TeliaSonera Gateway
Certificate Policy and Certification Practice Statement

TeliaSonera Gateway CA v1
TeliaSonera Gateway CA v2

OID 1.3.6.1.4.1.271.2.3.1.1.16

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Revision History

Version	Version date	Change	Author
1.0	11th June 2012	The first official version	TeliaSonera CA Policy Management Team
1.01	11th September 2012	Fixed minor errors in references	TeliaSonera CA Policy Management Team
1.02	21st December 2012	Added OCSP support, Small clarifications to used processes and text, Distinction of client and server certificates, Fixed AIA and EKU extension description, Fixed ST,L,C attribute description, Mandatory 2048 bit RSA key length	TeliaSonera CA Policy Management Team
1.1	3rd May 2013	Geographical definition to Server Certificates, Suspension no more used, small technical fixes	TeliaSonera CA Policy Management team
1.2	3rd April 2014	All Subject fields except O and OU will refer to registered O location. Small fixes and clarifications	TeliaSonera CA Policy Management team
1.3	16th April 2015	Full SSL references removed in 3.2.2, CA must understand all extensions in 3.2.4. Validity period max to 3y. OCSP specification rewritten. TeliaSonera Gateway CA v2 added.	TeliaSonera CA Policy Management team

1 INTRODUCTION

1.1 Overview

A Certification Practice Statement (CPS) is a Certification Authority's (CA) description of the practices it follows when issuing certificates. The purpose of this CPS is to describe the procedures that the TeliaSonera Gateway CA v1 uses when issuing certificates, and that all Registration Authorities, Subscribers and Relying Parties shall follow in connection with these certificates.

This CPS describes the procedures and routines which apply when registering and completing a certificate and for revoking and revocation checking of certificates. This CPS will refer to separate TeliaSonera Production CPS, which describes the premises, procedures and routines which apply for the Production of TeliaSonera CA Services.

This CPS generally conforms to the IETF PKIX Internet X.509 Public Key Infrastructure Certificate Policy and Certification Practice Statement Framework (also known as RFC 3647). This document is divided into nine sections:

- Section 1 - provides an overview of the policy and set of provisions, as well as the types of entities and the appropriate applications for certificates.
- Section 2 - contains any applicable provisions regarding identification of the entity or entities that operate repositories; responsibility of a PKI participant to publish information regarding its practices, certificates, and the current status; frequency of publication; and access control on published information.
- Section 3 - covers the identification and authentication requirements for certificate related activity.
- Section 4 - deals with certificate life-cycle management and operational requirements including application for a certificate, revocation, suspension, audit, archival and compromise.
- Section 5 - covers facility, management and operational controls (physical and procedural security requirements).
- Section 6 - provides the technical controls with regard to cryptographic key requirements.
- Section 7 - defines requirements for certificate, Certificate Revocation List (CRL) and Online Certificate Status Protocol (OCSP) formats. This includes information on profiles, versions, and extensions used.
- Section 8 - addresses topics covered and methodology used for assessments/audits; frequency of compliance audits or assessments; identity and/or qualifications of the personnel performing the audit or assessment; actions taken as a result of deficiencies found during the assessment; and who is entitled to see results of an assessment.
- Section 9 - covers general business and legal matters: the business issues of fees, liabilities, obligations, legal requirements, governing laws, processes, and confidentiality.

This CPS and all certificates containing the OID value reserved for this CPS conform to the current version of the Baseline Requirements for the Issuance and Management of Publicly-Trusted Certificates published at http://www.cabforum.org. In the event of any inconsistency between this document and those Requirements, those Requirements take precedence over this document.

1.2 Document name and identification

This CPS is titled TeliaSonera Gateway Certificate CPS and the CPS name of this CPS is {TELIASONERA-GATEWAY-CPS-1}.

This CPS is also a Certificate Policy for TeliaSonera gateway certificates. The routines and roles resulting from this CPS apply only in connection with certificates referring to the following Certificate policy object identifier: 1.3.6.1.4.1.271.2.3.1.1.16

This CPS also refers to the TeliaSonera Production CPS with the name {TELIASONERA-PRODUCTION-CPS-2}.

1.3 PKI participants

TeliaSonera gateway certificates are issued to devices (e.g. VPN gateways and clients) required by the services provided by TeliaSonera to its customer organizations or to its internal use.

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1.3.1 Certification authorities

The Certification Authority operating in compliance with this Certification Practice Statement is TeliaSonera. The name of the Certification Authority in the “Issuer” field of the certificate is TeliaSonera Gateway CA v1.

TeliaSonera Gateway CA v1 is a subordinate CA of TeliaSonera Root CA v1. TeliaSonera Root CA has its own CPS describing the management of the certificate life cycle of subordinate CA certificates signed by it. The title of that CPS is TeliaSonera Root CPS and its CPS name is {TELIASONERA-ROOT-CPS-2}.

The Certification Authorities are responsible for managing the certificate life cycle of end entity certificates signed by the CAs. This will include:

- creating and signing of certificates binding Subjects with their public key
- promulgating certificate status through CRLs

1.3.2 Registration authorities

The CA’s units and systems authorized to perform registration functions act as Registration Authorities. RA is responsible for the following activities on behalf of a CA:

- identification and authentication of certificate subscribers
- approve applications for renewal or re-keying certificates
- initiate or pass along revocation requests for certificates

1.3.3 Subscribers

The Subscriber is an entity subscribing with a Certification Authority on behalf of one or more device (Subject). The Subscriber for the gateway certificates is an employee of TeliaSonera, who requests gateway certificate from the RA.

The Subscriber shall ensure that the Subject and the certificate information fulfill the obligations defined in this CPS and the conditions of the certification services.

The Subject of a certificate is a Device with installed software capable of utilizing the private key stored in the Device.

1.3.4 Relying parties

The Relying Party is a Customer Organization, which utilizes certificates for securing the organization’s internal or external activities. The Relying Party can also be a company, organization or a private person having business with the Customer Organization. In case of TeliaSonera’s internal certificates, the relying party is TeliaSonera.

1.3.5 Other participants

No stipulation.

1.4 Certificate usage

1.4.1 Appropriate certificate uses

Certificates under this CPS are issued to servers or devices to be used for the following applications:

- VPN gateway certificate is a server certificate issued to VPN gateway devices possessed by TeliaSonera. VPN gateway certificate is used to authenticate VPN gateway devices and to create VPN OR SSL VPN connections.
- VPN tunnel certificate is a technical client certificate used by VPN clients to create IPSec VPN tunnel with the VPN gateway. All the VPN clients connecting to the same VPN gateway use the same certificate and key pair. Actual authentication of the remote user is made by other means (e.g. using other TeliaSonera certificates).
- TeliaSonera’s internal device certificates are issued to servers managed by TeliaSonera and other devices required by TeliaSonera’s internal services (e.g LDAP servers)

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1.4.2 Prohibited certificate uses

Applications using certificates issued under this CPS shall take into account the key usage purpose stated in the “Key Usage” extension field of the certificate.

Additionally, the key usage purposes and limitations possibly stated in the contract between the Customer Organization and the CA shall be taken into account when using certificates.

1.5 Policy administration

1.5.1 Organization administering the document

TeliaSonera CA Policy Management Team is the responsible authority for reviewing and approving changes to this CPS. Written and signed comments on proposed changes shall be directed to the TeliaSonera contact as described in Section 1.5.2. Decisions with respect to the proposed changes are at the sole discretion of the TeliaSonera CA Policy Management Team.

Contact information:

TELIASONERA AB
SE-106 63 Stockholm
Phone: +46 (0)8 504 550 00
Internet: https://repository.trust.teliasonera.com/

1.5.2 Contact person

Contact person in matters related to this CPS:

TeliaSonera CA Product Manager
Email: cainfo@sonera.com
Phone: +358 (0) 20401
Internet: https://repository.trust.teliasonera.com/

1.5.3 Person determining CPS suitability for the policy

TeliaSonera CA Policy Management Team is the administrative entity for determining this Certification Practice Statement (CPS) suitability to the applicable policies.

1.5.4 CPS approval procedures

TeliaSonera CA Policy Management Team will review any modifications, additions or deletions from this CPS and determine if modifications, additions or deletions are acceptable and do not jeopardize operations or the security of the production environment.

1.6 Definitions and acronyms

A list of definitions and acronyms can be found at the end of this document.

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2 PUBLICATION AND REPOSITORY RESPONSIBILITIES

2.1 Repositories

2.1.1 CPS Repository

A full text version of this CPS is published at http://repository.trust.teliasonera.com/.

2.1.2 Revocation Information Repository

OCSP is the recommended Revocation Information Repository. It can be found from http://ocsp.trust.teliasonera.com

Certificate Revocation Lists (CRLs) are published in the TeliaSonera LDAP directory and on the TeliaSonera website:

Issuing CA	**CRL addresses**
TeliaSonera Gateway CA v1	*http://crl-3.trust.teliasonera.com/teliasoneragatewaycav1.crl* *ldap://crl-1.trust.teliasonera.com/cn=TeliaSonera%20Gateway%20CA%20v1,o=TeliaSonera?certificaterevocationlist;binary*
TeliaSonera Gateway CA v2	*http://crl-3.trust.teliasonera.com/teliasoneragatewaycav2.crl* *ldap://crl-1.trust.teliasonera.com/cn=TeliaSonera%20Gateway%20CA%20v2,o=TeliaSonera?certificaterevocationlist;binary*

If OCSP is not used then http based CRL repository is recommended. It is listed at first on certificate's CDP extension.

2.1.3 Certificate Repository

All issued certificates are stored in the local database of the CA system. Certificates may also be published to other repositories if it is a part of the TeliaSonera CA Service or agreed with a customer.

2.2 Publication of certification information

It is TeliaSonera's duty to make the following information available:

a) This CPS

b) Certificate revocation lists of revoked certificates

c) Issued CA certificates and cross certificates for cross-certified CAs

TeliaSonera may publish and supply certificate information in accordance with applicable legislation.

Each published certificate revocation list (CRL) provides all processed revocation information at the time of publication for all revoked certificates of which the revocation list is intended to give notification.

TeliaSonera supplies CA certificates for all public CA keys provided these can be used for verifying valid certificates.

Subscribers will be notified that a CA may publish information submitted by them to publicly accessible directories in association with certificate information. The publication of this information will be within the limits of sections 9.3 and 9.4.

2.3 Time or frequency of publication

Updates to this CPS are published in accordance with the provisions specified in section 9.12.

Revocation information publication provisions are specified in section 4.9.

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All issued certificates are stored in the local database of the CA system promptly on issuing. Certificates may also be published to other repositories if it is a part of the TeliaSonera CA Service or agreed with a customer.

2.4 Access controls on repositories

This CPS, CRLs and CA certificates are publicly available. Only authorized CA personnel have access to subscriber certificates stored in the local database of the CA system.

3 IDENTIFICATION AND AUTHENTICATION

3.1 Naming

3.1.1 Types of names

An X.501 Distinguished Name (DN) is used as an unambiguous name of the Subject in the"Subject" field of the certificate. The name always includes the following attributes:

Attribute	**Description of value**
commonName (CN, OID 2.5.4.3)	"commonName" is a character string defined by TeliaSonera describing a device that is used to provide services of TeliaSonera. Typically the "commonName" attribute is a hostname, domain name or IP address of the certificate Subject.
Organization (O, OID 2.5.4.10)	"Organization" is a character string defined by TeliaSonera. Typically the "Organization" attribute is the name of the TeliaSonera's customer organization using the service related to the Subject.

Additionally, the "Subject" field may include following attributes depending on the usage purpose of the certificate:

Attribute	**Description of value**
organizationalUnit (OU, OID 2.5.4.11)	Character string defined by TeliaSonera, which can be used to indicate the service of TeliaSonera, with which the certificate is used.
State of province (ST, OID 2.5.4.8)	Qualifier for describing the location of the customer using the service related to the Subject.
Locality (L, OID 2.5.4.7)	Qualifier for describing the location of the customer using the service related to the Subject.
Country (C, OID 2.5.4.6)	Qualifier for describing the location of the customer using the service related to the Subject..

Subject name information may also be contained in the Subject Alternative Name X.509 version 3 extension. Subject Alternative Name extension may contain following attributes:

SAN Attribute	**Description of value**
dNSName	One or more DNS domain names (FQDN) of the Subject. May also contain wildcard domain names (e.g. "*.teliasonera.com"). Internal server names are not used in certificates created after September 2013. No certificates with internal server names will be valid after October 1, 2016. Internal server name is a server name without a domain name or with Unregistered Domain Name. CA verifies that the domain part of a FQDN can be found from a public domain register.
iPAddress	One or more IP addresses of the Subject. Reserved IP addresses are not used in certificates created after September 2013. No certificates with reserved IP addresses will be valid after October 1, 2016. Reserved IP address is an IPv4 or IPv6 address that the IANA has marked as reserved.

Additional Distinguished Name (DN) or Subject Alternative Name attributes may be used as necessary.

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3.1.2 Need for names to be meaningful

Names will be meaningful as stated in the section 3.1.1.

3.1.3 Anonymity or pseudonymity of subscribers

No stipulation.

3.1.4 Rules for interpreting various name forms

No stipulation.

3.1.5 Uniqueness of names

The Subject name stated in a certificate will be unique for all certificates issued within the domain of the CA, and conform to X.500 standards for name uniqueness. Subject name uniqueness means that the CA will not issue certificates with identical names to different organizations. However, the CA may issue several certificates to the same organization, and in that case the Subject names in those certificates may be the same.

3.1.6 Recognition, authentication, and role of trademarks

The priority to entity names is given to registered trademark holders.
The use of a Domain Name or IP address is restricted to the authenticated legal owner of that Name.

TeliaSonera reserves the right not to issue such a certificate, or to revoke a certificate that has already been issued, when there is a name claim dispute involved concerning the certificate contents.

3.2 Initial identity validation

3.2.1 Method to prove possession of private key

Key pairs are created by TeliaSonera. The CA verifies that the certificate orderer possesses the private key by verifying the electronic signature included in the PKCS #10 certificate request. The request is accepted only when signed with the private key associated with the public key to be certified.

3.2.2 Authentication of organization identity

The existence of the company, its legal name, business identity code and other relevant organization information are confirmed from an official business register maintained by an applicable government agency (e.g. ytj.fi in Finland) or from certified true copy of the organization's incorporation papers.

TeliaSonera verifies domain names and IP addresses from a database maintained by a reliable third party registrar e.g. "domain.fi" (for domain ".fi"), "iis.se" (for domain ".se"), "ripe.net" (for IP addresses) and "www.networksolutions.com/whois-search" (for non-country domains), that as of the date the Certificate was issued, the Customer either had the right to use, or had control of, the Fully-Qualified Domain Name(s) and IP address(es) listed in the Certificate, or was authorized by a person having such right or control (e.g. under a Principal-Agent or Licensor-Licensee relationship) to obtain a Certificate containing the Fully-Qualified Domain Name(s) and IP address(es). Connection to the third party database is SSL/TLS protected when applicable.

OrganizationalUnit may be used to indicate the service of TeliaSonera, with which the certificate is used.

If the Subject Identity Information is to include a Customer DBA, the CA verifies the Applicant's right to use the DBA from applicable government agency responsible of such names (e.g. "ytj.fi" in Finland). In all cases TeliaSonera CA regularly validates that the all Registration Officers have done the verification of all subject fields correctly.

Alternatively the Registration Officer may use another allowed authentication methods listed in the Baseline Requirements for the Issuance and Management of Publicly-Trusted Certificates published at http://www.cabforum.org.

3.2.3 Authentication of individual identity

Only authorized TeliaSonera employees can apply for gateway certificates used by devices as required by certain TeliaSonera's services. If the employee is an authorized Registration Officer he/she is authenticated by means of the certificate or other two factor authentication mechanism.

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Alternatively the employee is using a private order form for gateway certificates. In that case the employee is authenticated by using a special list of authorized TS employees.

3.2.4 Non-verified subscriber information

The Registration Officer is obliged to always review all subject information and initiate additional checking routines if there are any unclear Subject values. Only well-known certificate extensions are verified and others are acceptedonly if CA is aware of the reason for including the extension.

Domain name ownership of domains in email addresses is not verified by Teliasonera.

3.2.5 Validation of authority

SSL order by electronic form	Administrative and technical contact persons are always TeliaSonera employees. Their email address domain must be “teliasonera.com” and at least administrative contact person can be found from TeliaSonera employee register. CA verifies that the Customer has authorized TeliaSonera to create gateway SSL certificates on behalf of the Customer. Authorization may be done when Customer has ordered the service or separately using a special authorization form signed by the Customer representative.
SSL enrolment using TeliaSonera’s self-service software	Self-service software may be used only by authorized TeliaSonera Registration Officers. Authorization is done at application level based on strong authentication. Self-service method may be used for client certificates (Tunnel certificates via GWCerttool) or for TeliaSonera CA’s own devices (Gateway certificates via SecureManager) or in special cases when multiple Gateway certificates are needed so that the normal electronic SSL order form would be impractical. In the last case the authorization must come directly from TeliaSonera PKI Security Board and separately from each Customer if customer names are used in the certificates..

3.2.6 Criteria for interoperation

Not applicable.

3.3 Identification and authentication for re-key requests

3.3.1 Identification and authentication for routine re-key

Re-key requests may be done by authorized TeliaSonera personnel without new validation of the certificate data. However, previous data validation check shouldn’t be older than three years. In practice non-validated re-key requests are used when the device holding the original certificate and private key is renewed or re-installed before the expiration of the original certificate. Typically this is done because of device failure.

3.3.2 Identification and authentication for re-key after revocation

As described in 3.3.1.

3.4 Identification and authentication for revocation request

<u>Revocation</u>

TeliaSonera Registration Officer may revoke gateway certificates as necessary. He/she is authenticated based on certificate or other two factor authentication mechanism. This is a routine operation when renewing certificates

The Subscriber or other TeliaSonera employee shall submit a request for certificate revocation to the Revocation Service by telephone or by e-mail. The Revocation Service will authenticate requests based on the digital signature or by making a call back to the person requesting revocation and asks certain detailed data. This data is compared with the information recorded about the Subject or Subscriber at registration. If the data match the certificate will be revoked.

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In certain situations where there is an identified risk of abuse of the private key or when it is obvious that the authorized use of the key is prevented, the verification of the authenticity of the revocation request can require other authentication methods. In cases where reliable verification cannot be immediately performed the CA may prefer revocation of the certificate, however, to reduce risks.

4 CERTIFICATE LIFE-CYCLE OPERATIONAL REQUIREMENTS

4.1 Certificate Application

4.1.1 Who can submit a certificate application

Authorized employees of TeliaSonera can apply for gateway certificates used by devices as required by certain TeliaSonera's services.

TeliaSonera will issue server certificates only to organizations that are registered in the European Economic Area. The European Economic Area (EEA) comprises the countries of the European Union (EU), plus Iceland, Liechtenstein and Norway.

4.1.2 Enrollment process and responsibilities

The authorized employees of TeliaSonera may enroll for a certificate, when the certificate is required for the delivery of TeliaSonera's services. The certificate is enrolled by using an application provided by the CA. Before enrolling the certificate, the Employee is responsible for identifying and authenticating the Subject and validating the authority of the requester if the CA application doesn't validate it automatically.

4.2 Certificate application processing

4.2.1 Performing identification and authentication functions

TeliaSonera performs identification and authentication of Subject and Subscriber information in accordance with the section 3.2.

4.2.2 Approval or rejection of certificate applications

The CA will approve a certificate application if it meets the requirements documented in this CPS and there are no other reasons to reject the application. All other certificate applications will be rejected.

The applicant will be informed on why the certificate application was rejected and on how to proceed to be approved.

4.2.3 Time to process certificate applications

The certificate request is processed by CA immediately or within reasonable time frame.

4.3 Certificate issuance

4.3.1 CA actions during certificate issuance

If the certificate application is approved, the CA issues the certificate. The CA system accepts only such certificate requests the origin of which can be authenticated. The certificate is created by the CA according to the information contained in the certificate request. However, the CA may overwrite or delete some certificate information using pre-defined certificate profile specific standard values.

4.3.2 Notification to subscriber by the CA of issuance of certificate

The certificate is available for the Subscriber in the application after the issuance.

4.4 Certificate acceptance

4.4.1 Conduct constituting certificate acceptance

The Subscriber is considered to have accepted the certificate when the private key associated with it has been used, or when the certificate has been installed into a Device.

4.4.2 Publication of the certificate by the CA

TeliaSonera will not publish subscriber certificates to a publicly available repository.

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4.4.3 Notification of certificate issuance by the CA to other entities

No stipulation.

4.5 Key pair and certificate usage

4.5.1 Subscriber private key and certificate usage

The Subscriber shall only use certificates and their associated key pairs for the purposes identified in this CPS. Issued certificates contain information which defines suitable areas of application for the certificate and its associated keys. Area of application labelling takes place in accordance with X.509 and chapter 7 of this CPS. For more information regarding appropriate subscriber key usage see sections 1.4.1 and 6.1.7.

The subscriber shall protect the Subject private key from unauthorized use and discontinue the use of the Subject private key immediately and permanently in case the private key is compromised.

4.5.2 Relying party public key and certificate usage

Prior to accepting a TeliaSonera gateway certificate, a relying party is responsible to:

a) Verify that the certificate is appropriate for the intended use;

b) Check the validity of the certificate, i.e. verify the validity dates and the validity of the certificate and issuance signatures; and

c) Verify from a valid Certificate Revocation List (CRL) or other certificate status service provided by the CA that the certificate has not been revoked or suspended. If certificate status cannot be verified due to system failure or similar, the certificates shall not be accepted.

4.6 Certificate renewal

Certificate renewal is the re-issuance of a certificate with a new validity date using the same public key corresponding to the same private key.

When the validity time of a certificate is about to end, the certificate can be renewed. Renewal may be requested by the same persons as the initial certificate application and certificate renewal requests are processed like the initial certificate requests as described in section 4.1 - 4.2.

4.7 Certificate re-key

Certificate re-key is the re-issuance of a certificate using new public and private keys. Certificate re-key requests are processed as described in section 3.3.

4.8 Certificate modification

Certificate modification is the re-issuance of the certificate due to changes in the certificate information other than the validity time (certificate renewal) or Subscriber's public key (certificate re-key). Certificate modification requests are processed as initial certificate requests as described in sections 4.1 – 4.4.

4.9 Certificate revocation and suspension

4.9.1 Circumstances for revocation

A certificate must be revoked under the following conditions:

1. Upon suspected or known compromise of the private key;
2. Upon suspected or known compromise of the media holding the private key;
3. Subject or subscriber information is known to be invalid or re-verification fails.
4. When there is an essential error in the certificate

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A certificate may be revoked under the following conditions:

1. When any information in the certificate changes;
2. Upon termination of a Subject;
3. When a Subject no longer needs access to secured organizational resources;
4. When the certificate is redundant (for example, a duplicate certificate has been issued).
5. Customer's certificate contract with TeliaSonera has ended.
6. Any other reason that makes the certificate obsolete or threats related keys

TeliaSonera in its discretion may revoke a certificate under any circumstances, for example when an entity fails to comply with obligations set out in this CPS, any applicable agreement or applicable law. TeliaSonera will revoke a certificate at any time if TeliaSonera suspects that conditions may lead to a compromise of a Subscriber's keys or certificates.

4.9.2 Who can request revocation

The revocation of a certificate can be requested by the Subscriber or other TeliaSonera personnel.

4.9.3 Procedure for revocation request

TeliaSonera Registration Officer can revoke certificates as necessary using tools provided by CA.

Other persons requesting revocation may contact TeliaSonera Revocation Service by telephone or email. Authorized TeliaSonera revocation staff, then authenticates the identity of the originator of a revocation request according to section 3.4 "Identification and authentication for revocation request" and processes the revocation request using TeliaSonera's revocation system.

4.9.4 Revocation request grace period

The CA is available for revocation requests 24 hours per day, 7 days per week.

When a reason for the revocation of a certificate appears, the Subscriber shall immediately inform the Revocation Service. The CA shall not be responsible for the damage caused by illicit use of the Subject's private key. The CA shall be responsible for the publication of the revocation information on the Certificate Revocation List according to the principles given in this CPS.

4.9.5 Time within which CA must process the revocation request

TeliaSonera processes revocation requests within reasonable time frame. There are no specific requirements for the processing time.

4.9.6 Revocation checking requirement for relying parties

Prior to using a certificate, it is the Relying Party's responsibility to check the status of all certificates in the certificate validation chain. A certificate cannot be reasonably relied on if the Relying Party does not diligently follow the certificate status checking procedures denoted below:

- A Relying Party shall ensure the authenticity and integrity of the CRLs or OCSP responses by checking the digital signature and the certification path related to it.
- The Relying Party shall also check the validity period of the CRL or OCSP response in order to make sure that the information is up-to-date.
- Certificates may be stored locally in the Relying Party's system, but the prevailing revocation status of each of those certificates shall be checked before use.
- If valid certificate status information cannot be obtained because of a system or service failure, not a single certificate must be trusted. The acceptance of a certificate in violation of this condition befalls at the Relying Party's own risk.

The Relying Party may acquire the checking of the CRLs as a service that shall follow the certificate status checking procedures denoted above.

4.9.7 CRL issuance frequency

The Revocation Status Service is implemented by publishing Certificate Revocation Lists (CRLs), electronically signed by the CA, in a public directory. The rules below are followed:

- A new CRL is published in the directory at intervals of **not more than 2 hours**.

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- The validity time of every CRL is **forty-eight (48) hours**.

There may be several valid CRLs available at the same time. The one of those, which has been published as the latest, contains the most real time information.

4.9.8 Maximum latency for CRL's

CRL's are published to the TeliaSonera LDAP directory and updated automatically. Normally latency will be a matter of seconds.

4.9.9 On-line revocation/status checking availability

TeliaSonera is providing on-line revocation status checking via the OCSP protocol. The OCSP service address is added to certificate extension as defined by RFC2560.

4.9.10 On-line revocation checking requirements

In general all OCSP requests will be signed.

All responses will be signed by a private key corresponding to a public key certified by the CA on which the OCSP request is made.

The OCSP service is using real-time CA database information. The OCSP responder may use the previous status value for a certificate if it is fresher than two hours old (refresh time). In rare circumstances where the connection between OCSP and CA is broken the status information may be up to 48 hours old (grace period). OCSP responder will respond with an "unknown" status for certificates that do not exist in the CA database.

4.9.11 Other forms of revocation advertisements available

No stipulation.

4.9.12 Special requirements regarding key compromise

No stipulation.

4.9.13 Circumstances for suspension

Suspension is not used after March 2013.

4.9.14 Who can request suspension

Suspension is not used after March 2013..

4.9.15 Procedure for suspension request

Suspension is not used after March 2013.

4.9.16 Limits on suspension period

Suspension is not used after March 2013..

4.10 Certificate status services

4.10.1 Operational characteristics

The primary method for status checking is OCSP Service. The CRLs are published in the TeliaSonera's LDAP directory and website as disclosed in chapter 2.1.2.

4.10.2 Service availability

The certificate status services are available 24 hours per day, 7 days per week.

4.10.3 Optional features

No stipulation.

4.11 End of subscription

The end of a subscription as a result of no longer requiring the service, compromise, or termination of service (voluntary or imposed) may result in the immediate revocation of the certificate and the publishing of a CRL or other certificate status verification system.

4.12 Key escrow and recovery

4.12.1 Key escrow and recovery policy and practices

A Subscriber's digital signature private keys will not be escrowed.

4.12.2 Session key encapsulation and recovery policy and practices

No stipulation.

5 FACILITY, MANAGEMENT, AND OPERATIONAL CONTROLS

All stipulations regarding chapter **5 Facility Management, and Operational Control** are specified in “TeliaSonera Production CPS”.

6 TECHNICAL SECURITY CONTROLS

All general stipulations regarding chapter **6 Technical Security Controls** are specified in "TeliaSonera Production CPS".

The sections below are additions to the texts in the corresponding sections of the "TeliaSonera Production CPS" to complement and specify information concerning Subscriber key management.

6.1 Key pair generation and installation

6.1.1 Key pair generation

The Subscriber generates the key pair using server or other device software. Third party key generation systems (e.g OpenSSL) can be used if the server itself isn't supporting key generation.

6.1.2 Private key delivery to subscriber

Not applicable.

6.1.3 Public key delivery to certificate issuer

The public key is delivered digitally signed in a Certificate Signing Request (CSR) file.

6.1.4 CA public key delivery to relying parties

Methods to deliver CA certificates to Subscribers and Relying Parties are described in TeliaSonera Production CPS.

6.1.5 Key sizes

The CA requires that the Subscribers generate at least 2048 bit RSA keys.

6.1.6 Public key parameters generation and quality checking

No stipulation.

6.1.7 Key usage purposes (as per X.509 v3 key usage field)

Issued certificates contain information which defines suitable areas of application for the certificate and its associated keys. The CA is not responsible for use other than the given key usage purposes. Area of application labeling takes place in accordance with X.509 and chapter 7

6.2 Private key protection and cryptographic module engineering controls

6.2.1 Cryptographic module standards and controls

The Subscriber private keys are generated by software and normally the private keys are stored in the software of a server, network device or workstation.

6.2.2 Private key (n out of m) multi-person control

No stipulation.

6.2.3 Private key escrow

TeliaSonera does not escrow subscriber private keys.

6.2.4 Private key backup

No backups are made of the subscribers private keys by the CA.

6.2.5 Private key archival

The CA does not archive subscriber private keys.

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6.2.6 Private key transfer into or from a cryptographic module

Not applicable to subscriber keys.

6.2.7 Private key storage on cryptographic module

Not applicable to subscriber keys.

6.2.8 Method of activating private key

The Subscriber is responsible for the private key activation. The CA recommends that the Subscriber uses passwords or strong authentication methods to authenticate users to the server or other device before the private key is activated in accordance with the section 6.4 and takes other appropriate measures for the logical and physical protection of the server or other device used to store private keys.

6.2.9 Method of deactivating private key

Method of deactivating the private key of the Subscriber depends on the software used by the Subscriber.

6.2.10 Method of destroying private key

When the certificate has expired and has not been renewed, the private key related to it cannot be used any more in connection with certification services. The key is not returned to the CA to be destroyed but it remains in the possession of the Subscriber and should be destroyed by the Subscriber.

6.2.11 Cryptographic module rating

No stipulation.

6.3 Other aspects of key pair management

6.3.1 Public key archival

The CA stores the Subject public keys according to section 5.5 ”Records archival” in the TeliaSonera Production CPS.

6.3.2 Certificate operational periods and key pair usage periods

The usage period of the subscriber certificate shall not be longer than **3 years**.

The same keys may be certified again on expiration of a certificate, although it is not recommended by the CA. The usage period of the Subscriber public and private keys shall not exceed the period during which the applied cryptographic algorithms and their pertinent parameters remain cryptographically strong enough or otherwise suitable.

6.4 Activation data

The Subscriber uses his private keys with the help of activation data.

6.4.1 Activation data generation and installation

The Subscriber is responsible for activation data generation and installation. The Subscriber is recommended to use passwords or strong authentication methods to authenticate users to servers or other devices before the private key is activated. If passwords are used, the CA recommends that Subscriber uses passwords that consists of sufficiently many characters and cannot be easily guessed or concluded.

6.4.2 Activation data protection

The Subscriber is recommended to keep his activation data appropriately protected from unauthorized access.

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6.4.3 Other aspects of activation data

No stipulation.

7 CERTIFICATE, CRL, AND OCSP PROFILES

7.1 Certificate profile

The contents definition of a certificate, in other words the certificate profile, defines the fields in a certificate. The certificate profile of the certificates follows the version 3 profile defined in the ITU X.509 standard. The profile of the certificates also follows the document RFC 5280 “Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile”.

The basic fields used in certificates are listed in the table below:

Field name	**Field description and contents**
Version	This field states which of the certificate versions defined in the X.509 standard the certificate conforms to. The issued certificates conform to the version 3.
Serial number	The CA generates an individual serial number for every certificate. The number that has been given in this field is unique for every certificate created by the CA system. The software manages the uniqueness of the serial number automatically.
Signature algorithm	The signature algorithm is the set of mathematical rules according to which the CA software executes the signing of the certificate. Identifiers have been allocated for the algorithms that are generally used. The identifier of the algorithm used for the signing of the certificate is given in this field. The signature cannot be verified if the algorithm used is not known. The algorithm that is used for the signing of the certificates is sha1RSA or sha256RSA.
Issuer	This field states the name of the Issuer of the certificate. The Issuer name in the certificates of each CA has been described in section 1.3.1.
Validity	The validity of the certificate is that period of time during which the CA guarantees that it maintains status information of the certificate, in other words about the possible revocation of the certificate. This field states the date and time when the certificate comes into force, and the date and time after which the certificate is no more valid. The certificate can be trusted during its validity period if the certificate has not been published on the CRL.
Subject	This field identifies the Device under whose possession the private key is, that corresponds to the public key contained in the certificate. The field includes the unambiguous name of the Subject. The contents of the field have been described in section 3.1 “Naming”.
Subject public key info	This field states the algorithm under which the public key of the Subject shall be used. The Subject’s public key itself is also given in this field. The algorithms and key lengths of the subject keys are described in section 6.1.5 “Key sizes”.

7.1.1 Version number(s)

All issued certificates are X.509 Version 3 certificates, in accordance with the PKIX Certificate and CRL Profile.

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7.1.2 Certificate extensions

Certificate extensions will be supported in accordance with RFC 5280 “Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile”. In general, following extension may be used in a Subscriber certificate:

Extension	Authority	Extension description and contents
Authority key identifier	CA	The identifier of the issuing CA public key is given in this extension. The identifier can be used to identify the public key that corresponds to the private key used for the signing of the certificate. SHA-1 hash algorithm is used to calculate the identifier.
Subject key Identifier	CA	The identifier of the Subject public key that is contained in the certificate is given in this extension. The identifier can be used to pick up those certificates that contain a given public key. SHA-1 hash algorithm is used to calculate the identifier.
Certificate policies	CA	This extension states the policies according to which the certificate has been issued. The relevant policy is identified based on an individual identifier (object identifier, OID) assigned to the policy document or certain certificate type. The identifiers covered by this CPS have been given in section 1.2 “Document name and identification”. A URL to CPS location may be given in this extension.
CRL distribution points	CA	This extension gives the location where the CRL is available. The exact addresses of the CRLs corresponding to the different certificate classes are given in section 4.10.1.
Key usage	CA	The key usage purposes of the public key contained in the certificate are given in this extension. The CA is not responsible for the use that goes against the given key usage purposes. The key usage extension is optional for TeliaSonera gateway certificates. Purposes KeyCertSign and cRLSign are never set.
Extended key usage	CA	This extension contains other key usage purposes of the public key except those contained in the “Key usage” extension. A key usage purpose given in this extension may be generally known or privately defined for a certain application. The extended key usage purposes of the public keys contained in the Subscriber certificates may include: a) Server authentication b) Server authentication and Client authentication c) Client authentication
Subject alternative name	Subscriber	This extension can be used to relate alternative identification information to the Subject. Subject alternative name information used in the Certificates is described in section 3.1.1 “Types of names”.
Authority Info Access	CA	This extension may contain two values: a) The url to CA-certificate b) OCSP service address as defined by RFC2560 Typically all gateway certificates include the value a) and all gateway certificates with EKU value “Server authentication” will include the value b)

Also other extensions may be used.

7.1.3 Algorithm object identifiers

At least the following algorithms are supported for signing and verification:

sha1withRSAEncryption OBJECT IDENTIFIER ::== iso(1) member-body(2) us(840) rsadsi(113549)
pkcs(1) pkcs-1(1) 5; {1.2.840.113549.1.1.5}.

sha256withRSAEncryption OBJECT IDENTIFIER ::== iso(1) member-body(2) us(840) rsadsi(113549)
pkcs(1) pkcs-1(1) 11; {1.2.840.113549.1.1.11}

7.1.4 Name forms

Every DN will be in the form of an X.501 DirectoryString in accordance with section 3.1.1 “Types of names”.

7.1.5 Name constraints

Subject and Issuer DNs comply with PKIX standards and are present in all certificates.

7.1.6 Certificate policy object identifier

The certificate policy object identifier will be present in issued certificates and will contain the OID of the policy according to which the certificate has been issued. The identifiers covered by this CPS have been given in section 1.2 “Document name and identification”.

7.1.7 Usage of Policy Constraints extension

No stipulation.

7.1.8 Policy qualifiers syntax and semantics

The policy qualifier CPSuri may be used in the subscriber certificates. The value of the CPSuri points to TeliaSonera CA Services repository website where this CPS is published.

7.1.9 Processing semantics for the critical Certificate Policies extension

No stipulation.

7.2 CRL profile

The information contained in a Certificate Revocation List has been described below. The CRL is used to state which of the certificates, whose validity period has not yet expired have been revoked.

CRL basic fields are listed in the table below:

Field name	Field description and contents
Version	This field states which of the CRL versions defined in the X.509 standard the CRL conforms to. The CRLs conform to the version 2.
Signature algorithm	The CRLs are signed by using the same algorithm as is used for signing of the certificates. The algorithm used is sha1RSA or sha256RSA.
Issuer	This field states the name of the Issuer of the CRL. The CRL issuer name is always the same as the Issuer name (the CA’s name) in the certificates listed on the CRL.
This update	Date and time of the CRL issuance.
Next update	Date and time by which the next CRL shall be issued. The next CRL may be issued at any time after the issuing of the previous CRL, however, it shall be issued before the time stated in the “Next update” field. The time difference between “This update” and “Next update” is defined in section 4.9.7 “CRL issuance frequency”.

Revoked certificates	This field states the serial numbers of revoked certificates, and for each revoked certificate the date and time of revocation and the reason for revocation

In general, following CRL extensions may be used:

Extension	Extension description and contents
Authority key identifier	The identifier of the public key of the CRL Issuer is given in this field. The identifier can be used to identify the public key that corresponds to the private key used for the signing of the CRL. Within TeliaSonera PKI the SHA-1 hash algorithm is used to calculate the identifier.
CRL number	The CRL number is a number that indicates the position of the CRL in the sequence of issued CRLs. The numbering starts with 1, and it increases monotonically by one for each issued CRL. Based on the CRL number the user is able to determine if a certain CRL replaces another CRL.

7.2.1 Version number(s)

All issued CRL's are X.509 version 2 CRL's in accordance with the RFC 5280 "Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile.

7.2.2 CRL and CRL entry extensions

CRL extensions will be supported in accordance with RFC 5280 "Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile.

In general, the following entry extensions may be included in a CRL:

Extension	Extension description and contents
Reason Code of the CRL Entry	The reason for revocation can be one of the following: KeyCompromise, CACompromise, AffiliationChanged, Superseded, CessationOfOperation, CertificateHold
Invalidy date	The invalidity date provides the date, on which it is known or suspected that the private key was compromised or that the certificate otherwise became invalid. This date may be earlier than the revocation date in the CRL entry, which is the date at which the CA processed the revocation.

7.3 OCSP profile

7.3.1 Version number(s)

TeliaSonera OCSP responders conform to version 1 of RFC 2560.

7.3.2 OCSP extensions

The OCSP Nonce extension should be used in OCSP requests.

8 COMPLIANCE AUDIT AND OTHER ASSESSMENTS

8.1 Frequency or circumstances of assessment

An annual Compliance Audit will be performed by an independent, qualified third party.

8.2 Identity/qualifications of assessor

The Compliance Auditor must demonstrate competence in the field of compliance audits, and must be thoroughly familiar with the requirements which a CA service imposes on the issuance and management of certificates.

8.3 Assessor's relationship to assessed entity

The Compliance Auditor should not have any financial, legal or organizational relationship with the audited party. A person cannot be Compliance Auditor if he/she:

a) is owner to or joint owner to TeliaSonera or another company within the same group.
b) is a member of the TeliaSonera management or the management of any subsidiary, or assists with TeliaSonera's bookkeeping or management of means, or TeliaSonera's control of them, or managing the issues regarding information security.
c) is employed by or in other aspects in subordinate or dependent relation to TeliaSonera or any other company referred to in a) and b) above,
d) is married to or co-habiter with or is sibling or close relative to a person that is referred to in a) and b) above, or
e) is in debt to TeliaSonera or any other company referred to in a) to c) above.

8.4 Topics covered by assessment

The purpose of the Compliance Audit is to verify that TeliaSonera and all engaged subcontractors are complying with the requirements of this CPS and TeliaSonera Production CPS. The Compliance Audit will cover all requirements that define the operation of a CA under these CPSes including:

a. The CA production integrity (key and certificate life cycle management); and
b. CA environmental controls.

8.5 Actions taken as a result of deficiency

Depending on the severity of the deficiency, the following actions may be taken:

a) The Compliance Auditor may note the deficiency as part of the report;
b) The Compliance Auditor may meet with TeliaSonera and determine if the deficiency can be remedied and an action plan should be developed and steps taken to remedy the deficiency. Such steps could be to change applied procedures and/or updating the CPS;
c) The Compliance Auditor may report the deficiency and if the TeliaSonera CA Service deems the deficiency to have risk to the operation of the TeliaSonera or customers CAs, the TeliaSonera CA Service operator may revoke the CA's certificate.

Should the CPS be updated in such a way that the new CPS is deemed to involve an amended degree of security; a new CPS with a new identity shall be drawn up (see section 1.2).

8.6 Communication of results

The Compliance Auditor shall provide the TeliaSonera CA Service management with a copy of the results of the Compliance Audit. The results will not be made public unless required by law.

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9 OTHER BUSINESS AND LEGAL MATTERS

9.1 Fees

Fees are defined in applicable customer agreement.

9.1.1 Certificate issuance or renewal fees

See section 9.1.

9.1.2 Certificate access fees

See section 9.1.

9.1.3 Revocation or status information access fees

See section 9.1.

9.1.4 Fees for other services

See section 9.1.

9.1.5 Refund policy

See section 9.1.

9.2 Financial responsibility

All stipulations regarding the section **9.2 Financial responsibility** are specified in TeliaSonera Production CPS.

9.3 Confidentiality of business information

All stipulations regarding the section **9.3 Confidentiality of business information** are specified in TeliaSonera Production CPS.

9.4 Privacy of personal information

All stipulations regarding the section **9.4 Privacy of personal information** are specified in TeliaSonera Production CPS.

9.5 Intellectual property rights

The private signing key is the sole property of the legitimate holder of the corresponding public key identified in a certificate.

No part of this CPS (other than in accordance with the exceptions detailed below) may be reproduced, published in a database system or transmitted in any form (electronic, mechanical, photocopied, recorded or similar) without written permission from TeliaSonera AB.

However, permission generally applies for reproducing and disseminating this CPS in its entirety provided that this is at no charge and that no information in the document is added to, removed or changed.

Applications to reproduce and disseminate parts of this document in any other way may be made to TeliaSonera in accordance with section 1.5.2.

9.6 Representations and warranties

All stipulations regarding the section **9.6 Representations and warranties** are specified in TeliaSonera Production CPS.

9.7 Disclaimers of warranties

All stipulations regarding the section **9.7 Disclaimers of warranties** are specified in TeliaSonera Production CPS.

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9.8 Limitations of liability

All stipulations regarding the section **9.8 Limitations of liability** are specified in TeliaSonera Production CPS.

9.9 Indemnities

All stipulations regarding the section **9.9 Indemnities** are specified in TeliaSonera Production CPS.

9.10 Term and termination

9.10.1 Term

This CPS remains in force until notice of the opposite is communicated by TeliaSonera on its web site in the TeliaSonera CA Service Repository (https://repository.trust.teliasonera.com).

9.10.2 Termination

Termination of this document will be upon publication of a newer version or replacement document, or upon termination of CA operations.

9.10.3 Effect of termination and survival

The conditions and effect resulting from termination of this document will be communicated, on TeliaSonera's web site in the TeliaSonera CA Service Repository (https://repository.trust.teliasonera.com), upon termination outlining the provisions that may survive termination of the document and remain in force.

9.11 Individual notices and communications with participants

TeliaSonera will define in any applicable agreement the appropriate provisions governing notices.

9.12 Amendments

TeliaSonera CA Policy Management Team is the responsible authority for reviewing and approving changes to this CPS. Written and signed comments on proposed changes shall be directed to the TeliaSonera CA Service contact as described in Section 1.5. Decisions with respect to the proposed changes are at the sole discretion of the TeliaSonera CA Policy Management Team.

9.12.1 Procedure for amendment

The only changes which can be carried out to this CPS without notification are linguistic amendments and rearrangements which do not affect the security level of the described procedures and regulations.

Changes which shall take place with notification can be made to this CPS 15 days after notification.

The TeliaSonera CA Policy Management Team will post the notification at the CPS publishing point

at
(https://repository.trust.teliasonera.com). Changes affecting the terms of an agreement shall be notified in writing to the address given in the contact information of the signatory of the agreement.

TeliaSonera CA Policy Management Team decides which measures are taken in relation to the comments received. If comments received necessitate changes to the original change proposal which were not covered by the original notification, these changes may come into force no earlier than 15 days after publication of a new modified notification.

9.12.2 Notification mechanism and period

See 9.12.1

9.12.3 Circumstances under which OID must be changed

If TeliaSonera CA Policy Management Team determines that a new Object Identifier (OID) is required, TeliaSonera CA Policy Management Team will assign a new OID and required amendments will be made.

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9.13 Dispute resolution provisions

All stipulations regarding the section **9.13 Dispute resolution provisions** are specified in TeliaSonera Production CPS.

9.14 Governing law

All stipulations regarding the section **9.14 Governing law** are specified in TeliaSonera Production CPS.

9.15 Compliance with applicable law

All stipulations regarding the section **9.15 Compliance with applicable law** are specified in TeliaSonera Production CPS.

9.16 Miscellaneous provisions

All stipulations regarding the section **9.16 Miscellaneous provisions** are specified in TeliaSonera Production CPS.

9.17 Other provisions

All stipulations regarding the section **9.17 Other provisions** are specified in TeliaSonera Production CPS.

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ACRONYMS

CA	Certification Authority
CP	Certificate Policy
CPS	Certification Practice Statement
CRL	Certificate Revocation List
DER	Distinguished Encoding Rules
DN	Distinguished Name
DSA	Digital Signature Algorithm
EAL	Evaluation Assurance Level
EID	Electronic Identification
FIPS	Federal Information Processing Standard
HSM	Hardware Security Module
IETF	Internet Engineering Task Force
ISO	International Organization for Standardization
LDAP	Lightweight Directory Access Protocol
MD5	Message Digest 5
OCSP	On-line Certificate Status Protocol
OID	Object Identifier
PIN	Personal Identification Number
PKCS	Public Key Cryptography Standards
PKI	Public Key Infrastructure
PKIX	Public Key Infrastructure X.509 (IETF Working Group)
RA	Registration Authority
RFC	Request For Comments
RSA	Rivest-Shamir-Adleman asymmetric encryption algorithm
SEIS	Secure Electronic Information in Society
SHA –1	Secure Hash Algorithm
S/MIME	Secure Multipurpose Internet Mail Extension
SSL	Secure Sockets Layer
TTP	Trusted Third Party
UPS	Uninterruptible Power Supply
URI	Uniform Resource Identifier
URL	Uniform Resource Locator

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DEFINITIONS

Access control:

The granting or denial of use or entry.

Activation Data:

Activation data, in the context of certificate enrollment, consists of a one-time secret communicated to the enrolling user (Subscriber) out of band. This shared secret permits the user to complete of the enrollment process.

Administrator:

A Trusted Person within the organization of a Processing Center, Service Center, Managed PKI Customer, or Gateway Customer that performs validation and other CA or RA functions.

Administrator Certificate:

A Certificate issued to an Administrator that may only be used to perform CA or RA functions.

Agent:

A person, contractor, service provider, etc. that is providing a service to an organization under contract and are subject to the same corporate policies as if they were an employee of the organization.

Application Server:

An application service that is provided to an organizational or one of its partners and may own a certificate issued under the organizational PKI. Examples are Web SSL servers, VPN servers (IPSec), object signer services, Domain Controllers, etc.

Authentication:

Checking the identity provided, e.g. when logging in, in the event of communication between two systems or when exchanging messages between users. General: strengthening of authenticity.

Authorization:

The granting of permissions of use.

Authorised representative:

An employee of the commissioner who has the authority to order and revoke certificates at the CA.

Asymmetric encryption algorithm:

An encryption technique which uses two related transformation algorithms: a public transformation, with the use of a public key, and a private transformation with the use of a private key. The two transformations are such that if the public transformation is known, it is mathematically impossible to derive the private transformation from this.

Base certificate:

See primary certificate.

Business process:

A set of one or more linked procedures or activities which collectively realize a business objective or policy goal, normally within the context of an organizational structure defining functional roles and relationships.

CA certificate:

Certificate which certifies that a particular public key is the public key for a specific CA.

CA key:

Key pair where the private key is used by the CA in order to sign certificates and where the public key is used to verify the same certificate.

Certificate:

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The public key of a user, together with related information, digitally signed with the private key of the Certification Authority that issued it. The certificate format is in accordance with ITU-T Recommendation X.509.

Certificate extensions:

Sections of certificate content defined by standard X.509 version 3.

Certificate level:

Certificates exist at two levels: primary certificates and secondary certificates.

Certification Authority (CA):

An authority trusted by one or more users to manage X.509 certificates and CRLs.

Certification Chain:

An ordered list of Certificates containing an end-user Subscriber Certificate and CA Certificates, which terminates in a root Certificate.

Certificate Policy:

Named set of rules that indicates the applicability of a certificate to a particular community and/or class of applications with common security requirements. It is the principal statement of certificate policy governing the organizational PKI. The CP is a high-level document that describes the requirements, terms and conditions, and policy for issuing, utilizing and managing certificates issued by a CA.

Certification Practice Statement (CPS):

A statement of the practices, which a Certification Authority employs in issuing certificates. It is a comprehensive description of such details as the precise implementation of service offerings and detailed procedures of certificate life-cycle management and will be more detailed than the certificate policies supported by the CA.

Certificate Revocation List (CRL):

A periodically issued list, digitally signed by a CA, of identified Certificates that have been revoked prior to their expiration dates. The list generally indicates the CRL issuer's name, the date of issue, the date of the next scheduled CRL issue, the revoked Certificates' serial numbers, and the specific times and reasons for revocation. CRL can be used to check the status of certificates.

Confidential:

A security classification used to describe information which if disclosed could result in personal loss or minor financial loss. Personal information and tactical information would be deemed confidential.

Confidentiality:

Information that has an identifiable value associated with it such that if disclosed might cause damage to an entity.

Cross Certification:

The process describing the establishing of trust between two or more CAs. Usually involves the exchange and signing of CA certificates and involves the verification of assurance levels.

Cryptographic Module:

A unit in which encryption keys are stored together with a processor which can carry out critical cryptographic algorithms. Examples of cryptographic modules include EID cards.

Decryption:

The process of changing encrypted (coded) information into decrypted (legible) information. See also encryption.

Distinguished Encoding Rules (DER):

The Distinguished Encoding Rules for ASN.1, abbreviated DER, gives exactly one way to represent any ASN.1 value as an octet string. DER is intended for applications in which a unique octet string encoding is needed, as is the case when a digital signature is computed on an ASN.1 value.

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Digital Signature:

The result of the transformation of a message by means of a cryptographic system using keys such that a person who has the initial message can determine that the key that corresponds to the signer's key created the transformation and the message was not altered.

Directory Service:

Database service which in this document relates to a database structure in accordance with standard X.500 or LDAP.

Distinguished Name (DN):

Every entry in a X.500 or LDAP directory has a Distinguished Name, or DN. It is a unique entry identifier through out the complete directory. No two Entries can have the same DN within the same directory. A DN is used in certificates to uniquely identify a certificate-owner.

Dual Control:

A process utilizing two or more separate entities (usually persons), operating in concert, to protect sensitive functions or information, whereby no single entity is able to access or utilize the materials, e.g., cryptographic key.

EID card:

Electronic ID card in the form of an active card containing certificates and keys while the front of the card can be used as a visual ID document.

Electronic identity check:

Identity check which can be carried out without the persons whose identity is being checked being present in person.

Electronic signature:

General signature designation created using IT. Digital equivalent to traditional signature. See also digital signature.

Encryption:

The process of changing information which can be interpreted (clear text) into encrypted information. The aim of the encrypted information is that it shall not be interpretable by anyone who does not hold exactly the right key (in symmetrical encryption) or exactly the right private key (in asymmetrical encryption) required to correctly decrypting the information.

E-mail Certificates:

Certificates utilized for encrypting and verifying digital signatures. Normally two separate certificate: one for encryption, the other for signature verification.

Entity:

Any autonomous element or component within the Public Key Infrastructure that participate is one form or another, such managing certificates or utilizing certificates. An Entity can be a CA, RA, Subscriber, Relying Party, etc.

FIPS 140-2:

Federal Information Processing Standard 140-2(FIPS 140-2) is a standard that describes US Federal government requirements that IT products shall meet for Sensitive, but Unclassified (SBU) use. The standard was published by the National Institute of Standards and Technology (NIST), has been adopted by the Canadian government's Communication Security Establishment (CSE), and is likely to be adopted by the financial community through the American National Standards Institute (ANSI). The different levels (1 to 4) within the standard provide different levels of security and in the higher levels, have different documentation requirements.

FIPS 180-1:

Standard specifying a Secure Hash Algorithm, SHA-1, for computing a condensed representation of a message or a data files.

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Integrity:

Ensuring consistency of an object or information. Within security systems, integrity is the principle of ensuring that a piece of data has not been modified maliciously or accidentally.

ISO 11568-5:

Basic principles and requirements for Key lifecycle for public key cryptosystems, provides instructions to financial institutions in the development, implementation and/or the operation of systems and procedures throughout Key's lifecycle

Key:

When used in the context of cryptography, it is a secret value, a sequence of characters that is used to encrypt and decrypt data. A key is a unique, generated electronic string of bits used for encrypting, decrypting, e-signing or validating digital signatures.

Key holder:

In this context, a person, an organization, an organizational unit or a function which has exclusive control of the private key, the public equivalent of which is certified in a certificate. See also subscriber.

Key Pair:

Often referred to as public/private key pair. One key is used for encrypting and the other key used for decrypting. Although related, the keys are sufficiently different that knowing one does not allow derivation or computation of the other. This means that one key can be made publicly available without reducing security, provided the other key remains private.

Log:

A sequential and unbroken list of events in a system or a process. A typical log contains log entries for individual events, each containing information on the event, who initiated it, when it occurred, what it resulted in, etc.

MD5:

A Message Digest Algorithm.

Non-repudiation:

Protection against the denial of the transaction or service or activity occurrence.

Non-repudiation services:

Service which aim to hold a key holder responsible for signed messages in such a way that they can be verified by a third party at a later point in time.

Object Identifier:

The unique alpha-numeric identifier registered under the ISO registration standard to reference a standard object or class.

Operator:

Employee of a CA.

PKCS #1:

Standard that provides recommendations for the implementation of public-key cryptography based on the RSA algorithm, covering the following aspects: cryptographic primitives; encryption schemes; signature schemes, etc.

PKCS #7:

A cryptographic message format or syntax managed and edited by RSA Laboratories. A standard describing general syntax for data that may have cryptography applied to it, such as digital signatures and digital envelopes.

PKCS #10:

A certificate request format or syntax managed and edited by RSA Laboratories. It is a standard describing syntax for a request for certification of a public key, a name, and possibly a set of attributes.

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PKIX:

The Public Key Infrastructure (X.509) or PKIX is an IETF Working Group established with the intent of developing Internet standards needed to support an X.509-based PKI. The scope of PKIX extends to also develop new standards for use of X.509-based PKIs in the Internet.

PKI personnel:

Persons, generally employees, associated with the operation, administration and management of a CA or RA.

PKI Security Board:

The virtual organization inside TeliaSonera who own's the CA and has the daily responsibility of its actions and decisions.

Policy:

The set of laws, rules and practices that regulates how an organization manages its business. Specifically, security policy would be the set of laws, rules and practices that regulates how an organization manages, protects and distributes sensitive information.

Primary certificate:

A certificate which is issued on the basis of identifying key holders other than by the key holder producing another certificate. Identification then normally takes place through the key holder instead producing an identity document.

PrintableString:

String format for representing names, such as Common Name (CN), in X.509 certificates. The encoding of a value in this syntax is the string value itself.

Private Key:

The private key is one of the keys in a public/private key pair. This is the key that is kept secret as opposed to the other key that is publicly available. Private keys a utilized for digitally signing documents, uniquely authenticating an individual, or decrypting data that was encrypted with the corresponding public key.

Public Key Infrastructure:

A set of policies, procedures, technology, audit and control mechanisms used for the purpose of managing certificates and keys.

Public:

A security classification for information that if disclosed would not result in any personal damage or financial loss.

Public Key:

The community verification key for digital signature and the community encryption key for encrypting information to a specific Subscriber.

RA policy:

A named set of rules for the RA's role in producing, issuing and revoking certificates and which regulates the applicability of certificates within a specific area of application.

Registration Authority (RA):

An entity that performs registration services on behalf of a CA. RAs work with a particular CA to vet requests for certificates that will then be issued by the CA.

Re-key:

The process of replacing or updating the key(s). The expiration of the crypto period involves the replacement of the public key in the certificate and therefore the generation of a new certificate.

Relative Distinguished Name (RDN):

A Distinguished Name is made up of a sequence of Relative Distinguished Names, or RDNs. The sequences of RDNs are separated by commas (,) or semi-colons (;). There can be more than one identical RDN in a directory, but they must be in different bases, or branches, of the directory.

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Relying Party:

A person or entity that uses a certificate signed by the CA to authenticate a digital signature or encrypt communications to a certificate subject. The relying party relies on the certificate as a result of the certificate being sign by a CA, which is trusted. A relying party normally is but does not have to be a Subscriber of the PKI.

Repository:

A place or container where objects are stored. A data repository is technology where data is stored logically. In PKI terms, a repository accepts certificates and CRLs form one or more CAs and makes them available to entities that need them for implementing security services.

Revocation:

In PKI, revocation is the action associated with revoking a certificate. Revoking a certificate is to make the certificate invalid before its normal expiration. The Certification Authority that issued the certificate is the entity that revokes a certificate. The revoked status is normally published on a certificate revocation list (CRL).

RSA:

A public key cryptographic algorithm invented by Rivest, Shamir, and Adelman.

Secondary certificate:

A certificate issued on the basis of another certificate, the primary certificate. This means that the issuing CA relies on the CA which issued the primary certificate, i.e. accepts the public key's certification of the key holder, which is turn requires reliance on the identification of the key holder when issuing the primary certificate being correct.

Sensitive:

Used to describe the security classification of information where the information if disclosed would result in serious financial loss, serious loss in confidence or could result in personal harm or death.

Signature Verification Certificate:

Often referred to as simply a Signature Certificate. It is the certificate containing the public key used to verify a digital signature that was signed by the corresponding private key.

Split Knowledge

A condition under which two or more parties separately and confidentially have custody of components of a single key that, individually, convey no knowledge of the resultant cryptographic key. The resultant key exists only within secure cryptographic devices.

SSL Client Certificate:

Certificate utilized to verify the authentication of an end user to a server when a connection is being established via a SSL session (secure channel).

SSL Server Certificate:

Certificate utilized to verify the authentication of a web or application server to the end user (client) when a connection is being established via a SSL session (secure channel).

Storage module:

In this document relates to cryptographic module.

Subject

Entity identified in a certificate as the holder of the private key associated with the public key given in the certificate. [ETSI TS 101 456 v1.2.1] Subject can also be a device (a data network component or software, hereafter referred to as "Device").

Subscriber:

Entity subscribing with a Certification Authority on behalf of one or more Subjects. The Subject may be a Subscriber acting on its own behalf. [ETSI TS 101 456 v1.2.1]

Surveillance Camera:

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A surveillance camera is a video recording device used for detection and identification of unauthorized physical entry to a secured area. A camera used for recording a signing ceremony for auditing purposes is not considered a surveillance camera.

Symmetric encryption:

Encryption system characterised by both the sender and the recipient of encrypted information using the same secret key for both encryption and decryption.

Threat:

A danger to an asset in terms of that asset's confidentiality, integrity, availability or legitimate use.

Token:

Hardware devices, normally associated with a reader, used to store and/or generate encryption keys, such as smartcards and USB tokens.

Trusted Third Party (TTP):

A party on which two or more collaborative parties rely. A TTP carries out services for the collaborative parties, such as time-stamping, certificate issuing, etc.

Trusting party:

A recipient of a certificate which trusts this certificate on authentication,

verification of digital signatures and/or encryption of information. See also Relying Party.

Unambiguous identity:

An identity comprising a set of attributes which relate unambiguously to a specific person. The unambiguous connection between the identity and the person may be dependant on the context within which the identity term is used. Certain contexts may require assistance from the current registrar of various attributes.

URI

Universal Resource Indicator - an address on the Internet.

UTF8String

UTF-8 is a type of Unicode, which is a character set supported across many commonly used software applications and operating systems. UTF-8 is a multibyte encoding in which each character can be encoded in as little as one byte and as many as four bytes. Most Western European languages require less than two bytes per character. Greek, Arabic, Hebrew, and Russian require an average of 1.7 bytes. Japanese, Korean, and Chinese typically require three bytes per character. Such Unicode is important to ensure that universal /foreign characters are supported.

Verification:

The process of ensuring that an assumption is correct. This term relates primarily to the process of ensuring that a digital signature represents the party which the signed information details as its issuer.

Vettor:

A person who verifies information provided by a person applying for a certificate.

Vulnerability:

Weaknesses in a safeguard or the absence of a safeguard.

Written:

Where this CPS specifies that information shall be written, this requirement is generally also met by digital data provided that the information it contains is accessible in such a way that it is useable by the parties involved.

X.500

Specification of the directory service required to support X.400 e-mail initially but common used by other applications as well.

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X501 PrintableString:

String format for representing names, such as Common Name (CN), in X.509 certificates. The encoding of a value in this syntax is the string value itself; an arbitrary string of printable characters.

X.509:

ISO standard that describes the basic format for digital certificates.