttributeQuery> to specify the location to which <Response> must be returned. If the element is not specified in a request, the IdP SHOULD take the location from either the metadata or from the issuer element.

If no SAML attributes are specified in the SAML attribute request then this is interpreted as a request for all attributes allowed by policy.

4.10.1.7 Step 12 – SAML Attribute Response

The following is an attribute response to the above request. Note that <samlp:Response> and signatures are skipped for better reading.
This section introduces the usage of STS with Information Cards.

Core IdP/CAS providers **MAY** support Information Card technology.

There is no obligation for a IdP/CAS provider to support Information Cards.
4.10.2.1 Sequence Chart

Information Cards are based on mechanisms described in [18] and [21]. They allow for a digital identity to be integrated in a user-centric identity framework that promotes interoperability between identity providers and relying parties with the user in control.

Chart: STS/WS-Trust Confirmation Card Dialog

1. Sign-up (out-of-band)

2. Return InfoCard (out-of-band)

3. User requests identity based service

4. Request security policy

5. Return security policy

6. Present possible digital identities (InfoCards) to user

7. User selects digital identity (InfoCard) and trusts identity provider to use

8. Request security policy for InfoCard

9. Return security policy for InfoCard

10. Request security token with required claims

11. Return signed security token with proof-of-possession key

12. Present security token and proof of service

13. Return requested service response

14. User gains access to identity based service

Chart: STS/WS-Trust Confirmation Card Dialog
4.10.2.2 Identity Provider Information Card

An Information Card represents a digital entity that can be issued by an IdP. Technically speaking, Information Cards are signed XML documents issued by the IdP. The following is sample Information Card XML code:

```xml
<ic:InformationCard>
  <ic:InformationCardReference>
    <ic:CardId>eCH-0113:csp-0001</ic:CardId>
    <ic:CardVersion>1</ic:CardVersion>
  </ic:InformationCardReference>
  <ic:CardName>CSP-0001 SuisseID Information Card</ic:CardName>
  <ic:TokenServiceList>
    <ic:TokenService>
      <wsa:EndpointReference xmlns:wsa="http://www.w3.org/2005/08/addressing">
        <wsa:Address>https://a-suisseid-idp.ch:7443/sts</wsa:Address>
      </wsa:EndpointReference>
      <ic:UserCredential>
        <ic:DisplayCredentialHint>CSP-0001 SuisseID</ic:DisplayCredentialHint>
        <ic:X509V3Credential>
          <ds:X509Data>
            <wsse:KeyIdentifier ValueType="http://docs.oasis-open.org/wss/2004/xx/oasis-2004xx-wss-sec#ThumbprintSHA1" EncodingType="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0#Base64Binary">
              IdigssraDay3mpstsjsfieU1Ud=
            </wsse:KeyIdentifier>
          </ds:X509Data>
        </ic:X509V3Credential>
      </ic:UserCredential>
    </ic:TokenService>
  </ic:TokenServiceList>
  <ic:SupportedTokenTypeList>
  </ic:SupportedTokenTypeList>
  <ic:SupportedClaimTypeList>
    <ic:SupportedClaimType Uri="http://www.ech.ch/xmlns/eCH-0113/1/identificationValidUntil">
      <ic:DisplayTag>Identification Valid Until</ic:DisplayTag>
      <ic:Description>Date until the identification document is valid.</ic:Description>
    </ic:SupportedClaimType>
  </ic:SupportedClaimTypeList>
</ic:InformationCard>
```
<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UserCredential</td>
<td>The SuisseID certificate and keys are stored on smart card, thus X509V3Credential is set as the user credential.</td>
</tr>
<tr>
<td>TokenType</td>
<td>The only TokenType that <strong>MUST</strong> be supported is SAML 2.0.</td>
</tr>
<tr>
<td>SupportedClaimType-List</td>
<td>Contains the SuisseID attributes (see 4.6.3). The attributes DisplayTag and Description are localized in the SuisseID standard languages.</td>
</tr>
<tr>
<td>PrivacyNotice</td>
<td>Provides the location of the privacy statement of the Identity Provider.</td>
</tr>
</tbody>
</table>

The SuisseID Identity Card is localized in the following languages: German, French, Italian, and English.
Best Practices

5 for Certificate Validation

5.1 Validation of SuisseID IAC

5.1.1 Precondition for Validation:
The SP MUST configure at least the root CA of the SuisseID IAC issuing CA of its supported SuisseID providers. Additionally the entire certificate chain(s) MAY be configured for better interoperability.

5.1.2 Validation Algorithm:
1) Basic Path Validation according to RFC5280 (see Certificate Path Validation) with the following particular input:
   - user-initial-policy-set (CertPolicyId to check):
     OID=2.16.756.5.26.1.1.2
   - initial-any-policy-inhibit (inhibit anyPolicy policy): true
2) CRL check according to RFC5280 (CRL Validation, see Certificate Path Validation) or OSCP check according to RFC2560.

5.2 Validation of SuisseID QC

5.2.1 Precondition for Validation:
The SP MUST configure at least the root CA of the SuisseID QC issuing CA of its supported SuisseID providers. Additionally the entire certificate chain(s) MAY be configured for better interoperability.

5.2.2 Validation Algorithm:
1) Basic Path Validation according to RFC5280 (see Certificate Path Validation) with the following particular input:
   - user-initial-policy-set (CertPolicyId to check):
     OID=2.16.756.5.26.1.1.1
   - initial-any-policy-inhibit (inhibit anyPolicy policy): true
2) CRL check according to RFC5280 (CRL Validation, see Certificate Path Validation) or OSCP check according to RFC2560.

5.3 Validation of a Claim Assertion
SAML assertions MUST be signed by the core IdP/CAS using an advanced signature.
Until version 1.3 of SuisseID specification
- no specific policy is defined to be contained in the advanced certificate used for assertion signing.
only the signer certificate is contained in the assertion signature section but not the corresponding certificate chain.

5.3.1 Precondition for Validation:
For each SuisseID provider, the SP MUST either configure the entire certificate chain(s) of the issuing CA of the assertion signer certificate or it MUST configure all possible assertion signer certificates as peer trusts.

Configuring the assertion signer certificates as peer trusts is not recommended because of operational issues with certificate renewal procedures.

5.3.2 Validation Algorithm (until version 1.3 of SuisseID specification):
1) Basic Path Validation according to RFC5280 (see Certificate Path Validation).
   Hint: see hint section above.
2) CRL check according to RFC5280 (CRL Validation, see Certificate Path Validation) or OSCP check according to RFC2560.
3) DN check (in case of non-peer-trust): limit accepted certificates by certificate DN

5.3.3 Validation Algorithm (after version 1.5 of SuisseID specification):
1) Basic Path Validation according to RFC5280 (see Certificate Path Validation) with the following particular input:
   • user-initial-policy-set (CertPolicyId to check):
     OID=2.16.756.5.26.1.1.4
   • initial-any-policy-inhibit (inhibit anyPolicy policy): true
2) CRL check according to RFC5280 (CRL Validation, see Certificate Path Validation) or OSCP check according to RFC2560.

5.4 Validation of a QC Signed Attribute
Each QC signed core assertion attribute MUST contain a qualified signature of the CA to increase traceability and trust.

5.4.1 Preconditions for Validation:
The SP MUST configure several trust anchors:
   • QC attribute signer issuing CA: For each SuisseID provider, the SP MUST either configure the entire certificate chain(s) of the issuing CA of the QC attribute signer certificate or it MUST configure all possible QC attribute signer certificates as peer trusts.
   • QC timestamp token signer issuing CA according to RFC 3161: For each SuisseID provider, the SP MUST either configure the entire certificate chain(s) of the issuing CA of the QC timestamp token signer certificate or it MUST configure all possible QC timestamp token signer certificates as peer trusts.

Configuring the QC attribute signer or the QC timestamp token signer certificates as peer trusts is not recommended because of operational issues with certificate renewal procedures.
5.4.2 Validation Algorithm: see also chapter 3.6.3.4.4 Validation Checks

[1] Validate the QC attribute signer certificate
   1) Basic Path Validation according to RFC5280 (see Certificate Path Validation) with the following particular input:
      • user-initial-policy-set (CertPolicyId to check):
        OID=2.16.756.5.26.1.1.3
      • initial-any-policy-inhibit (inhibit anyPolicy policy): true
   2) CRL check according to RFC5280 (CRL Validation, see Certificate Path Validation) or OSCP check according to RFC2560.


[3] Validate the QC timestamp token signer certificate
   Hint: see preconditions for validation

[4] Validate the XAdES signature timestamp:
   1) Check that QualifyingProperties Target references Signature Id
   2) Check that HashDataInfo uri references SignatureValue Id
   3) Check if message digest of base-64 decoded time stamp token matches the base-64 decoded signature value string.

[5] Optional: verify timestamp on attribute:
   Ensure that difference between the timestamp and the embedded signer certificate.notBefore time differ by less than a SP-specific (configurable) maxTimeStampDeltaInSecs.

[6] Verify that the attribute corresponds to the given user:
   Check the SuisseID number.

5.5 Certification Path Validation
Certification path processing verifies the binding between the subject distinguished name and/or subject alternative name and subject public key.
RFC5280 describes an algorithm for validating certification paths:
   • Basic Path Validation
   • CRL Validation
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Annex A – XML Schema eCH-0113

<?xml version="1.0" encoding="UTF-8"?>
<!-- eCH-0113 Specification SuisseID -->
<xs:schema xmlns:eCH-0113="http://www.ech.ch/xmlns/eCH-0113/1"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
xmlns:icc="http://schemas.xmlsoap.org/ws/2005/05/identity/claims"
targetNamespace="http://www.ech.ch/xmlns/eCH-0113/1" elementFormDefault="qualified" blockDefault="#all" version="2">
  <xs:import namespace="http://www.w3.org/2000/09/xmldsig#" schemaLocation="xmldsig-core-schema.xsd"/>
  <xs:import namespace="http://schemas.xmlsoap.org/ws/2005/05/identity/claims" schemaLocation="claims-1.0-os.xsd"/>
  <xs:annotation>
    <xs:documentation xml:lang="en">Issue date: 18.03.2010</xs:documentation>
  </xs:annotation>
  <xs:simpleType name="stringMaxLength255MinLength1Type">
    <xs:restriction base="xs:string">
      <xs:maxLength value="255"/>
      <xs:minLength value="1"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="stringMaxLength255Type">
    <xs:restriction base="xs:string">
      <xs:maxLength value="255"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="stringMaxLength9Type">
    <xs:restriction base="xs:string">
      <xs:maxLength value="9"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="stringMaxLength24Type">
    <xs:restriction base="xs:string">
      <xs:maxLength value="24"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="givenNamesType">
    <xs:sequence>
      <xs:element name="givenName" type="eCH-0113:stringMaxLength255MinLength1Type" minOccurs="1" maxOccurs="20"/>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="countryIdISO3Type">
    <xs:restriction base="xs:token">
      <xs:length value="3"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="datePartiallyKnownType">
    <xs:choice>
      <xs:element name="yearMonthDay" type="xs:date"/>
      <xs:element name="yearMonth" type="xs:gYearMonth"/>
      <xs:element name="year" type="xs:gYear"/>
    </xs:choice>
  </xs:complexType>
  <xs:simpleType name="identificationKindType">
    <xs:restriction base="xs:token">
      <xs:enumeration value="0"/>
      <xs:enumeration value="1"/>
      <xs:enumeration value="2"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:complexType name="signedAttributeType">
    <xs:sequence>
      <xs:element name="attribute" type="eCH-0113:attributeType"/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
The actual content model cannot be expressed by means of XML Schema 1.0 without violating the 'Unique Particle Attribution' (UPA) rule, hence wild-card.

The following shows the intended content model:

```xml
<xs:choice maxOccurs="1" minOccurs="1">
  <xs:element name="givenNames" type="eCH-0113:givenNamesType"/>
  <xs:element name="dateOfBirthPartiallyKnown" type="eCH-0113:stringMaxLength255Type"/>
  <xs:element name="placeOfBirth" type="eCH-0113:stringMaxLength255Type"/>
  <xs:element name="origin" type="eCH-0113:stringMaxLength255Type"/>
  <xs:element name="nationality" type="eCH-0113:countryIdISO3Type"/>
  <xs:element name="identificationNumber" type="eCH-0113:stringMaxLength9Type"/>
  <xs:element name="identificationNumberFull" type="eCH-0113:stringMaxLength24Type"/>
  <xs:element name="identificationKind" type="eCH-0113:identificationKindType"/>
  <xs:element name="issuingCountry" type="eCH-0113:countryIdISO3Type"/>
  <xs:element name="issuingOffice" type="eCH-0113:stringMaxLength255Type"/>
  <xs:element name="identificationIssuedOn" type="xs:date"/>
  <xs:element name="identificationValidUntil" type="xs:date"/>
  <xs:element ref="icc:givenname"/>
  <xs:element ref="icc:surname"/>
  <xs:element ref="icc:dateofbirth"/>
  <xs:element ref="icc:gender"/>
  <xs:any namespace='##other' />  
</xs:choice>
```

The actual content model cannot be expressed by means of XML Schema 1.0 without violating the 'Unique Particle Attribution' (UPA) rule, hence wild-card.

The following shows the intended content model:

```xml
<xs:choice maxOccurs="1" minOccurs="1">
  <xs:element name="givenNames" type="eCH-0113:givenNamesType"/>
  <xs:element name="dateOfBirthPartiallyKnown" type="eCH-0113:stringMaxLength255Type"/>
  <xs:element name="placeOfBirth" type="eCH-0113:stringMaxLength255Type"/>
  <xs:element name="origin" type="eCH-0113:stringMaxLength255Type"/>
  <xs:element name="nationality" type="eCH-0113:countryIdISO3Type"/>
  <xs:element name="identificationNumber" type="eCH-0113:stringMaxLength9Type"/>
  <xs:element name="identificationNumberFull" type="eCH-0113:stringMaxLength24Type"/>
  <xs:element name="identificationKind" type="eCH-0113:identificationKindType"/>
  <xs:element name="issuingCountry" type="eCH-0113:countryIdISO3Type"/>
  <xs:element name="issuingOffice" type="eCH-0113:stringMaxLength255Type"/>
  <xs:element name="identificationIssuedOn" type="xs:date"/>
  <xs:element name="identificationValidUntil" type="xs:date"/>
  <xs:element ref="icc:givenname"/>
  <xs:element ref="icc:surname"/>
  <xs:element ref="icc:dateofbirth"/>
  <xs:element ref="icc:gender"/>
  <xs:any namespace='##other' />  
</xs:choice>
```
```xml
<xs:element name="givenNameQc" type="eCH-0113:signedAttributeType"/>
<xs:element name="surnameQc" type="eCH-0113:signedAttributeType"/>
<xs:element name="dateOfBirthQc" type="eCH-0113:signedAttributeType"/>
<xs:element name="genderQc" type="eCH-0113:signedAttributeType"/>
<!-- SuisseID plain core claim elements defined by eCH-0113 -->
<xs:element name="dateOfBirthPartiallyKnown" type="eCH-0113:datePartiallyKnownType"/>
<xs:element name="placeOfBirth" type="eCH-0113:stringMaxLength255Type"/>
<xs:element name="nationality" type="eCH-0113:countryIdISO3Type"/>
<xs:element name="identificationNumber" type="eCH-0113:stringMaxLength9Type"/>
<xs:element name="identificationNumberFull" type="eCH-0113:stringMaxLength24Type"/>
<xs:element name="identificationValidUntil" type="xs:date"/>
<xs:element name="organizationName" type="eCH-0113:stringMaxLength255Type"/>
<!-- SuisseID core claim elements defined by http://schemas.xmlsoap.org/ws/2005/05/identity/claims -->
<xs:element name="givenName" type="icc:StringMaxLength255MinLength1" />
<xs:element name="surname" type="icc:StringMaxLength255MinLength1" />
<xs:element name="dateOfBirth" type="xs:date" />
<xs:element name="gender" type="icc:GenderType" />
<xs:element name="emailAddress" type="icc:StringMaxLength255MinLength1" />
<!-- SuisseID derived core claim elements defined by eCH-0113 -->
<xs:element name="age" type="xs:unsignedInt"/>
<xs:element name="isOver16" type="xs:boolean"/>
<xs:element name="isOver18" type="xs:boolean"/>
<xs:element name="isSwissCitizen" type="xs:boolean"/>
<!-- SuisseID derived core claim elements defined by http://schemas.informationcard.net/@ics -->
<!-- SuisseID SAML request extensions -->
<xs:attribute name="required" type="xs:boolean"/>
<xs:element name="assertionConsumerServiceUrl" type="xs:anyURI"/>
<!-- SAML Core 2.0: System entities are free to define more specific status codes by defining appropriate URI references -->
<!-- http://www.ech.ch/xmlns/eCH-0113/1/abortedByUser -->
</xs:schema>
```
Annex B – References

[9] RFC 3739 (März 2004), Internet X.509 Public Key Infrastructure – Qualified Certificates Profile
[10] FIPS 140-1 (11.1.94), Security Requirements for Cryptographic Modules
[11] FIPS 140-2 (25.5.01), Security Requirements for Cryptographic Modules
[16] RFC 2119 (März 1997), Key words for use in RFCs to Indicate Requirement Levels

[19] Identity Metasystem Interoperability 1.0 (1.7.2009), Organization for the Advancement of Structured Information Standards.
## Annex C – Abbreviations

<table>
<thead>
<tr>
<th>Abbr.</th>
<th>Full name</th>
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<tbody>
<tr>
<td>ASN.1</td>
<td>Abstract Syntax Notation 1</td>
</tr>
<tr>
<td>CA</td>
<td>Certificate Authority</td>
</tr>
<tr>
<td>CAI</td>
<td>Claim Assertion Infrastructure</td>
</tr>
<tr>
<td>CAS</td>
<td>Claim Assertion Service</td>
</tr>
<tr>
<td>CN</td>
<td>Common Name</td>
</tr>
<tr>
<td>CSP</td>
<td>Certification Service Provider</td>
</tr>
<tr>
<td>DN</td>
<td>Distinguished Name</td>
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<tr>
<td>eCH</td>
<td>Verein für E-Government- und E-Health-Standards für die Schweiz</td>
</tr>
<tr>
<td>EIdP</td>
<td>Extended Identity Provider</td>
</tr>
<tr>
<td>FIPS</td>
<td>Federal Information Processing Standards</td>
</tr>
<tr>
<td>HTML</td>
<td>Hypertext Markup Language</td>
</tr>
<tr>
<td>HTTP</td>
<td>Hypertext Transfer Protocol</td>
</tr>
<tr>
<td>IAC</td>
<td>Identification and Authentication Certificate</td>
</tr>
<tr>
<td>IAM</td>
<td>Identity and Access Management</td>
</tr>
<tr>
<td>IAS</td>
<td>Identity and Authentication Service</td>
</tr>
<tr>
<td>ICAO</td>
<td>International Civil Aviation Organization</td>
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<td>ID</td>
<td>Identity</td>
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<tr>
<td>IdP</td>
<td>Identity Provider</td>
</tr>
<tr>
<td>IKT</td>
<td>Informations- und Kommunikationstechnologien</td>
</tr>
<tr>
<td>ITSEC</td>
<td>Information Technology Security Evaluation Criteria</td>
</tr>
<tr>
<td>LDAP</td>
<td>Lightweight Directory Access Protocol</td>
</tr>
<tr>
<td>OCSP</td>
<td>Online Certificate Status Protocol</td>
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<tr>
<td>OID</td>
<td>Object Identifier</td>
</tr>
<tr>
<td>PKI</td>
<td>Public Key Infrastructure</td>
</tr>
<tr>
<td>QC</td>
<td>Qualified Certificate</td>
</tr>
<tr>
<td>RA</td>
<td>Registration Authority</td>
</tr>
<tr>
<td>RDN</td>
<td>Relative Distinguished Name</td>
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<td>RFC</td>
<td>Request for Comments</td>
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<td>RST</td>
<td>Request Security Token</td>
</tr>
<tr>
<td>RSTR</td>
<td>Request Security Token Response</td>
</tr>
<tr>
<td>SAML</td>
<td>Security Assertion Markup Language</td>
</tr>
<tr>
<td>SECO</td>
<td>Staatssekretariat für Wirtschaft</td>
</tr>
<tr>
<td>SP</td>
<td>Service Provider</td>
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<tr>
<td>Abbr.</td>
<td>Full name</td>
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<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SR</td>
<td>Systematische Rechtssammlung</td>
</tr>
<tr>
<td>SSCD</td>
<td>Secure Signature Creation Device</td>
</tr>
<tr>
<td>SOAP</td>
<td>Simple Object Access Protocol</td>
</tr>
<tr>
<td>SSL/TLS</td>
<td>Secure Socket Layer / Transport Layer Security</td>
</tr>
<tr>
<td>SSO</td>
<td>Single Sign On</td>
</tr>
<tr>
<td>STS</td>
<td>Security Token Service</td>
</tr>
<tr>
<td>TAV</td>
<td>Technische und administrative Vorschriften</td>
</tr>
<tr>
<td>TSA</td>
<td>Time Stamping Authority</td>
</tr>
<tr>
<td>UPN</td>
<td>User Principal Name</td>
</tr>
<tr>
<td>URL</td>
<td>Uniform Resource Locator</td>
</tr>
<tr>
<td>UTF-8</td>
<td>Unicode Transformation Format-8</td>
</tr>
<tr>
<td>WSDL</td>
<td>Web Service Definition Language</td>
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<td>WSS</td>
<td>Web Services Security</td>
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<td>XAdES</td>
<td>XML Advanced Electronic Signatures</td>
</tr>
<tr>
<td>XHTML</td>
<td>Extensible Hypertext Markup Language</td>
</tr>
<tr>
<td>XML</td>
<td>Extended Markup Language</td>
</tr>
<tr>
<td>ZertES</td>
<td>Bundesgesetz über Zertifizierungsdienste im Bereich der elektronischen Signatur</td>
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</table>
Annex D – Changes from Version 1.3

The following changes have been made to this document:

- The document has been formatted as an eCH standard.
- The attributes organization, e-mail and title are being provided in the IdP as attributes. To support backwards compatibility, these attributes are provided as core assertion attributes only. Implementers **MAY** choose to read the attributes from the authentication certificate provided to the IdP instead of storing the attributes in the IdP database.
- The attributes identificationNumberFull and identificationNumberFullQc are now being provided by the IdP. This attribute is to be implemented both as a plain core assertion attributes and as a QC signed core assertion attributes.
- The issuing procedure of SAML assertions was modified. The advanced certificate used by the IdP/CAS to sign the SAML assertions **MUST** contain a well-defined object identifier in its PolicyInformation and the IdP/CAS has to include the complete chain of the advanced signature certificate into the signed SAML Assertion for certificate path validation.
- Best practices for the validation of a SuisseID have been added.