

Policy requirements for certification authorities issuing public key certificates



Reference

DTS/SEC-004006

Keywords

e-commerce, electronic signature, public key,
security, trust services

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Contents

Intellectual Property Rights	5
Foreword.....	5
Introduction	5
1 Scope	6
2 References	7
3 Definitions, abbreviations and notation.....	7
3.1 Definitions	7
3.2 Abbreviations	8
3.3 Notation.....	8
4 General concepts	8
4.1 Certification authority	8
4.2 Certification services.....	9
4.3 Certificate policy and certification practice statement	10
4.3.1 Purpose	10
4.3.2 Level of specificity	11
4.3.3 Approach	11
4.3.4 Other CA statements	11
4.4 Subscriber and subject.....	11
5 Introduction to certificate policies.....	12
5.1 Overview	12
5.2 Identification	12
5.3 User community and applicability.....	12
5.4 Conformance	13
5.4.1 Conformance claim.....	13
5.4.2 Conformance requirements	13
6 Obligations and liability	13
6.1 Certification authority obligations.....	13
6.2 Subscriber obligations	13
6.3 Information for relying parties	14
6.4 Liability	14
7 Requirements on CA practice.....	14
7.1 Certification practice statement.....	15
7.2 Public key infrastructure - Key management life cycle.....	15
7.2.1 Certification authority key generation	15
7.2.2 Certification authority key storage, backup and recovery.....	16
7.2.3 Certification authority public key distribution.....	17
7.2.4 Key escrow	17
7.2.5 Certification authority key usage	17
7.2.6 End of CA key life cycle.....	17
7.2.7 Life cycle management of cryptographic hardware used to sign certificates	18
7.2.8 CA provided subject key management services.....	18
7.2.9 Secure user device preparation	18
7.3 Public key infrastructure - Certificate management life cycle.....	19
7.3.1 Subject registration	19
7.3.2 Certificate renewal, rekey and update.....	21
7.3.3 Certificate generation.....	21
7.3.4 Dissemination of terms and conditions	22
7.3.5 Certificate dissemination	23
7.3.6 Certificate revocation and suspension.....	23
7.4 CA management and operation	25
7.4.1 Security management.....	25

7.4.2	Asset classification and management	25
7.4.3	Personnel security	26
7.4.4	Physical and environmental security.....	27
7.4.5	Operations management	27
7.4.6	System access management	28
7.4.7	Trustworthy systems deployment and maintenance	30
7.4.8	Business continuity management and incident handling	30
7.4.9	CA termination	31
7.4.10	Compliance with legal requirements.....	31
7.4.11	Recording of information concerning certificates.....	32
7.5	Organizational	33
8	Framework for the definition of other certificate policies.....	34
8.1	Certificate policy management.....	34
8.2	Additional requirements	34
8.3	Conformance	34
Annex A (informative): Significant differences to TS 101 456		36
A.1	Scope	36
A.2	TS 101 456 specific requirements	36
A.3	Alternative quality requirements	36
A.4	Alternative functionality requirements.....	36
Annex B (informative): Model PKI disclosure statement.....		37
B.1	Introduction	37
B.2	The PDS structure	38
Annex C (informative): IETF RFC 2527 and certificate policy cross reference.....		39
Annex D (informative): Bibliography.....		40
History		41

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Security (SEC).

Introduction

Electronic commerce, in its broadest sense, is emerging as a way of doing business and communicating across public and private networks. An important requirement of electronic commerce is the ability to identify the originator and protect the confidentiality of electronic exchanges. This is commonly achieved by using cryptographic mechanisms which are supported by a certification-service-provider issuing certificates, commonly called a Certification Authority (CA).

For participants of electronic commerce to have confidence in the security of these cryptographic mechanisms they need to have confidence that the CA has properly established procedures and protective measure in order to minimize the operational and financial threats and risks associated with public key crypto systems.

TS 101 456 provides a baseline for policy requirements for certification authorities issuing qualified certificates in line with the Directive 1999/93/EC of the European Parliament and of the Council on a Community framework for electronic signatures (hereinafter referred to as "the Electronic Signature Directive"). The present document is based on the same approach as TS 101 456 but is applicable to the general requirements of certification in support of cryptographic mechanisms, including other forms of electronic signature as well as the use of cryptography for authentication and encryption. Moreover, where requirements identified have general applicability they are carried forward into the present document. Annex A of the present document identifies significant differences to TS 101 456.

Article 5.2 of the Electronic Signature Directive states that an electronic signature "is not denied legal effectiveness ... solely on the grounds that ...[it is] not based on a qualified certificate ...". Hence, certificates issued by certification authorities operating in accordance with the present document are applicable to electronic signatures as described in article 5.2.

The present document includes options for supporting the same level of quality by certification authorities issuing qualified certificates (as required article 5.1 of the Electronic Signature Directive 1999/93/EC) but "normalized" for wider applicability and for ease of alignment with other similar specifications and standards from other sources and institutions. Through such harmonization the quality level set by the Electronic Signature Directive can become embodied in more widely recognized and accepted specifications.

1 Scope

The present document specifies policy requirements relating to Certification Authorities (CAs) issuing public key certificates. It defines policy requirements on the operation and management practices of certification authorities issuing certificates such that subscribers, subjects certified by the CA and relying parties may have confidence in the applicability of the certificate in support of cryptographic mechanisms.

The policy requirements are defined in terms of three reference certificates policies and a framework from which CAs can produce a certificate policy targeted at a particular service.

The first reference policy defines a set of requirements for CAs providing a level of quality the same as that offered by qualified certificates, without being tied to the Electronic Signature Directive (1999/93/EC) and without requiring use of a secure user (signing or decrypting) device. This is labelled the "Normalized" Certificate Policy (NCP). It is anticipated that the NCP may be used as the basis for realizing the quality level set by the Qualified Certificate Policy (as defined TS 101 456) but without the legal constraints of the Electronic Signature Directive (1999/93/EC).

In addition to the NCP quality level, the present document specifies two alternative variants of NCP, the requirements of which may be used where alternative levels of service can be justified through risk analysis. The alternatives are referred to as:

- the Lightweight Certificate Policy (LCP) for use where a risk assessment does not justify the additional costs of meeting the more onerous requirements of the NCP (e.g. physical presence);
- the extended Normalized Certificate Policy (NCP+) for use where a secure user device (signing or decrypting) is considered necessary.

Service Providers adopting the present document as a framework for their own particular certificate policy need to make an explicit choice between these three alternatives and state clearly in their certificate policy which alternative that they have adopted.

Certificates issued under these policy requirements may be used in support of any asymmetric mechanisms requiring certification of public keys including electronic and digital signatures, encryption, key exchange and key agreement mechanisms.

The present document may be used by competent independent bodies as the basis for confirming that a CA provides a reliable service in line with recognized practices.

It is recommended that subscribers and relying parties consult the certificate policy and certification practice statement of the issuing CA to obtain details of the requirements addressed by its certificate policy and how the certificate policy is implemented by the particular CA.

The policy requirements relating to the CA include requirements on the provision of services for registration, certificate generation, certificate dissemination, revocation management, revocation status and if required, secure subject device provision. Support for other trusted third party functions such as time-stamping and attribute certificates are outside the scope of the present document. In addition, the present document does not address requirements for certification authority certificates, including certificate hierarchies and cross-certification.

The present document does not specify how the requirements identified may be assessed by an independent party, nor does it specify requirements for information to be made available to such independent assessors, or requirements on such assessors.

NOTE: See CEN Workshop Agreement 14172 (see bibliography).

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

- [1] Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data.
- [2] FIPS PUB 140-1: "Security Requirements for Cryptographic Modules".
- [3] ISO/IEC 15408 (parts 1 to 3): "Information technology - Security techniques - Evaluation criteria for IT security".
- [4] CEN Workshop Agreement 14167-2: "Security Requirements for Trustworthy Systems Managing Certificates for Electronic Signatures - Part 2 Cryptographic Module for CSP Signing Operations - Protection Profile (MCSO-PP)".
- [5] ISO/IEC 9794-8|ITU-T Recommendation X.509: "Information technology - Open Systems Interconnection - The Directory: Public-key and attribute certificate frameworks".

3 Definitions, abbreviations and notation

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

certificate: public key of a user, together with some other information, rendered un-forgable by encipherment with the private key of the certification authority which issued it

certificate policy: named set of rules that indicates the applicability of a certificate to a particular community and/or class of application with common security requirements

NOTE: See clause 4.3 for explanation of the relative role of certificate policies and certification practice statement.

certification authority: authority trusted by one or more users to create and assign certificates

NOTE: See clause 4.1 for further explanation of the concept of certification authority.

certification practice statement: statement of the practices which a certification authority employs in issuing certificates

electronic signature: data in electronic form which are attached to or logically associated with other electronic data and which serve as a method of authentication of that data

lightweight certificate policy: certificate policy which offers a quality of service less onerous than the qualified certificate policy as defined in TS 101 456

normalized certificate policy: certificate policy which offers a quality of service equivalent to the qualified certificate policy as defined in TS 101 456

relying party: recipient of a certificate who acts in reliance on that certificate and/or digital signatures verified using that certificate

secure user device: device which holds the user's private key, protects this key against compromise and performs signing or decryption functions on behalf of the user

subject: entity identified in a certificate as the holder of the private key associated with the public key given in the certificate

subscriber: entity subscribing with a Certification Authority on behalf of one or more subjects

NOTE: The subject may be a subscriber acting on its own behalf.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CA	Certification Authority
CSP	Certification Service Provider
LCP	Lightweight Certificate Policy
NCP	Normalized Certificate Policy
NCP+	Normalized Certificate Policy requiring use of a secure user device
PDS	PKI Disclosure Statement
PKI	Public Key Infrastructure
QCP	Qualified Certificate Policy
CRL	Certificate Revocation List

3.3 Notation

The requirements identified in the present document include:

- a) mandatory requirements that must always be addressed. Such requirements are indicated by clauses without any additional marking;
- b) requirements that must be addressed if applicable to the services offered under the applicable certificate policy. Such requirements are indicated by clauses marked by "[CONDITIONAL]";
- c) requirements that include several choices which ought to be selected depending on the quality of the service offered under the applicable certificate policy. Such requirements are indicated by markings by "[CHOICE]" with a subsequent indicator relating to the relative quality: "[LCP]" - lightweight, "[NCP]" normalized, "[NCP+]" normalized with secure user device.

4 General concepts

4.1 Certification authority

The authority trusted by the users of the certification services (i.e. subscribers as well as relying parties) to create and assign certificates is called the certification authority. The certification authority has overall responsibility for the provision of the certification services identified in clause 4.1. The certification authority's key is used to sign the certificates and it is identified in the certificate as the issuer.

The certification authority may make use of other parties to provide parts of the certification service. However, the certification authority always maintains overall responsibility and ensures that the policy requirements identified in the present document are met. For example, a certification authority may sub-contract all the component services, including the certificate generation service. However, the key used to generate the certificates is identified as belonging to the CA, and the CA maintains overall responsibility for meeting the requirements defined in the present document.

A certification authority is a certification-service-provider, as defined in the Electronic Signatures Directive (1999/93/EC), which issues public key certificates.

4.2 Certification services

The service of issuing certificates is broken down in the present document into the following component services for the purposes of classifying requirements:

- **Registration service:** verifies the identity and, if applicable, any specific attributes of a subject. The results of this service are passed to the certificate generation service.
- **Certificate generation service:** creates and signs certificates based on the identity and other attributes verified by the registration service.
- **Dissemination service:** disseminates certificates to subjects, and if the subject consents, to relying parties. This service also disseminates the CA's terms and conditions, and any published policy and practice information, to subscribers and relying parties.
- **Revocation management service:** processes requests and reports relating to revocation to determine the necessary action to be taken. The results of this service are distributed through the revocation status service.
- **Revocation status service:** provides certificate revocation status information to relying parties. This service may be a real-time service or may be based on revocation status information which is updated at regular intervals.

and optionally:

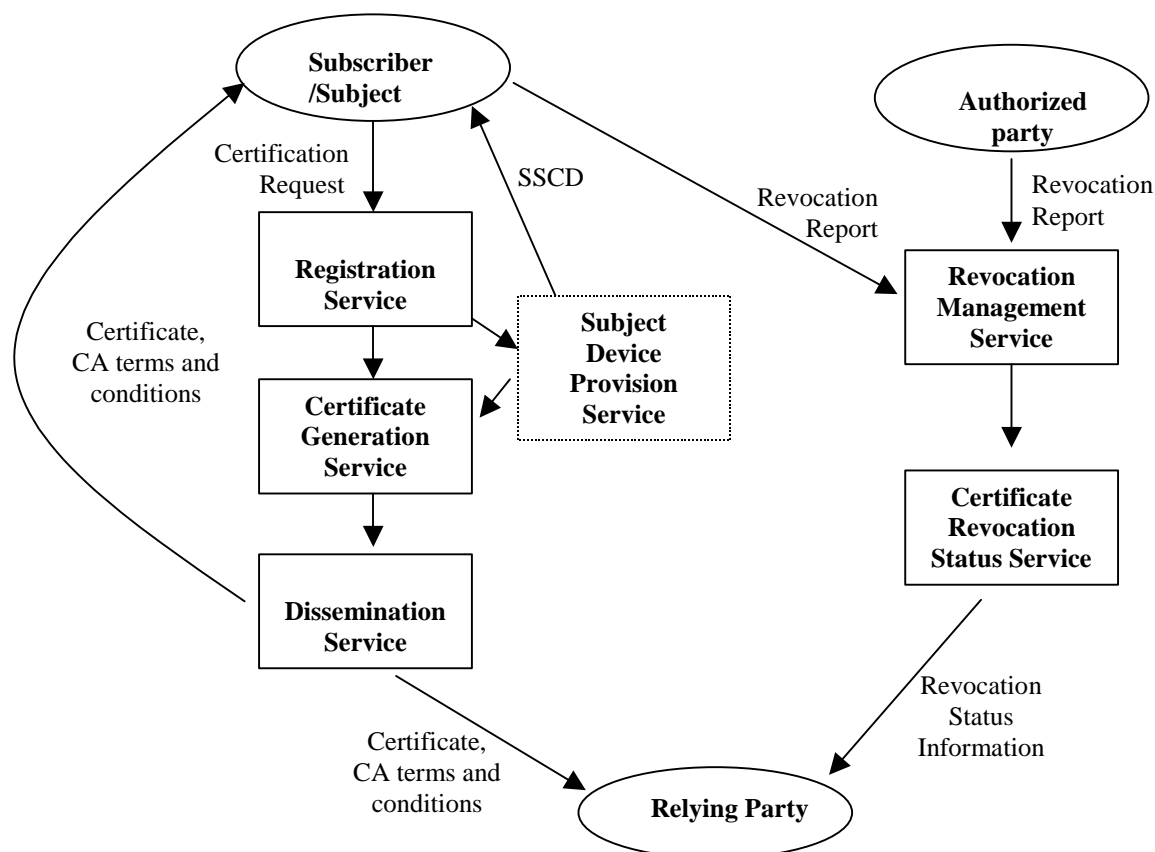
- **Subject device provision service:** prepares and provides signature-creation devices, or other secure user device, to subjects.

NOTE: Examples of this service are:

- a service which generates the subject's key pair and distributes the private key to the subject;
- a service which prepares the subject's signature-creation module and enabling codes and distributes the module to the registered subject.

This subdivision of services is only for the purposes of clarification of policy requirements and places no restrictions on any subdivision of an implementation of the CA services.

Figure 1 illustrates the interrelationship between the services.



NOTE: Figure 1 is for illustrative purposes. Clause 7 specifies the specific requirements for each of the services.

Figure 1: Illustration of subdivision of certification services used in the present document

4.3 Certificate policy and certification practice statement

This clause explains the relative roles of certificate policy and certification practice statement. It places no restriction on the form of a certificate policy or certification practice statement specification.

4.3.1 Purpose

In general, the purpose of the certificate policy, referenced by a policy identifier in a certificate, states "what is to be adhered to", while a certification practice statement states "how it is adhered to", i.e. the processes it will use in creating and maintaining the certificate. The relationship between the certificate policy and certification practice statement is similar in nature to the relationship of other business policies which state the requirements of the business, while operational units define the practices and procedures of how these policies are to be carried out.

4.3.2 Level of specificity

A certificate policy is a less specific document than a certification practice statement. A certification practice statement is a more detailed description of the terms and conditions as well as business and operational practices of a certification authority in issuing and otherwise managing certificates. A certification practice statement defines how a specific certification authority meets the technical, organizational and procedural requirements identified in a certificate policy.

NOTE: Even lower-level documents may be appropriate for a CA detailing the specific procedures necessary to complete the practices identified in the certification practice statement. This lower-level documentation is generally regarded as an internal operational procedure documents, which may define specific tasks and responsibilities within an organization. While this lower-level documentation may be used in the daily operation of the CA and reviewed by those doing a process review, due to its internal nature this level of documentation is considered private and proprietary and therefore beyond the scope of the present document. For example, the policy may require secure management of the private key(s), the practices may describe the dual-control, secure storage practices, while the operational procedures may describe the detailed procedures with locations, access lists and access procedures.

4.3.3 Approach

The approach of a certificate policy is significantly different from a certification practice statement. A certificate policy is defined independently of the specific details of the specific operating environment of a certification authority, whereas a certification practice statement is tailored to the organizational structure, operating procedures, facilities, and computing environment of a certification authority. A certificate policy may be defined by the user of certification services, whereas the certification practice statement is always defined by the provider.

4.3.4 Other CA statements

In addition to the policy and practice statements a CA may issue terms and conditions. Such a statement of terms and conditions is broad category of terms to cover the broad range of commercial terms or PKI specific, etc. terms that are not necessarily communicated to the customer, they may, nevertheless apply in the situation.

The PKI disclosure statement is that part of the CA's terms and conditions which relate to the operation of the PKI and which it is considered that the CA ought to disclose to both subscribers and relying parties.

4.4 Subscriber and subject

In some cases certificates are issued directly to individuals for their own use. However, there commonly exist other situations where the party requiring a certificate is different from subject to whom the certificate applies. For example, a company may require certificates for its employees to allow them to participate in electronic business on behalf of the company, or a computer system may perform automated commerce on behalf of the owner organization. In such situations the entity subscribing to the certification authority for the issuance of certificates is different from the entity which is the subject of the certificate. Another common example is the case of server certificates, where the certificate is required for a computer system acting on behalf of the owner organization.

In the present document to clarify the requirements which are applicable to the two different roles that may occur two different terms are used for the "subscriber" who contracts with the certification authority for the issuance of certificates and the "subject" to whom the certificate applies. The subscriber bears ultimate responsibility for the use of the private key associated with the public key certificate but the subject is the individual that is authenticated by the private key.

In the case of certificates issued to individual for their own use the subscriber and subject can be the same entity. In other cases, such as certificates issued to employees or computer systems as mentioned above, the subscriber and subject are different. The subscriber would be, for example, the employer or owner organization. The subject would be the employee or computer system.

Within the present document we use these two terms with this explicit distinction wherever it is meaningful to do so, although in some cases the distinction is not always crystal clear.

5 Introduction to certificate policies

5.1 Overview

A certificate policy is a "named set of rules that indicates the applicability of a certificate to a particular community and/or class of application with common security requirements".

The policy requirements are defined in the present document in terms of certificate policies. Certificates issued in accordance with the present document include a certificate policy identifier which can be used by relying parties in determining the certificates suitability and trustworthiness for a particular application. The present document specifies three certificate policies:

- 1) A Normalized Certificate Policy (NCP) which offers the same quality as that offer by the Qualified Certificate Policy (QCP) as defined TS 101 456 but without the legal constraints implied by the Electronic Signature Directive (1999/93/EC) without requiring use of a Secure User Device (signing or decrypting);
- 2) A Normalized Certificate Policy (NCP) requiring use of a Secure User Device (signing or decrypting) (NCP+);
- 3) A Lightweight Certificate Policy (LCP) which incorporates less demanding policy requirements.

Clause 8 specifies a framework for other certificate policies which enhance or further constrain the above policies.

5.2 Identification

The identifiers for the certificate policies specified in the present document are:

- a) NCP: Normalized Certificate Policy

```
itu-t(0) identified-organization(4) etsi(0) other-certificate-policies(2042)
policy-identifiers(1) ncp (1)
```

- b) NCP+: Normalized Certificate Policy requiring a secure user device

```
itu-t(0) identified-organization(4) etsi(0) other-certificate-policies(2042)
policy-identifiers(1) qcp-public (2)
```

- c) LCP: Lightweight Certificate Policy:

```
itu-t(0) identified-organization(4) etsi(0) other-certificate-policies(2042)
policy-identifiers(1) qcp-public (3)
```

By including one of these object identifiers in a certificate the CA claims conformance to the identified certificate policy.

A CA shall also include the identifier(s) for the certificate policy (or policies) being supported in the terms and conditions made available to subscribers and relying parties to indicate its claim of conformance.

5.3 User community and applicability

The policies defined in the present document place no constraints on the user community and applicability of the certificate.

5.4 Conformance

5.4.1 Conformance claim

The CA shall only claim conformance to the present document as applied in the certificate policy (or policies) identified in the certificate that it issues if:

- a) it either claims conformance to the identified certificate policy and makes available to subscribers and relying parties on request the evidence to support the claim of conformance; or
- b) it has been assessed to be conformant to the identified certificate policy by a competent independent party.

NOTE: See CEN Workshop Agreement 14172 (see bibliography).

5.4.2 Conformance requirements

A conformant CA must demonstrate that:

- a) it meets its obligations as defined in clause 6.1;
- b) it has implemented controls which meet the requirements, including options applicable to the implemented policies, as specified in clause 7.

6 Obligations and liability

6.1 Certification authority obligations

The CA shall ensure that all requirements on CA, as detailed in clause 7, are implemented as applicable to the selected certificate policy.

The CA has the responsibility for conformance with the procedures prescribed in this policy, even when the CA functionality is undertaken by sub-contractors.

The CA shall provide all its certification services consistent with its certification practice statement.

6.2 Subscriber obligations

The CA shall oblige, through agreement (see clauses 7.3.1a and 7.3.4), the subscriber to ensure that the subject fulfils the following obligations:

- a) accurate and complete information is submitted to the CA in accordance with the requirements of this policy, particularly with regards to registration;
- b) the key pair is only used in accordance with any limitations notified to the subscriber (see clause 7.3.4);
- c) reasonable care is exercised to avoid unauthorized use of the subject's private key;
- d) [CONDITIONAL] if the subscriber or subject generates the subject's keys:
 - subject keys are generated using an algorithm recognized by industry as being fit for the uses of the certified key as identified in the certificate policy;
 - a key length and algorithm is used which is recognized as being fit for the uses of the certified key as identified in the certificate policy;
- e) [CONDITIONAL] if the subscriber or subject generates the subject's keys and the private key is for creating electronic signatures only the subject holds the private key once delivered to the subject;
- f) [NCP+] only use the subject's private key for signing or decrypting with the secure user device;

- g) [NCP+] [CONDITIONAL] if the subject's keys are generated under control of the subscriber, generate the subject's keys within the secure user device used for signing or decrypting;
- h) notify the CA without any reasonable delay, if any of the following occur up to the end of the validity period indicated in the certificate:
 - the subject's private key has been lost, stolen, potentially compromised; or
 - control over the subject's private key has been lost due to compromise of activation data (e.g. PIN code) or other reasons; and/or
 - inaccuracy or changes to the certificate content, as notified to the subscriber;
- i) following compromise, the use of the subject's private key is immediately and permanently discontinued.

6.3 Information for relying parties

The terms and conditions made available to relying parties (see clause 7.3.4) shall include a notice that if it is to reasonably rely upon a certificate, it shall:

- a) verify the validity, suspension or revocation of the certificate using current revocation status information as indicated to the relying party (see clause 7.3.4); and
- b) take account of any limitations on the usage of the certificate indicated to the relying party either in the certificate or the terms and conditions supplied as required in clause 7.3.4; and
- c) take any other precautions prescribed in agreements or elsewhere.

6.4 Liability

The CA shall specify any disclaimers or limitations of liability in accordance with applicable laws.

7 Requirements on CA practice

The CA shall implement the controls that meet the following requirements.

The present document includes the provision of services for registration, certificate generation, dissemination, revocation management and revocation status (see clause 4.1). Where requirements relate to a specific service area of the CA then it is listed under one of these subheadings. Where no service area is listed, or "CA General" is indicated, a requirement is relevant to the general operation of the CA.

These policy requirements are not meant to imply any restrictions on charging for CA services.

The requirements are indicated in terms of the security objectives followed by more specific requirements for controls to meet those objectives where considered necessary to provide the necessary confidence that those objective will be met.

NOTE: The details of controls required to meet an objective is a balance between achieving the necessary confidence whilst minimizing the restrictions on the techniques that a CA may employ in issuing certificates. In case of clause 7.4 (CA management and operation) reference is made to other more general standards which may be used as a source of more detailed control requirements. Due to these factors the specificity of the requirements given under a given topic may vary.

7.1 Certification practice statement

The CA shall have a statement of the practices and procedures used to address all the requirements identified in the certificate policy.

NOTE 1: This policy makes no requirement as to the structure of the certification practice statement.

In particular:

- a) The CA shall have a statement of the practices and procedures used to address all the requirements identified in the applicable certificate policy.
- b) The CA's certification practice statement shall identify the obligations of all external organizations supporting the CA services including the applicable policies and practices.
- c) The CA shall make available to subscribers and relying parties its certification practice statement, and other relevant documentation, as necessary to assess conformance to the certificate policy.

NOTE 2: The CA is not generally required to make all the details of its practices public.

- d) The CA shall disclose to all subscribers and potential relying parties the terms and conditions regarding use of the certificate as specified in clause 7.3.4.
- e) The CA shall have a high level management body with final authority and responsibility for approving the certification practice statement.
- f) The management of the CA has responsibility for ensuring the practices are properly implemented.
- g) The CA shall define a review process for certification practices including responsibilities for maintaining the certification practice statement.
- h) The CA shall give due notice of changes it intends to make in its certification practice statement and shall, following approval as in d) above, make the revised certification practice statement immediately available as required under c) above.

7.2 Public key infrastructure - Key management life cycle

7.2.1 Certification authority key generation

Certificate generation

The CA shall ensure that CA keys are generated in controlled circumstances.

In particular:

- a) Certification authority key generation shall be undertaken in a physically secured environment (see clause 7.4.4) by personnel in trusted roles (see clause 7.4.3) under, at least, dual control. The number of personnel authorized to carry out this function shall be kept to a minimum and be consistent with the CA's practices.

- b) [CHOICE]:

[LCP] CA key generation shall be carried out in a product, application or device which ensures that the keys are generated in a trustworthy manner and do not compromise the security of the private key and which:

- meets the requirements identified in FIPS PUB 140-1 [2] level 2 or higher; or
- is a trustworthy system which is assured to EAL 3 or higher in accordance to ISO/IEC 15408 [3], or equivalent security criteria.

[NCP] CA key generation shall be carried out within a device which either:

- meets the requirements identified in FIPS PUB 140-1 [2] level 3 or higher; or
- meets the requirements identified in CEN Workshop Agreement 14167-2 [4], or

- is a trustworthy system which is assured to EAL 4 or higher in accordance to ISO/IEC 15408 [3], or equivalent security criteria. This shall be to a security target or protection profile which meets the requirements of the present document, based on a risk analysis and taking into account physical and other non-technical security measures.

NOTE: The rules of clause 7.2.2 (b) to e)) apply also to key generation even if carried out in a separate system.

- c) Certification authority key generation shall be performed using an algorithm recognized by industry as being fit for the CA's signing purposes.
- d) The selected key length and algorithm for CA signing key shall be one which is recognized by industry as being fit for the CA's signing purposes.

7.2.2 Certification authority key storage, backup and recovery

Certificate generation

The CA shall ensure that CA private keys remain confidential and maintain their integrity.

In particular:

a) [CHOICE]:

[LCP] The CA private signing key shall be held and used in a product, application or device which does not compromise the security of the private key and which:

- meets the requirements identified in FIPS PUB 140-1 [2] level 2 or higher; or
- is a trustworthy system which is assured to EAL 3 or higher in accordance to ISO/IEC 15408 [3], or equivalent security criteria.

[NCP] The CA private signing key shall be held and used within a secure cryptographic device which:

- meets the requirements identified in FIPS PUB 140-1 [2] level 3 or higher; or
- meets the requirements identified in CEN Workshop Agreement 14167-2 [4], or
- is a trustworthy system which is assured to EAL 4 or higher in accordance to ISO/IEC 15408 [3], or equivalent security criteria. This shall be to a security target or protection profile which meets the requirements of the present document, based on a risk analysis and taking into account physical and other non-technical security measures.

b) [CHOICE]:

[LCP] When outside the signature-creation product, application or device, the secrecy of the CA's private key shall be ensured.

NOTE: This may be achieved using physical security or encryption.

[NCP] When outside the signature-creation device (see a) above) the CA private signing key shall be encrypted with an algorithm and key-length that, according to the state of the art, are capable to withstand cryptanalytic attacks for the residual life of the encrypted key or key part.

- c) The CA private signing key shall be backed up, stored and recovered only by personnel in trusted roles using, at least, dual control in a physically secured environment (see clause 7.4.4). The number of personnel authorized to carry out this function shall be kept to a minimum and be consistent with the CA's practices.
- d) Backup copies of the CA private signing keys shall be subject to the same or greater level of security controls as keys currently in use.
- e) Where the keys are stored in a dedicated key processing hardware module, access controls shall be in place to ensure that the keys are not accessible outside the hardware module.

7.2.3 Certification authority public key distribution

Certificate generation and certificate distribution

The CA shall ensure that the integrity and authenticity of the CA signature verification (public) key and any associated parameters are maintained during its distribution to relying parties.

In particular:

- a) CA signature verification (public) keys shall be made available to relying parties in a manner that assures the integrity of the CA public key and authenticates its origin.

NOTE: For example, certification authority public keys may be distributed in certificates signed by itself, along with a declaration that the key authenticates the CA, or issued by another CA. By itself a self signed certificate cannot be known to come from the CA. Additional measures, such as checking the fingerprint of the certificate against information provided by a trusted source, is needed to give assurance of the correctness of this certificate.

7.2.4 Key escrow

- a) [CONDITIONAL] If the subject's key is to be used for electronic signatures then the CA shall not hold the subject's private signing keys in a way which provides a backup decryption capability (commonly called key escrow).
- b) [CONDITIONAL] If a copy of the subject's key is kept by the CA then the CA shall ensure that the private key is kept secret and only made available to appropriately authorized persons.

NOTE: It is not allowed that the CA escrows the subject's private key if it is used for electronic signature (see a) above).

7.2.5 Certification authority key usage

The CA shall ensure that CA private signing keys are not used inappropriately.

In particular:

Certificate generation

- a) CA signing key(s) used for generating certificates, as defined in clause 7.3.3, and/or issuing revocation status information, shall not be used for any other purpose.
- b) The certificate signing keys shall only be used within physically secure premises.

7.2.6 End of CA key life cycle

The CA shall ensure that CA private signing keys are not used beyond the end of their life cycle.

In particular:

Certificate generation

- a) The use of the corresponding CA's private key, shall be limited to that compatible with the hash algorithm, the signature algorithm and signature key length used in the generating certificates, in line current practice as in clause 7.2.1 d).
- b) all copies of the CA private signing keys shall be:
 - destroyed such that the private keys cannot be retrieved; or
 - retained in a manner such that they are protected against being put back into use.

7.2.7 Life cycle management of cryptographic hardware used to sign certificates

[NCP] The CA shall ensure the security of cryptographic device throughout its lifecycle.

Certificate generation

[NCP] In particular the CA shall ensure that:

- a) certificate and revocation status information signing cryptographic hardware is not tampered with during shipment;
- b) certificate and revocation status information signing cryptographic hardware is not tampered with while stored;
- c) the installation, activation, back-up and recovery of the CA's signing keys in cryptographic hardware shall require simultaneous control of at least of two trusted employees;
- d) certificate and revocation status information signing cryptographic hardware is functioning correctly; and
- e) CA private signing keys stored on CA cryptographic hardware are destroyed upon device retirement.

7.2.8 CA provided subject key management services

The CA shall ensure that any subject keys, that it generates, are generated securely and the secrecy of the subject's private key is assured.

Certificate generation

[CONDITIONAL] If the CA generates the subject's keys:

- a) CA-generated subject keys shall be generated using an algorithm recognized by industry as being fit for the uses identified in the certificate policy.
- b) CA-generated subject keys shall be of a key length and for use with a public key algorithm which are recognized by industry as being fit for the purposes stated in the certificate policy.
- c) CA-generated subject keys shall be generated and stored securely before delivery to the subject.
- d) The subject's private key shall be delivered to the subject in a manner such that the secrecy of the key is not compromised.
- e) [CONDITIONAL] If a copy of the subject's public key is not required to be kept by the CA (see clause 7.2.4), on delivery to the subject, only the subject (or, if the key is not for electronic signatures, the subscriber) shall have access to its private key. Any copies of the subject's private key held by the CA shall be destroyed.

7.2.9 Secure user device preparation

[NCP+] The CA shall ensure that if it issues to the subject secure user device this is carried out securely.

Subject device provision

[CONDITIONAL]: In particular, if the CA issues a secure user device:

- a) Secure user device preparation shall be securely controlled by the service provider.
- b) Secure user device shall be securely stored and distributed.
- c) Secure user device deactivation and reactivation shall be securely controlled.
- d) Where the secure user device has associated user activation data (e.g. PIN code), the activation data shall be securely prepared and distributed separately from the signature-creation module.

NOTE: Separation may be achieved by ensuring distribution and delivery at different times, or via a different route.

7.3 Public key infrastructure - Certificate management life cycle

7.3.1 Subject registration

The CA shall ensure that evidence of subscriber's and subject's identification and accuracy of their names and associated data are either properly examined as part of the defined service or, where applicable, concluded through examination of attestations from appropriate and authorized sources, and that subscriber certificate requests are accurate, authorized and complete according to the collected evidence or attestation.

In particular:

Registration

- a) Before entering into a contractual relationship with a subscriber, the CA shall inform the subscriber of the terms and conditions regarding use of the certificate as given in clause 7.3.4.
- b) [CONDITIONAL]: If the subject is a person and not the same as the subscriber, the subject shall be informed of his/her obligations.
- c) The CA shall communicate this information through a durable (i.e. with integrity over time) means of communication, which may be transmitted electronically, and in readily understandable language.

NOTE 1: A model PKI disclosure statement which may be used as the basis of such a communication is given in annex B.

- d) The service provider shall collect either direct evidence, or an attestation from an appropriate and authorized source, of the identity (e.g. name) and, if applicable, any specific attributes of subjects to whom a certificate is issued. Submitted evidence may be in the form of either paper or electronic documentation. Verification of the subject's identity shall be by appropriate means and in accordance with national law.
- e) [CHOICE]:

[LCP] No requirement.

[NCP] If the subject is a physical person evidence of the subject's identity (e.g. name) shall be checked against a physical person either directly or indirectly using means which provides equivalent assurance to physical presence (see note 2). Evidence for verifying other entities shall involve procedures which provide the same degree of assurance.

NOTE 2: An example of evidence checked indirectly against a physical person is documentation presented for registration which was acquired as the result of an application requiring physical presence.

- f) [CONDITIONAL] If the subject is a physical person, evidence shall be provided of:
 - full name (including surname and given names);
 - date and place of birth, reference to a nationally recognized identity document, or other attributes which may be used to, as far as possible, distinguish the person from others with the same name.

NOTE 3: It is recommended that the place be given in accordance to national conventions for registering births.

- g) [CONDITIONAL] If the subject is a physical person who is identified in association with a legal person, or organizational entity (e.g. the subscriber), evidence shall be provided of:
 - full name (including surname and given names) of the subject;
 - date and place of birth, reference to a nationally recognized identity document, or other attributes of the subscriber which may be used to, as far as possible, distinguish the person from others with the same name;
 - full name and legal status of the associated legal person or other organizational entity (e.g. the subscriber);

- any relevant existing registration information (e.g. company registration) of the associated legal person or other organizational entity;
 - evidence that the subject is associated with the legal person or other organizational entity.
- h) [CONDITIONAL] If the subject is an organizational entity, evidence shall be provided of:
- full name of the organizational entity;
 - reference to a nationally recognized registration, or other attributes which may be used to, as far as possible, distinguish the organizational entity from others with the same name.
- i) [CONDITIONAL] If the subject is a device or system operated by or on behalf of an organizational entity, evidence shall be provided of:
- identifier of the device by which it may be referenced (e.g. Internet domain name);
 - full name of the organizational entity;
 - a nationally recognized identity number, or other attributes which may be used to, as far as possible, distinguish the organizational entity from others with the same name.
- j) The subscriber shall provide a physical address, or other attributes, which describe how the subscriber may be contacted.
- k) The CA shall record all the information necessary to verify the subject's identity, including any reference number on the documentation used for verification, and any limitations on its validity.
- l) The CA shall record the signed agreement with the subscriber including:
- agreement to the subscriber's obligations (see clause 6.2);
 - if required by the CA, agreement by the subscriber to user secure user device;
 - consent to the keeping of a record by the CA of information used in registration, subject device provision, including whether this is to the subscriber or to the subject where they differ, and any subsequent revocation (see clause 7.4.11), and passing of this information to third parties under the same conditions as required by this policy in the case of the CA terminating its services;
 - whether, and under what conditions, the subscriber requires and the subject consents to the publication of the certificate;
 - confirmation that the information held in the certificate as being correct.
- NOTE 4: The subscriber may agree to different aspects of this agreement during different stages of registration. For example, agreement that the information held in the certificate is correct may be carried out subsequent to other aspects of the agreement.
- NOTE 5: This agreement may be in electronic form.
- m) The records identified above shall be retained for the period of time as indicated to the subscriber (see c) above) and as necessary for the purposes for providing evidence of certification in legal proceedings.
- n) [CONDITIONAL] If the subject's key pair is not generated by the CA, the certificate request process shall ensure that the subject has possession of the private key associated with the public key presented for certification.
- o) The CA shall ensure that the requirements of the applicable national data protection legislation are adhered to (including the use of pseudonyms if applicable) within their registration process.
- p) The CA's verification policy shall only require the capture of evidence of identity sufficient to satisfy the requirements of the intended use of the certificate.

7.3.2 Certificate renewal, rekey and update

The CA shall ensure that requests for certificates issued to a subject who has previously registered with the same CA are complete, accurate and duly authorized. This includes certificate renewals, rekey following revocation or prior to expiration, or update due to change to the subject's attributes.

NOTE: The subscriber may, if the CA offers this service, request a certificate renewal for example where relevant attributes presented in the certificate have changed or when the certificate is nearing expiry.

In particular:

Registration

- a) The CA shall check the existence and validity of the certificate to be renewed and that the information used to verify the identity and attributes of the subject are still valid.
- b) If any of the CA terms and conditions have changed, these shall be communicated to the subscriber and agreed to in accordance with clause 7.3.1 a), b), c) and l).
- c) If any information has changed, this is verified, recorded, agreed to by the subscriber in accordance with clause 7.3.1 d) to k).
- d) The CA shall issue a new certificate using the subject's previously certified public key, only if its cryptographic security is still sufficient for the new certificate's intended lifetime and no indications exist that the subject's private key has been compromised.

7.3.3 Certificate generation

The CA shall ensure that it issues certificates securely to maintain their authenticity.

In particular:

Certificate generation

- a) the certificates shall include:
 - identification of the certification-service-provider and the country in which it is established;
 - the name of the subject, or a pseudonym which shall be identified as such;
 - provision for a specific attribute of the signatory to be included if relevant, depending on the purpose for which the certificate is intended;
 - the public key which corresponds to the private key under the control of the subject;
 - an indication of the beginning and end of the period of validity of the certificate;
 - the serial number of the certificate;
 - the electronic signature of the certification authority issuing it;
 - limitations on the scope of use of the certificate, if applicable; and
 - limits on the value of transactions for which the certificate can be used, if applicable.
- b) the procedure of issuing the certificate is securely linked to the associated registration, certificate renewal or rekey, including the provision of any subject-generated public key.
- c) [CONDITIONAL] if the CA generated the subject's key:
 - the procedure of issuing the certificate is securely linked to the generation of the key pair by the CA;
 - [LCP], [NCP] the private key is securely passed to the registered subject.

- [NCP+] the secure user device containing the subject's private key is securely passed to the registered subject.
- d) The CA shall ensure that over the life time of the CA a distinguished name which has been used in a certificate by it is never be re-assigned to another entity.
- e) The confidentiality and integrity of registration data shall be protected, especially when exchanged with the subscriber/subject or between distributed CA system components.
- f) The CA shall verify that registration data is exchanged with recognized registration service providers, whose identity is authenticated, in the event that external registration service providers are used.

7.3.4 Dissemination of terms and conditions

The CA shall ensure that the terms and conditions are made available to subscribers and relying parties.

In particular:

- a) The CA shall make available to subscribers and relying parties the terms and conditions regarding the use of the certificate:
 - the certificate policy being applied, including a clear statement as to whether the policy is for certificates issued to the public and whether the policy requires the use of any particular product, application or device for the purposes of applying the key-pair associated with the certificate being issued;
 - any limitations on its use;
 - the subscriber's obligations as defined in clause 6.2, including whether the policy requires the use of any particular product, application or device for the purposes of applying the key-pair associated with the certificate being issued;
 - information on how to validate the certificate, including requirements to check the revocation status of the certificate, such that the relying party is considered to "reasonably rely" on the certificate (see clause 6.3);
 - any limitations of liability, including the purposes/uses for which the CA accepts (or excludes) liability;
 - the period of time which registration information (see clause 7.3.1) is retained;
 - the period of time which CA event logs (see clause 7.4.11) are retained;
 - procedures for complaints and dispute settlement;
 - the applicable legal system; and
 - if the CA has been assessed to be conformant with the identified certificate policy, and if so through which scheme.
- b) The information identified in a) above shall be available through a durable (i.e. with integrity over time) means of communication, which may be transmitted electronically, and in readily understandable language.

NOTE: A model PKI disclosure statement which may be used as the basis of such a communication is given in annex B. Alternatively this communication may be provided as part of a subscriber/relying party agreement. These terms and conditions may be included in a certification practice statement provided that they are conspicuous to the reader.

7.3.5 Certificate dissemination

The CA shall ensure that certificates are made available as necessary to subscribers, subjects and relying parties.

In particular:

Dissemination

- a) Upon generation, the complete and accurate certificate shall be available to the subscriber or subject for whom the certificate is being issued.
- b) Certificates are available for retrieval in only those cases for which the subject's consent has been obtained.
- c) The CA shall make available to relying parties the terms and conditions regarding the use of the certificate (see clause 7.3.4).
- d) The applicable terms and conditions shall be readily identifiable for a given a certificate.
- e) [CHOICE]:
 - [LCP] The information identified in b) and c) above shall be available as specified in the CA's Certification Practice Statement.
 - [NCP] the information identified in b) and c) above shall be available 24 hours per day, 7 days per week. Upon system failure, service or other factors which are not under the control of the CA, the CA shall apply best endeavours to ensure that this information service is not unavailable for longer than a maximum period of time as denoted in the certification practice statement.
- f) [CONDITIONAL] If the CA is issuing certificate to the public the information identified in b) and c) above shall be publicly and internationally available.

7.3.6 Certificate revocation and suspension

The CA shall ensure that certificates are revoked in a timely manner based on authorized and validated certificate revocation requests.

In particular:

Revocation management

- a) The CA shall document as part of its certification practice statement (see clause 7.1) the procedures for revocation of certificates including:
 - who may submit revocation reports and requests;
 - how they may be submitted;
 - any requirements for subsequent confirmation of revocation reports and requests;

NOTE 1: For example, a confirmation may be required from the subscriber if a compromise is reported by a third party.

- whether and for what reasons certificates may be suspended;
- the mechanism used for distributing revocation status information;
- the maximum delay between receipt of a revocation request or report and the change to revocation status information being available to all relying parties.
This shall be at most [CHOICE]:

[LCP] 72 hours;

[NCP] 24 hours.

- b) Requests and reports relating to revocation (e.g. due to compromise of subject's private key, death of the subject, unexpected termination of a subscriber's or subject's agreement or business functions, violation of contractual obligations) shall be processed on receipt.
- c) Requests and reports relating to revocation shall be authenticated, checked to be from an authorized source. Such reports and requests will be confirmed as required under the CA's practices.
- d) A certificate's revocation status may be set to "suspended" whilst the revocation is being confirmed. The CA shall ensure that a certificate is not kept suspended for longer than is necessary to confirm its status.

NOTE 2: Support for certificate suspension is optional.

- e) The subject, and where applicable the subscriber, of a revoked or suspended certificate, shall be informed of the change of status of the certificate.
- f) Once a certificate is definitively revoked (i.e. not suspended) it shall not be reinstated.
- g) Where Certificate Revocation Lists (CRLs) including any variants (e.g. Delta CRLs) are used, these shall be published at least [CHOICE]:
 - [LCP] 72 hours;
 - [NCP] 24 hours.
- h) Where Certificate Revocation Lists (CRLs) including any variants (e.g. Delta CRLs) are used as the sole means of providing revocation status information:
 - every CRL shall state a time for next scheduled CRL issue; and
 - a new CRL may be published before the stated time of the next CRL issue;
 - the CRL shall be signed by the certification authority or an authority designated by the CA.

Revocation status

- i) [CHOICE]:

[LCP] Revocation status information shall be available as specified in the CA's Certification Practice Statement.

[NCP] Revocation status information, shall be available 24 hours per day, 7 days per week. Upon system failure, service or other factors which are not under the control of the CA, the CA shall make best endeavours to ensure that this information service is not unavailable for longer than a maximum period of time as denoted in the certification practice statement.

NOTE 3: Revocation status information may be provided, for example, using on-line certificate status service or through distribution of CRLs through a repository.

- j) The integrity and authenticity of the status information shall be protected.
- k) [CONDITIONAL] If the CA is issuing certificate to the public, Revocation status information shall be publicly and internationally available.

7.4 CA management and operation

7.4.1 Security management

The CA shall ensure that administrative and management procedures are applied which are adequate and correspond to recognized standards.

In particular:

CA General

- a) The CA shall carry out a risk assessment to evaluate business risks and determine the necessary security requirements and operational procedures.
- b) The CA shall retain responsibility for all aspects of the provision of certification services, even if some functions are outsourced to subcontractors. Responsibilities of third parties shall be clearly defined by the CA and appropriate arrangements made to ensure that third parties are bound to implement any controls required by the CA. The CA shall retain responsibility for the disclosure of relevant practices of all parties.
- c) The CA management shall provide direction on information security through a suitable high level steering forum that is responsible for defining the CA's information security policy and ensuring publication and communication of the policy to all employees who are impacted by the policy.
- d) The information security infrastructure necessary to manage the security within the CA shall be maintained at all times. Any changes that will impact on the level of security provided shall be approved by the CA management forum.

NOTE 1: See ISO/IEC 17799 for guidance on information security management including information security infrastructure, management information security forum and information security policies. Other alternative guidance documents are given in bibliography.

- e) The security controls and operating procedures for CA facilities, systems and information assets providing the certification services shall be documented, implemented and maintained.

NOTE 2: It is recommended that this documentation (commonly called a system security policy) identifies all relevant targets, objects and potential threats related to the services provided and the safeguards required to avoid or limit the effects of those threats. It is recommended that the documentation describes the rules, directives and procedures regarding how the specified services and the associated security assurance are granted in addition to stating policy on incidents and disasters.

- f) The CA shall ensure that the security of information shall be maintained when the responsibility for CA functions has been outsourced to another organization or entity.

7.4.2 Asset classification and management

The CA shall ensure that its assets and information receive an appropriate level of protection.

In particular:

CA General

- a) The CA shall carry out a risk assessment to evaluate business risks and determine the necessary security requirements and operational procedures.
- b) The CA shall maintain an inventory of all information assets and shall assign a classification for the protection requirements to those assets consistent with the risk analysis.

7.4.3 Personnel security

The CA shall ensure that personnel and hiring practices enhance and support the trustworthiness of the CA's operations.

In particular:

CA General

- a) The CA shall employ personnel which possess the expert knowledge, experience and qualifications necessary for the offered services and as appropriate to the job function.

NOTE 1: It is recommended that CA personnel fulfil the requirement of "expert knowledge, experience and qualifications" through formal training and credentials, actual experience, or a combination of the two.

- b) Security roles and responsibilities, as specified in the CA's security policy, shall be documented in job descriptions. Trusted roles, on which the security of the CA's operation is dependent, shall be clearly identified.
- c) CA personnel (both temporary and permanent) shall have job descriptions defined from the view point of separation of duties and least privilege, determining position sensitivity based on the duties and access levels, background screening and employee training and awareness. Where appropriate, these shall differentiate between general functions and CA specific functions. It is recommended that the job descriptions include skills and experience requirements.
- d) Personnel shall exercise administrative and management procedures and processes that are in line with the CA's information security management procedures (see clause 7.4.1).

NOTE 2: See ISO/IEC 17799 for guidance.

Registration, certificate generation, subject device provision, revocation management

- e) Managerial personnel shall be employed who possess expertise in the electronic signature technology and familiarity with security procedures for personnel with security responsibilities and experience with information security and risk assessment.
- f) All CA personnel in trusted roles shall be free from conflicting interests that might prejudice the impartiality of the CA operations.
- g) Trusted roles include roles that involve the following responsibilities:
 - Security Officers: overall responsibility for administering the implementation of the security practices. Additionally approve the generation/revocation/suspension of Certificates;
 - System Administrators: authorized to install, configure and maintain the CA trustworthy systems for registration, certificate generation, subject device provision and revocation management;
 - System Operators: responsible for operating the CA trustworthy systems on a day-to-day basis. Authorized to perform system backup and recovery;
 - System Auditors: authorized to view archives and audit logs of the CA trustworthy systems.
- h) CA personnel shall be formally appointed to trusted roles by senior management responsible for security.
- i) The CA shall not appoint to trusted roles or management any person who is known to have a conviction for a serious crime or other offence which affects his/her suitability for the position. Personnel shall not have access to the trusted functions until any necessary checks are completed.

NOTE 3: In some countries it may not be possible for CA to obtain information on past convictions without the collaboration of the potential employee.

7.4.4 Physical and environmental security

The CA shall ensure that physical access to critical services is controlled and physical risks to its assets minimized.

In particular:

CA General

- a) Physical access to facilities concerned with certificate generation, subject device provision, and revocation management services shall be limited to properly authorized individuals;
- b) Controls shall be implemented to avoid loss, damage or compromise of assets and interruption to business activities; and
- c) Controls shall be implemented to avoid compromise or theft of information and information processing facilities.

Certificate generation, subject device provision and revocation management

- d) The facilities concerned with certificate generation, subject device provision and revocation management shall be operated in an environment which physically protects the services from compromise through unauthorized access to systems or data.
- e) Physical protection shall be achieved through the creation of clearly defined security perimeters (i.e. physical barriers) around the certificate generation, subject device provision and revocation management services. Any parts of the premises shared with other organizations shall be outside this perimeter.
- f) Physical and environmental security controls shall be implemented to protect the facility housing system resources, the system resources themselves, and the facilities used to support their operation. The CA's physical and environmental security policy for systems concerned with certificate generation, subject device provision and revocation management services shall address the physical access control, natural disaster protection, fire safety factors, failure of supporting utilities (e.g. power, telecommunications), structure collapse, plumbing leaks, protection against theft, breaking and entering, and disaster recovery, etc.
- g) Controls shall be implemented to protect against equipment, information, media and software relating to the CA services being taken off-site without authorization.

NOTE 1: See ISO/IEC 17799 for guidance on physical and environmental security.

NOTE 2: Other functions may be supported within the same secured area provided that the access is limited to authorized personnel.

7.4.5 Operations management

The CA shall ensure that the CA systems are secure and correctly operated, with minimal risk of failure.

In particular:

CA General

- a) The integrity of CA systems and information shall be protected against viruses, malicious and unauthorized software.
- b) Damage from security incidents and malfunctions shall be minimized through the use of incident reporting and response procedures.
- c) Media used within the CA shall be securely handled to protect media from damage, theft and unauthorized access.

NOTE 1: Every member of personnel with management responsibilities is responsible for planning and effectively implementing the certificate policy and associated practices as documented in the certification practice statement.

- d) Procedures shall be established and implemented for all trusted and administrative roles that impact on the provision of certification services.

Media handling and security

- e) All media shall be handled securely in accordance with requirements of the information classification scheme (see clause 7.4.2). Media containing sensitive data shall be securely disposed of when no longer required.

System planning

- f) [CHOICE]:

[LCP] No requirement.

[NCP] Capacity demands are monitored and projections of future capacity requirements made to ensure that adequate processing power and storage are available.

Incident reporting and response

- g) The CA shall act in a timely and co-ordinated manner in order to respond quickly to incidents and to limit the impact of breaches of security. All incidents shall be reported as soon as possible after the incident.

Certificate generation, revocation management

Operations procedures and responsibilities

- h) CA security operations shall be separated from normal operations.

NOTE 2: CA security operations' responsibilities include:

- operational procedures and responsibilities;
- secure systems planning and acceptance;
- protection from malicious software;
- housekeeping;
- network management;
- active monitoring of audit journals, event analysis and follow-up;
- media handling and security;
- data and software exchange.

These responsibilities will be managed by CA security operations, but, may actually be performed by, non-specialist, operational personnel (under supervision); as defined within the appropriate security policy, and, roles and responsibility documents.

7.4.6 System access management

The CA shall ensure that CA system access is limited to properly authorized individuals.

In particular:

CA General

- a) Controls (e.g. firewalls) shall be implemented to protect the CA's internal network domains from external network domains accessible by third parties.

NOTE 1: It is recommended that firewalls be configured to prevent protocols and accesses not required for the operation of the CA.

- b) Sensitive data shall be protected when exchanged over networks which are not secure.

NOTE 2: Sensitive data includes registration information.

- c) The CA shall ensure effective administration of user (this includes operators, administrators and any users given direct access to the system) access to maintain system security, including user account management, auditing and timely modification or removal of access.
- d) The CA shall ensure access to information and application system functions are restricted in accordance with the access control policy and that the CA system provides sufficient computer security controls for the separation of trusted roles identified in CA's practices, including the separation of security administrator and operation functions. Particularly, use of system utility programs is restricted and tightly controlled.
- e) CA personnel shall be successfully identified and authenticated before using critical applications related to certificate management.
- f) CA personnel shall be accountable for their activities, for example by retaining event logs (see clause 7.4.11).
- g) Sensitive data shall be protected against being revealed through re-used storage objects (e.g. deleted files) being accessible to unauthorized users.

NOTE 3: Sensitive data includes registration information.

Certificate generation

- h) The CA shall ensure that local network components (e.g. routers) are kept in a physically secure environment and their configurations periodically audited for compliance with the requirements specified by the CA.
- i) Continuous monitoring and alarm facilities shall be provided to enable the CA to detect, register and react in a timely manner upon any unauthorized and/or irregular attempts to access its resources.

NOTE 4: This may use, for example, an intrusion detection system, access control monitoring and alarm facilities.

Dissemination

- j) Dissemination application shall enforce access control on attempts to add or delete certificates and modify other associated information.

Revocation management

- k) Continuous monitoring and alarm facilities shall be provided to enable the CA to detect, register and react in a timely manner upon any unauthorized and/or irregular attempts to access its resources.

NOTE 5: This may used, for example, an intrusion detection system, access control monitoring and alarm facilities.

Revocation status

- l) Revocation status application shall enforce access control on attempts to modify revocation status information.

7.4.7 Trustworthy systems deployment and maintenance

The CA shall use trustworthy systems and products that are protected against modification.

NOTE 1: Requirements for the trustworthy systems may be ensured using, for example, systems conforming to a suitable protection profile (or profiles), defined in accordance with ISO/IEC 15408 [3] or equivalent.

NOTE 2: It is recommended that the risk analysis carried out on the CA's services (see clause 7.1) identifies its critical services requiring trustworthy systems and the levels of assurance required.

In particular:

CA General

- a) An analysis of security requirements shall be carried out at the design and requirements specification stage of any systems development project undertaken by the CA or on behalf of the CA to ensure that security is built into IT systems.
- b) Change control procedures exist for releases, modifications and emergency software fixes for any operational software.

7.4.8 Business continuity management and incident handling

The CA shall ensure in the event of a disaster, including compromise of the CA's private signing key, operations are restored as soon as possible.

NOTE 1: Other disaster situations include failure of critical components of a CA system, including hardware and software.

In particular:

CA General

- a) The CA's business continuity plan (or disaster recovery plan) shall address the compromise or suspected compromise of a CA's private signing key as a disaster and the planned processes shall be in place.
- b) Following a disaster the CA shall, where practical, take steps to avoid repetition of a disaster.

Revocation status

- c) In the case of compromise the CA shall as a minimum provide the following undertakings:
 - inform all subscribers, relying parties and other CAs with which it has agreements or other form of established relations of the compromise;
 - indicate that certificates and revocation status information issued using this CA key may no longer be valid.

NOTE 2: It is recommended that when another CA, with which a compromised CA has an agreement, is informed of the compromise, any CA certificate that it has issued for the compromised CA is revoked.

7.4.9 CA termination

The CA shall ensure that potential disruptions to subscribers and relying parties are minimized as a result of the cessation of the CA's services, and ensure continued maintenance of records required to provide evidence of certification for the purposes of legal proceedings.

In particular:

CA General

- a) Before the CA terminates its services the following procedures shall be executed as a minimum:
- the CA shall inform all subscribers, relying parties and other CAs with which it has agreements or other form of established relations;

NOTE: The CA is not required to have a prior relationship with the relying party.

- the CA shall terminate all authorization of subcontractors to act on behalf of the CA in the performance of any functions related to the process of issuing certificates;
 - the CA shall perform necessary undertakings to transfer obligations for maintaining registration information (see clause 7.3.1) and event log archives (see clause 7.4.11) for their respective period of time as indicated to the subscriber and relying party (see clause 7.3.4);
 - the CA shall destroy, or withdraw from use, its private keys, as defined in clause 7.2.6.
- b) The CA shall have an arrangement to cover the costs to fulfil these minimum requirements in case the CA becomes bankrupt or for other reasons is unable to cover the costs by itself.
- c) The CA shall state in its practices the provisions made for termination of service. This shall include:
- the notification of affected entities;
 - the transfer of its obligations to other parties;
 - the handling of the revocation status for unexpired certificates that have been issued.

7.4.10 Compliance with legal requirements

The CA shall ensure compliance with legal requirements.

In particular:

CA General

- a) Important records shall be protected from loss, destruction and falsification. Some records may need to be securely retained to meet statutory requirements, as well as to support essential business activities (see clause 7.4.11).
- b) The CA shall ensure that the requirements of the applicable national data protection legislation are met.
- c) Appropriate technical and organizational measures shall be taken against unauthorized or unlawful processing of personal data and against accidental loss or destruction of, or damage to, personal data.
- d) The information that users contribute to the CA shall be completely protected from disclosure without the user's agreement, a court order or other legal authorization.

7.4.11 Recording of information concerning certificates

The CA shall ensure that all relevant information concerning a certificate is recorded for an appropriate period of time, in particular for the purpose of providing evidence of certification for the purposes of legal proceedings.

NOTE 1: Records concerning certificates include registration information (see clause 7.3.1) and information concerning significant CA environmental, key management and certificate management events.

In particular:

General

- a) The confidentiality and integrity of current and archived records concerning certificates shall be maintained.
- b) Records concerning certificates shall be completely and confidentially archived in accordance with disclosed business practices.
- c) Records concerning certificates shall be made available if required for the purposes of providing evidence of certification for the purpose of legal proceedings. The subject, and within the constraints of data protection requirements (see clause 7.4.10) the subscriber, shall have access to registration and other information relating to the subject.

NOTE 2: This may be used, for example, to support the link between the certificate and the subject.

- d) The precise time of significant CA environmental, key management and certificate management events shall be recorded.

NOTE 3: It is recommended that the CA states in its practices the accuracy of the clock used in timing of events, and how this accuracy is ensured.

- e) Records concerning certificates shall be held for a period of time as indicated in the CA's terms and conditions (see clause 7.3.4).
- f) The events shall be logged in a way that they cannot be easily deleted or destroyed (except for transfer to long-term media) within the period of time that they are required to be held.

NOTE 4: This may be achieved, for example, through the use of write only media, a record of each removable media used and the use of off site backup.

- g) The specific events and data to be logged shall be documented by the CA.

Registration

- h) The CA shall ensure all events relating to registration including requests for certificate re-key or renewal, are logged.
- i) The CA shall ensure that all registration information including the following is recorded:
 - type of document(s) presented by the applicant to support registration;
 - record of unique identification data, numbers, or a combination thereof (e.g. applicant's drivers license number) of identification documents, if applicable;
 - storage location of copies of applications and identification documents, including the signed subscriber agreement (see clause 7.3.1 l);
 - any specific choices in the subscriber agreement (e.g. consent to publication of certificate);
 - identity of entity accepting the application;
 - method used to validate identification documents, if any;
 - name of receiving CA and/or submitting Registration Authority, if applicable.
- j) The CA shall ensure that privacy of subject information is maintained.

Certificate generation

- k) The CA shall log all events relating to the life-cycle of CA keys.
- l) The CA shall log all events relating to the life-cycle of certificates.

Subject device provision

- m) The CA shall log all events relating to the life cycle of keys managed by the CA, including any subject keys generated by the CA.
- n) If applicable, the CA shall log all events relating to the preparation of secure user devices.

Revocation management

- o) The CA shall ensure that all requests and reports relating to revocation, as well as the resulting action, are logged.

7.5 Organizational

The CA shall ensure that its organization is reliable.

In particular that:

CA general

- a) Policies and procedures under which the CA operates shall be non-discriminatory.
- b) The CA shall make its services accessible to all applicants whose activities fall within its declared field of operation.
- c) The CA is a legal entity according to national law.
- d) The CA has a system or systems for quality and information security management appropriate for the certification services it is providing.
- e) The CA has adequate arrangements to cover liabilities arising from its operations and/or activities.
- f) The CA has the financial stability and resources required to operate in conformity with this policy.
- g) The CA employs a sufficient number of personnel having the necessary education, training, technical knowledge and experience relating to the type, range and volume of work necessary to provide certification services.
- h) The CA has policies and procedures for the resolution of complaints and disputes received from customers or other parties about the provisioning of electronic trust services or any other related matters.
- i) The CA has a properly documented agreement and contractual relationship in place where the provisioning of services involves subcontracting, outsourcing or other third party arrangements.

Certificate generation, revocation management

- j) The parts of the CA concerned with certificate generation and revocation management shall be independent of other organizations for its decisions relating to the establishing, provisioning and maintaining and suspending of services in conformance with the applicable certificate policies; in particular its senior executive, senior staff and staff in trusted roles, must be free from any commercial, financial and other pressures which might adversely influence trust in the services it provides.
- k) The parts of the CA concerned with certificate generation and revocation management shall have a documented structure which safeguards impartiality of operations.

8 Framework for the definition of other certificate policies

This clause provides a general framework for other policies for CAs issuing public key certificates. A CA may claim conformance to this general framework as defined in clause 8.4. In general terms this requires conformance to the requirements in clauses 6 and 7 excluding those applicable only to CAs issuing certificates to the public.

8.1 Certificate policy management

The authority issuing the certificate policy shall ensure that the certificate policy is effective.

In particular:

- a) The certificate policy shall identify which of the certificate policies defined in the present document it adopts as the basis, plus any variances it chooses to apply.
- b) There shall be a body (e.g. a policy management authority) with final authority and responsibility for specifying and approving the certificate policy.
- c) A risk assessment shall be carried out to evaluate business requirements and determine the security requirements to be included in the certificate policy for the stated community and applicability.
- d) Certificate policy(s) shall be approved and modified in accordance with a defined review process, including responsibilities for maintaining the certificate policy.
- e) A defined review process shall exist to ensure that the certificate policy are supported by the CA's Certification Practice Statement.
- f) The CA shall make available the certificate policies supported by the CA to its user community.

NOTE: The CA's user community includes the subscribers/subjects eligible to hold certificates issued under the policy and any parties which may require to rely upon those certificates.

- g) Revisions to certificate policies supported by the CA shall be made available to subscribers and relying parties.
- h) The certificate policy shall incorporate, or further constrain, all the requirements identified in clauses 6 and 7.
- i) A unique object identifier shall be obtained for the certificate policy of the form required in ITU-T Recommendation X.509 [5].

8.2 Additional requirements

Subscribers and relying parties shall be informed, as part of implementing the requirements defined in clause 7.3.4, of the ways in which the specific policy adds to or further constrains the requirements of the certificate policy as defined in the present document.

8.3 Conformance

The CA shall only claim conformance to the present document and the applicable certificate policy:

- a) if the CA claims conformance to the identified certificate policy and makes available to subscribers and relying parties on request the evidence to support the claim of conformance; or
- b) if the CA has been assessed to be conformant to the identified certificate policy by an independent party.

A conformant CA must demonstrate that:

- c) it meets its obligations as defined in clause 6.1;
- d) it has implemented controls which meet the requirements specified in clause 7;

- e) uses a certificate policy which meets the requirements specified in clause 8.1;
- f) it has implemented controls which meet the additional requirements of the certificate policies employed;
- g) it meets the additional requirements specified in clause 8.2.

Annex A (informative): Significant differences to TS 101 456

The present document is based upon TS 101 456 and includes much text that is in common. The significant differences between the present document and TS 101 456 are outlined below.

Other changes are generally due to:

- a) alternative wording being considered to be necessary to clarify the requirements. Such changes are likely to be incorporated in future editions of TS 101 456, subject to ratification;
- b) differences in the scope requiring generalization of wording (e.g. qualified certificate changed to public key certificate).

A.1 Scope

TS 101 456 is limited to CA's issuing qualified certificates whereas the present document is for any CA issuing public key certificates. Certificates issued under the policy requirements defined in the present document may be used in support of any asymmetric mechanisms requiring certification of public keys including electronic and digital signatures, encryption, key exchange and key agreement mechanisms.

TS 101 456 specifies two "qualified certificate policies". The present document specifies two Normalized Certificate Policies that is of equivalent quality to that specified in TS 101 456 but without the legal constraints of the Electronic Signatures Directive (1999/93/EC).

In addition, the present document specifies a Lightweight Certificate Policy where certain requirements are eased for use where the risks do not justify the additional costs of meeting the more onerous requirements of the NCP (e.g. physical presence),

A.2 TS 101 456 specific requirements

The following requirement clauses in TS 101 456 are removed or replaced because they relate to requirements which are only applicable to the narrow scope of TS 101 456.

NOTE: Scope and other introductory clauses not directly specifying requirements are not included.

Clauses: All of 5, 6.4, 7.3.3 a) requirements specific to qualified certificates

A.3 Alternative quality requirements

The clauses in the present document offer alternative requirements to support a choice between:

- a) Lightweight quality of service which is less onerous than TS 101 456;
- b) Normalized quality of service which is equivalent to TS 101 456, including options for use of a secure user device which is a generalized form of secure signature creation device.

As marked with LCP/NCP/NCP+.

A.4 Alternative functionality requirements

The clauses in the present document are conditional due to the wider variation of services supported by the present document as marked with [CONDITIONAL].

Annex B (informative): Model PKI disclosure statement

B.1 Introduction

The proposed model PKI disclosure statement is designed for use by a CA issuing certificates as a supplemental instrument of disclosure and notice. A PKI disclosure statement may assist a CA to respond to regulatory requirements and concerns. Further, the aim of the model PKI disclosure statement is to foster industry "self-regulation" and build consensus on those elements of a certificate policy and/or certification practice statement that require emphasis and disclosure.

Although certificate policy and certification practice statement documents are essential for describing and governing certificate policies and practices, many PKI users, especially consumers, find these documents difficult to understand. Consequently, there is a need for a supplemental and simplified instrument that can assist PKI users in making informed trust decisions. Consequently, a PKI disclosure statement is not intended to replace a certificate policy or certification practice statement.

This annex provides an example of the structure for a PKI disclosure statement, illustrating the harmonized set of statement types (categories) that would be contained in a deployed.

B.2 The PDS structure

The PDS contains a clause for each defined statement type. Each clause of a PDS contains a descriptive statement, which MAY include hyperlinks to the relevant certificate policy/certification practice statement sections.

Statement types	Statement descriptions	Specific Requirements of certificate policy (see clause 7.3.4)
CA contact info:	The name, location and relevant contact information for the CA/PKI.	
Certificate type, validation procedures and usage:	A description of each class/type of certificate issued by the CA, corresponding validation procedures, and any restrictions on certificate usage.	Any limitations on its use. Whether the policy is for certificate issued to the public.
Reliance limits:	The reliance limits, if any.	Indication that the certificate is only for use with electronic signatures. The period of time which registration information and CA event logs (see clause 7.4.11) are maintained (and hence are available to provide supporting evidence).
Obligations of subscribers:	The description of, or reference to, the critical subscriber obligations.	The subscriber's obligations as defined in clause 6.2, including whether the policy requires use of a secure user device.
Certificate status checking obligations of relying parties:	The extent to which relying parties are obligated to check certificate status, and references to further explanation.	Information on how to validate the certificate, including requirements to check the revocation status of the certificate, such that the relying party is considered to "reasonably rely" on the certificate (see clause 6.3).
Limited warranty and disclaimer/Limitation of liability:	Summary of the warranty, disclaimers, limitations of liability and any applicable warranty or insurance programs.	Limitations of liability (see clause 6.4).
Applicable agreements, certification practice statement, Certificate	Identification and references to applicable agreements, certification practice statement, certificate policy and other relevant documents.	Certificate policy being applied.
Privacy policy:	A description of and reference to the applicable privacy policy.	NOTE: CA's under this policy are required to comply with the requirements of Data Protection Legislation.
Refund policy:	A description of and reference to the applicable refund policy.	
Applicable law, complaints and dispute resolution:	Statement of the choice of law, complaints procedure and dispute resolution mechanisms (anticipated to often include a reference to the International Chambers of Commerce's arbitration services).	The procedures for complaints and dispute settlements. The applicable legal system.
CA and repository licenses, trust marks, and audit:	Summary of any governmental licenses, seal programs; and a description of the audit process and if applicable the audit firm.	If the CA has been certified to be conformant with a certificate policy, and if so through which scheme.

Annex C (informative): IETF RFC 2527 and certificate policy cross reference

Table D.1: Cross-reference IETF RFC 2527 clauses and policy references

IETF RFC 2527	Certificate policy reference
1.1 Overview	5.1
1 INTRODUCTION	
1.2 Identification	5.2
1.3 Community and Applicability	5.3
1.4 Contact Details	back of title page
2 GENERAL PROVISIONS	
2.1 Obligations	6.1, 6.2, 6.3
2.2 Liability	6.4
2.3 Financial Responsibility	7.5
2.4 Interpretation and Enforcement	5.4
2.5 Fees	N/A
2.6 Publication and Repositories	7.3.5, 7.3.6
2.7 Compliance Audit	N/A
2.8 Confidentiality Policy	7.3.1
2.9 Intellectual Property Rights	N/A
3 IDENTIFICATION AND AUTHENTICATION	
3.1 Initial Registration	7.3.1
3.2 Routine Rekey	7.3.2
3.3 Rekey After Revocation -- No Key Compromise	7.3.2
3.4 Revocation Request	7.3.5
4 OPERATIONAL REQUIREMENTS	
4.1 Certificate Application	7.3.1
4.2 Certificate Issuance	7.3.3
4.3 Certificate Acceptance	7.3.1
4.4 Certificate Suspension and Revocation	7.3.5
4.5 Security Audit Procedures	N/A
4.6 Records Archival	7.4.11
4.7 Key Changeover	7.3.2
4.8 Compromise and Disaster Recovery	7.4.8
4.9 CA Termination	7.4.9
5 PHYSICAL, PROCEDURAL, AND PERSONNEL SECURITY CONTROLS	
5.1 Physical Security Controls	7.4.4
5.2 Procedural Controls	7.4.5
5.3 Personnel Security Controls	7.4.3
6 TECHNICAL SECURITY CONTROLS	
6.1 Key Pair Generation and Installation	7.2.8, 7.2.9
6.2 Private Key Protection	7.2.8
6.3 Other Aspects of Key Pair Management	7.2
6.4 Activation Data	7.2.9
6.5 Computer Security Controls	7.4.6
6.6 Life Cycle Security Controls	7.3
6.7 Network Security Controls	7.4.6
6.8 Cryptographic Module Engineering Controls	7.2
7 CERTIFICATE AND CRL PROFILES	
7.1 Certificate Profile	7.3.3
7.2 CRL Profile	N/A
8 SPECIFICATION ADMINISTRATION	
8.1 Specification Change Procedures	7.1
8.2 Publication and Notification Procedures	7.1
8.3 Certification practice statement Approval Procedures	7.1

Annex D (informative): Bibliography

TTP.NL Part 1: "Requirements and Guidance for the Certification of the Public Key Infrastructure of Certification Service Providers".

TTP.NL Part 2: "Requirements and Guidance for the Certification of Information Security Management of Certification Service Providers".

TTP.NL Part 3: "General Requirements and Guidance for the Accreditation of Certification Service Providers issuing Certificates".

"Scheme Approval Profiles for Trust Service Providers".

NOTE: See <http://www.tscheme.org/>.

ISO/IEC 17799: "Information technology - Code of practice for information security management".

ITU-T Recommendation X.843 | ISO/IEC 15945: "Information technology - Security techniques - Specification of TTP services to support the Application of Digital Signatures".

ITU-T Recommendation X.842 | ISO/IEC 14516: "Information technology - Security techniques - Guidelines on the use and management of Trusted Third Party services".

ISO/IEC TR 13335-1 (1996): "Information technology - Guidelines for the management of IT Security - Part 1: Concepts and models for IT Security".

ISO/IEC TR 13335-2 (1997): "Information technology - Guidelines for the management of IT Security - Part 2: Managing and planning IT Security".

ISO/IEC TR 13335-3 (1998): "Information technology - Guidelines for the management of IT Security - Part 3: Techniques for the management of IT Security".

ISO/IEC TR 13335-4 (2000): "Information technology - Guidelines for the management of IT Security - Part 4: Selection of safeguards".

ANS X9.79: "Public Key Infrastructure - Practices and Policy Framework".

Council Directive 93/13/EEC of 5 April 1993 on unfair terms in consumer contracts.

Directive 97/7/EC of the European Parliament and of the Council of 20 May 1997 on the protection of consumers in respect of distance contracts - Statement by the Council and the Parliament re article 6 (1) - Statement by the Commission re article 3 (1), first indent.

ETSI TS 101 456: "Policy requirements for certification authorities issuing qualified certificates".

Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community framework for electronic signatures.

IETF RFC 2527: "Internet X.509 Public Key Infrastructure - Certificate Policy and Certification Practices Framework", S. Chokhani, W. Ford.

CEN Workshop Agreement 14172: "EESSI Conformity Assessment Guidance".

History

Document history		
V1.1.1	April 2002	Publication