CA/Browser Forum

Baseline Requirements for the Issuance and Management of Publicly-Trusted Certificates, v.1.0

Adopted on 22 Nov. 2011 with an Effective Date of 1 July 2012

Baseline Requirements for the Issuance and Management of Publicly-Trusted Certificates, v. 1.0

Version 1.0, as adopted by the CA/Browser Forum on 22 Nov. 2011 with an Effective Date of 1 July 2012.

These Baseline Requirements describe an integrated set of technologies, protocols, identity-proofing, lifecycle management, and auditing requirements that are necessary (but not sufficient) for the issuance and management of Publicly-Trusted Certificates; Certificates that are trusted by virtue of the fact that their corresponding Root Certificate is distributed in widely-available application software. The Requirements are not mandatory for Certification Authorities unless and until they become adopted and enforced by relying–party Application Software Suppliers.

Notice to Readers

This version of the Baseline Requirements for the Issuance and Management of Publicly-Trusted Certificates present criteria established by the CA/Browser Forum for use by Certification Authorities when issuing, maintaining, and revoking publicly-trusted Certificates. The Requirements may be revised from time to time, as appropriate, in accordance with procedures adopted by the CA/Browser Forum. Because one of the primary beneficiaries of these Requirements is the end user, the Forum openly invites anyone to make recommendations and suggestions by email to the CA/Browser Forum at questions@cabforum.org. The Forum members value all input, regardless of source, and will seriously consider all such input.

The CA/Browser Forum

The CA/Browser Forum is a voluntary organization of Certification Authorities and suppliers of Internet browser and other relying-party software applications. Membership as of November 2011 is as follows:

Certification Authorities

- A-Trust GmbH
- AC Camerfirma SA
- Buypass AS
- Certum
- Comodo CA Ltd
- Cybertrust
- D-TRUST GmbH
- DanID A/S
- DigiCert, Inc.
- Digidentity BV
- Echoworx Corporation
- Entrust, Inc.
- GeoTrust, Inc.
- Getronics PinkRoccade
- GlobalSign
- GoDaddy.com, Inc.
- IdenTrust, Inc.
- ipsCA, IPS Certification Authority s.l.
- Izenpe S.A.
- Japan Certification Services, Inc.
- Kamu Sertifikasyon Merkezi
- Keynectis
- Logius PKIoverheid
- Network Solutions, LLC
- QuoVadis Ltd.
- RSA Security, Inc.
- SECOM Trust Systems CO., Ltd.
- Skaitmeninio sertifikavimo centras (SSC)
- StartCom Certification Authority
- SwissSign AG
- Symantec Corporation
- T-Systems Enterprise Services GmbH.
- TC TrustCenter GmbH
- Thawte, Inc.
- TÜRKTRUST
- Trustis Limited
- Trustwave
- TWCA
- Verizon
- Wells Fargo Bank, N.A.

Relying-Party Application Software Suppliers

- Apple
- Google Inc.
- KDE
- Microsoft Corporation
- Opera Software ASA
- Research in Motion Limited
- The Mozilla Foundation

Other groups that have participated in the development of these Requirements include the AICPA/CICA WebTrust for Certification Authorities task force and ETSI ESI. Participation by such groups does not imply their endorsement, recommendation, or approval of the final product.

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1. Scope

The Baseline Requirements for the Issuance and Management of Publicly-Trusted Certificates describe a subset of the requirements that a Certification Authority must meet in order to issue Publicly Trusted Certificates. Except where explicitly stated otherwise, these requirements apply only to relevant events that occur on or after the Effective Date.

These Requirements do not address all of the issues relevant to the issuance and management of Publicly-Trusted Certificates. The CA/Browser Forum may update the Requirements from time to time, in order to address both existing and emerging threats to online security. In particular, it is expected that a future version will contain more formal and comprehensive audit requirements for delegated functions.

This version of the Requirements only addresses Certificates intended to be used for authenticating servers accessible through the Internet. Similar requirements for code signing, S/MIME, time-stamping, VoIP, IM, Web services, etc. may be covered in future versions.

These Requirements do not address the issuance, or management of Certificates by enterprises that operate their own Public Key Infrastructure for internal purposes only, and for which the Root Certificate is not distributed by any Application Software Supplier.

2. Purpose

The primary goal of these Requirements is to enable efficient and secure electronic communication, while addressing user concerns about the trustworthiness of Certificates. The Requirements also serve to inform users and help them to make informed decisions when relying on Certificates.

3. References

ETSI TS 102 042 V2.1.1, Electronic Signatures and Infrastructures (ESI); Policy requirements for certification authorities issuing public key certificates.

FIPS 140-2, Federal Information Processing Standards Publication - Security Requirements For Cryptographic Modules, Information Technology Laboratory, National Institute of Standards and Technology, May 25, 2001.

ISO 21188:2006, Public key infrastructure for financial services -- Practices and policy framework.

RFC2119, Request for Comments: 2119, Key words for use in RFCs to Indicate Requirement Levels, Bradner, March 1997.

RFC2527, Request for Comments: 2527, Internet X.509 Public Key Infrastructure: Certificate Policy and Certification Practices Framework, Chokhani, et al, March 1999.

RFC2560, Request for Comments: 2560, X.509 Internet Public Key Infrastructure Online Certificate Status Protocol - OCSP M. Myers, et al, June 1999.

RFC3647, Request for Comments: 3647, Internet X.509 Public Key Infrastructure: Certificate Policy and Certification Practices Framework, Chokhani, et al, November 2003.

RFC4366, Request for Comments: 4366, Transport Layer Security (TLS) Extensions, Blake-Wilson, et al, April 2006.

RFC5019, Request for Comments: 5019, The Lightweight Online Certificate Status Protocol (OCSP) Profile for High-Volume Environments, A. Deacon, et al, September 2007.

RFC5280, Request for Comments: 5280, Internet X.509 Public Key Infrastructure: Certificate and Certificate Revocation List (CRL) Profile, Cooper et al, May 2008.

WebTrust, WebTrust Program for Certification Authorities Version 2.0, AICPA/CICA, available at http://www.webtrust.org/homepage-documents/item49945.aspx

X.509v3, ITU-T Recommendation X.509 (2005) | ISO/IEC 9594-8:2005, Information technology - Open Systems Interconnection - The Directory: Public-key and attribute certificate frameworks.

4. Definitions

Affiliate: A corporation, partnership, joint venture or other entity controlling, controlled by, or under common control with another entity, or an agency, department, political subdivision, or any entity operating under the direct control of a Government Entity.

Applicant: The natural person or Legal Entity that applies for (or seeks renewal of) a Certificate. Once the Certificate issues, the Applicant is referred to as the Subscriber. For Certificates issued to devices, the Applicant is the entity that controls or operates the device named in the Certificate, even if the device is sending the actual certificate request.

Applicant Representative: A natural person or human sponsor who is either the Applicant, employed by the Applicant, or an authorized agent who has express authority to represent the Applicant: (i) who signs and submits, or approves a certificate request on behalf of the Applicant, and/or (ii) who signs and submits a Subscriber Agreement on behalf of the Applicant, and/or (iii) who acknowledges and agrees to the Certificate Terms of Use on behalf of the Applicant when the Applicant is an Affiliate of the CA.

Application Software Supplier: A supplier of Internet browser software or other relying-party application software that displays or uses Certificates and incorporates Root Certificates.

Attestation Letter: A letter attesting that Subject Information is correct written by an accountant, lawyer, government official, or other reliable third party customarily relied upon for such information.

Audit Report: A report from a Qualified Auditor stating the Qualified Auditor's opinion on whether an entity's processes and controls comply with the mandatory provisions of these Requirements.

Certificate: An electronic document that uses a digital signature to bind a public key and an identity.

Certificate Data: Certificate requests and data related thereto (whether obtained from the Applicant or otherwise) in the CA's possession or control or to which the CA has access.

Certificate Management Process: Processes, practices, and procedures associated with the use of keys, software, and hardware, by which the CA verifies Certificate Data, issues Certificates, maintains a Repository, and revokes Certificates.

Certificate Policy: A set of rules that indicates the applicability of a named Certificate to a particular community and/or PKI implementation with common security requirements.

Certificate Problem Report: Complaint of suspected Key Compromise, Certificate misuse, or other types of fraud, compromise, misuse, or inappropriate conduct related to Certificates.

Certificate Revocation List: A regularly updated time-stamped list of revoked Certificates that is created and digitally signed by the CA that issued the Certificates.

Certification Authority: An organization that is responsible for the creation, issuance, revocation, and management of Certificates. The term applies equally to both Roots CAs and Subordinate CAs.

Certification Practice Statement: One of several documents forming the governance framework in which Certificates are created, issued, managed, and used.

Cross Certificate: A certificate that is used to establish a trust relationship between two Root CAs.

Delegated Third Party: A natural person or Legal Entity that is not the CA but is authorized by the CA to assist in the Certificate Management Process by performing or fulfilling one or more of the CA requirements found herein.

Domain Authorization: Correspondence or other documentation provided by a Domain Name Registrant attesting to the authority of an Applicant to request a Certificate for a specific Domain Namespace.

Domain Name: The label assigned to a node in the Domain Name System.

Domain Namespace: The set of all possible Domain Names that are subordinate to a single node in the Domain Name System.

Domain Name Registrant: Sometimes referred to as the "owner" of a Domain Name, but more properly the person(s) or entity(ies) registered with a Domain Name Registrar as having the right to control how a Domain Name is used, such as the natural person or Legal Entity that is listed as the "Registrant" by WHOIS or the Domain Name Registrar.

Domain Name Registrar: A person or entity that registers Domain Names under the auspices of or by agreement with: (i) the Internet Corporation for Assigned Names and Numbers (ICANN), (ii) a national Domain Name authority/registry, or (iii) a Network Information Center (including their affiliates, contractors, delegates, successors, or assigns).

Effective Date: These Requirements come into force on 1 July 2012.

Enterprise RA: An employee or agent of an organization unaffiliated with the CA who authorizes issuance of Certificates to that organization.

Expiry Date: The "Not After" date in a Certificate that defines the end of a Certificate's validity period.

Fully-Qualified Domain Name: A Domain Name that includes the labels of all superior nodes in the Internet Domain Name System.

Government Entity: A government-operated legal entity, agency, department, ministry, branch, or similar element of the government of a country, or political subdivision within such country (such as a state, province, city, county, etc.).

Internal Server Name: A Server Name (which may or may not include an Unregistered Domain Name) that is not resolvable using the public DNS.

Issuing CA: In relation to a particular Certificate, the CA that issued the Certificate. This could be either a Root CA or a Subordinate CA.

Key Compromise: A Private Key is said to be compromised if its value has been disclosed to an unauthorized person, an unauthorized person has had access to it, or there exists a practical technique by which an unauthorized person may discover its value.

Key Generation Script: A documented plan of procedures for the generation of a CA Key Pair**.**

Key Pair: The Private Key and its associated Public Key.

Legal Entity: An association, corporation, partnership, proprietorship, trust, government entity or other entity with legal standing in a country's legal system.

Object Identifier: A unique alphanumeric or numeric identifier registered under the International Organization for Standardization's applicable standard for a specific object or object class.

OCSP Responder: An online server operated under the authority of the CA and connected to its Repository for processing Certificate status requests. See also, Online Certificate Status Protocol.

Online Certificate Status Protocol: An online Certificate-checking protocol that enables relying-party application software to determine the status of an identified Certificate. See also OCSP Responder.

Private Key: The key of a Key Pair that is kept secret by the holder of the Key Pair, and that is used to create Digital Signatures and/or to decrypt electronic records or files that were encrypted with the corresponding Public Key.

Public Key: The key of a Key Pair that may be publicly disclosed by the holder of the corresponding Private Key and that is used by a Relying Party to verify Digital Signatures created with the holder's corresponding Private Key and/or to encrypt messages so that they can be decrypted only with the holder's corresponding Private Key.

Public Key Infrastructure: A set of hardware, software, people, procedures, rules, policies, and obligations used to facilitate the trustworthy creation, issuance, management, and use of Certificates and keys based on Public Key Cryptography.

Publicly-Trusted Certificate: A Certificate that is trusted by virtue of the fact that its corresponding Root Certificate is distributed as a trust anchor in widely-available application software.

Qualified Auditor: A natural person or Legal Entity that meets the requirements of Section 17.6 (Auditor Qualifications).

Registered Domain Name: A Domain Name that has been registered with a Domain Name Registrar.

Registration Authority (RA): Any Legal Entity that is responsible for identification and authentication of subjects of Certificates, but is not a CA, and hence does not sign or issue Certificates. An RA may assist in the certificate application process or revocation process or both. When "RA" is used as an adjective to describe a role or function, it does not necessarily imply a separate body, but can be part of the CA.

Reliable Method of Communication: A method of communication, such as a postal/courier delivery address, telephone number, or email address, that was verified using a source other than the Applicant Representative.

Relying Party: Any natural person or Legal Entity that relies on a Valid Certificate. An Application Software Supplier is not considered a Relying Party when software distributed by such Supplier merely displays information relating to a Certificate.

Repository: An online database containing publicly-disclosed PKI governance documents (such as Certificate Policies and Certification Practice Statements) and Certificate status information, either in the form of a CRL or an OCSP response.

Requirements: This document.

Reserved IP Address: An IPv4 or IPv6 address that the IANA has marked as reserved:
http://www.iana.org/assignments/ipv4-address-space/ipv4-address-space.xml
http://www.iana.org/assignments/ipv6-address-space/ipv6-address-space.xml

Root CA: The top level Certification Authority whose Root Certificate is distributed by Application Software Suppliers and that issues Subordinate CA Certificates.

Root Certificate: The self-signed Certificate issued by the Root CA to identify itself and to facilitate verification of Certificates issued to its Subordinate CAs.

Subject: The natural person, device, system, unit, or Legal Entity identified in a Certificate as the Subject. The Subject is either the Subscriber or a device under the control and operation of the Subscriber.

Subject Identity Information: Information that identifies the Certificate Subject. Subject Identity Information does not include a domain name listed in the subjectAltName extension or the Subject commonName field.

Subordinate CA: A Certification Authority whose Certificate is signed by the Root CA, or another Subordinate CA.

Subscriber: A natural person or Legal Entity to whom a Certificate is issued and who is legally bound by a Subscriber or Terms of Use Agreement.

Subscriber Agreement: An agreement between the CA and the Applicant/Subscriber that specifies the rights and responsibilities of the parties.

Terms of Use: Provisions regarding the safekeeping and acceptable uses of a Certificate issued in accordance with these Requirements when the Applicant/Subscriber is an Affiliate of the CA.

Trustworthy System: Computer hardware, software, and procedures that are: reasonably secure from intrusion and misuse; provide a reasonable level of availability, reliability, and correct operation; are reasonably suited to performing their intended functions; and enforce the applicable security policy.

Unregistered Domain Name: A Domain Name that is not a Registered Domain Name.

Valid Certificate: A Certificate that passes the validation procedure specified in RFC 5280.

Validation Specialists: Someone who performs the information verification duties specified by these Requirements.

Validity Period: The period of time measured from the date when the Certificate is issued until the Expiry Date.

Wildcard Certificate: A Certificate containing an asterisk (*) in the left-most position of any of the Subject Fully-Qualified Domain Names contained in the Certificate.

5. Abbreviations and Acronyms

AICPA	American Institute of Certified Public Accountants
CA	Certification Authority
ccTLD	Country Code Top-Level Domain
CICA	Canadian Institute of Chartered Accountants
CP	Certificate Policy
CPS	Certification Practice Statement
CRL	Certificate Revocation List
DBA	Doing Business As
DNS	Domain Name System
FIPS	(US Government) Federal Information Processing Standard
FQDN	Fully Qualified Domain Name
IM	Instant Messaging
IANA	Internet Assigned Numbers Authority
ICANN	Internet Corporation for Assigned Names and Numbers
ISO	International Organization for Standardization
NIST	(US Government) National Institute of Standards and Technology
OCSP	Online Certificate Status Protocol
OID	Object Identifier
PKI	Public Key Infrastructure
RA	Registration Authority
S/MIME	Secure MIME (Multipurpose Internet Mail Extensions)
SSL	Secure Sockets Layer
TLD	Top-Level Domain
TLS	Transport Layer Security
VOIP	Voice Over Internet Protocol

6. Conventions

Terms not otherwise defined in these Requirements shall be as defined in applicable agreements, user manuals, Certificate Policies and Certification Practice Statements, of the CA.

The key words “MUST”, “MUST NOT”, "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in these Requirements shall be interpreted in accordance with RFC 2119.

7. Certificate Warranties and Representations

7.1 By the CA

By issuing a Certificate, the CA makes the Certificate Warranties listed in Section 7.1.2 to the Certificate Beneficiaries listed in 7.1.1.

7.1.1 Certificate Beneficiaries

Certificate Beneficiaries include, but are not limited to, the following:

1. The Subscriber that is a party to the Subscriber or Terms of Use Agreement for the Certificate;
2. All Application Software Suppliers with whom the Root CA has entered into a contract for inclusion of its Root Certificate in software distributed by such Application Software Supplier; and
3. All Relying Parties who reasonably rely on a Valid Certificate.

7.1.2 Certificate Warranties

The CA represents and warrants to the Certificate Beneficiaries that, during the period when the Certificate is valid, the CA has complied with these Requirements and its Certificate Policy and/or Certification Practice Statement in issuing and managing the Certificate.

The Certificate Warranties specifically include, but are not limited to, the following:

1. **Right to Use Domain Name or IP Address:** That, at the time of issuance, the CA (i) implemented a procedure for verifying that the Applicant either had the right to use, or had control of, the Domain Name(s) and IP address(es) listed in the Certificate's subject field and subjectAltName extension (or, only in the case of Domain Names, was delegated such right or control by someone who had such right to use or control); (ii) followed the procedure when issuing the Certificate; and (iii) accurately described the procedure in the CA's Certificate Policy and/or Certification Practice Statement;
2. **Authorization for Certificate:** That, at the time of issuance, the CA (i) implemented a procedure for verifying that the Subject authorized the issuance of the Certificate and that the Applicant Representative is authorized to request the Certificate on behalf of the Subject; (ii) followed the procedure when issuing the Certificate; and (iii) accurately described the procedure in the CA's Certificate Policy and/or Certification Practice Statement;
3. **Accuracy of Information:** That, at the time of issuance, the CA (i) implemented a procedure for verifying the accuracy of all of the information contained in the Certificate (with the exception of the subject:organizationalUnitName attribute); (ii) followed the procedure when issuing the Certificate; and (iii) accurately described the procedure in the CA's Certificate Policy and/or Certification Practice Statement;
4. **No Misleading Information:** That, at the time of issuance, the CA (i) implemented a procedure for reducing the likelihood that the information contained in the Certificate's subject:organizationalUnitName attribute would be misleading; (ii) followed the procedure when issuing the Certificate; and (iii) accurately described the procedure in the CA's Certificate Policy and/or Certification Practice Statement;
5. **Identity of Applicant:** That, if the Certificate contains Subject Identity Information, the CA (i) implemented a procedure to verify the identity of the Applicant in accordance with Sections 9.2.4 and 11.2; (ii) followed the procedure when issuing the Certificate; and (iii) accurately described the procedure in the CA's Certificate Policy and/or Certification Practice Statement;
6. **Subscriber Agreement:** That, if the CA and Subscriber are not Affiliated, the Subscriber and CA are parties to a legally valid and enforceable Subscriber Agreement that satisfies these Requirements, or, if the CA and Subscriber are Affiliated, the Applicant Representative acknowledged and accepted the Terms of Use;

7. **Status:** That the CA maintains a 24 x 7 publicly-accessible Repository with current information regarding the status (valid or revoked) of all unexpired Certificates; and
8. **Revocation:** That the CA will revoke the Certificate for any of the reasons specified in these Requirements.

7.2 By the Applicant

The CA SHALL require, as part of the Subscriber or Terms of Use Agreement, that the Applicant make the commitments and warranties set forth in Section 10.3.2 of these Requirements, for the benefit of the CA and the Certificate Beneficiaries.

8. Community and Applicability

8.1 Compliance

The CA SHALL at all times:

1. Issue Certificates and operate its PKI in accordance with all law applicable to its business and the Certificates it issues in every jurisdiction in which it operates;
2. Comply with these Requirements;
3. Comply with the audit requirements set forth in Section 17; and
4. Be licensed as a CA in each jurisdiction where it operates, if licensing is required by the law of such jurisdiction for the issuance of Certificates.

If a court or government body with jurisdiction over the activities covered by these Requirements determines that the performance of any mandatory requirement is illegal, then such requirement is considered reformed to the minimum extent necessary to make the requirement valid and legal. This applies only to operations or certificate issuances that are subject to the laws of that jurisdiction. The parties involved SHALL notify the CA / Browser Forum of the facts, circumstances, and law(s) involved, so that the CA/Browser Forum may revise these Requirements accordingly.

8.2 Certificate Policies

8.2.1 Implementation

The CA SHALL develop, implement, enforce, and annually update a Certificate Policy and/or Certification Practice Statement that describes in detail how the CA implements the latest version of these Requirements.

8.2.2 Disclosure

The CA SHALL publicly disclose its Certificate Policy and/or Certification Practice Statement through an appropriate and readily accessible online means that is available on a 24x7 basis. The CA SHALL publicly disclose its CA business practices to the extent required by the CA's selected audit scheme (see Section 17.1). The disclosures MUST include all the material required by RFC 2527 or RFC 3647, and MUST be structured in accordance with either RFC 2527 or RFC 3647.

8.3 Commitment to Comply

The CA SHALL publicly give effect to these Requirements and represent that it will adhere to the latest published version. The CA MAY fulfill this requirement by incorporating these Requirements directly into its Certificate Policy and/or Certification Practice Statements or by incorporating them by reference using a clause such as the following (which MUST include a link to the official version of these Requirements):

> [Name of CA] conforms to the current version of the Baseline Requirements for the Issuance and Management of Publicly-Trusted Certificates published at http://www.cabforum.org. In the event

of any inconsistency between this document and those Requirements, those Requirements take precedence over this document.

8.4 Trust model

The CA SHALL disclose all Cross Certificates that identify the CA as the Subject, provided that the CA arranged for or accepted the establishment of the trust relationship (i.e. the Cross Certificate at issue).

9. Certificate Content and Profile

9.1 Issuer Information

An Issuing CA SHALL populate the issuer field of each Certificate issued after the adoption of these Requirements in accordance with the following subsections.

9.1.1 Issuer Common Name Field

Certificate Field: issuer:commonName (OID 2.5.4.3)

Required/Optional: Optional

Contents: If present in a Certificate, the Common Name field MUST include a name that accurately identifies the Issuing CA.

9.1.2 Issuer Domain Component Field

Certificate Field: issuer:domainComponent (OID 0.9.2342.19200300.100.1.25)

Required/Optional: Optional.

Contents: If present in a Certificate, the Domain Component field MUST include all components of the Issuing CA's Registered Domain Name in ordered sequence, with the most significant component, closest to the root of the namespace, written last.

9.1.3 Issuer Organization Name Field

Certificate Field: issuer:organizationName (OID 2.5.4.10)

Required/Optional: Required

Contents: This field MUST contain the name (or abbreviation thereof), trademark, or other meaningful identifier for the CA, provided that they accurately identify the CA. The field MUST NOT contain a generic designation such as "Root" or "CA1".

9.1.4 Issuer Country Name Field

Certificate Field: issuer:countryName (OID 2.5.4.6)

Required/Optional: Required

Contents: This field MUST contain the two-letter ISO 3166-1 country code for the country in which the issuer's place of business is located.

9.2 Subject Information

By issuing the Certificate, the CA represents that it followed the procedure set forth in its Certificate Policy and/or Certification Practice Statement to verify that, as of the Certificate's issuance date, all of the Subject Information was accurate.

9.2.1 Subject Alternative Name Extension

Certificate Field: extensions:subjectAltName

Required/Optional: Required

Contents: This extension MUST contain at least one entry. Each entry MUST be either a dNSName containing the Fully-Qualified Domain Name or an iPAddress containing the IP address of a server. The CA MUST confirm that the Applicant controls the Fully-Qualified Domain Name or IP address or has been granted the right to use it by the Domain Name Registrant or IP address assignee, as appropriate.

Wildcard FQDNs are permitted.

As of the Effective Date of these Requirements, prior to the issuance of a Certificate with a subjectAlternativeName extension or Subject commonName field containing a Reserved IP Address or Internal Server Name, the CA SHALL notify the Applicant that the use of such Certificates has been deprecated by the CA / Browser Forum and that the practice will be eliminated by October 2016. Also as of the Effective Date, the CA SHALL NOT issue a certificate with an Expiry Date later than 1 November 2015 with a subjectAlternativeName extension or Subject commonName field containing a Reserved IP Address or Internal Server Name. Effective 1 October 2016, CAs SHALL revoke all unexpired Certificates whose subjectAlternativeName extension or Subject commonName field contains a Reserved IP Address or Internal Server Name.

9.2.2 Subject Common Name Field

Certificate Field: subject:commonName (OID 2.5.4.3)

Required/Optional: Deprecated (Discouraged, but not prohibited)

Contents: If present, this field MUST contain a single IP address or Fully-Qualified Domain Name that is one of the values contained in the Certificate's subjectAltName extension (see Section 9.2.1).

9.2.3 Subject Domain Component Field

Certificate Field: subject:domainComponent (OID 0.9.2342.19200300.100.1.25)

Required/Optional: Optional.

Contents: If present, this field MUST contain all components of the subject's Registered Domain Name in ordered sequence, with the most significant component, closest to the root of the namespace, written last.

9.2.4 Subject Organization Name Field

Certificate Fields:

Organization name: organizationName (OID 2.5.4.10)

Number and street: subject:streetAddress (OID: 2.5.4.9)

City or town: subject:localityName (OID: 2.5.4.7)

State or province (where applicable): subject:stateOrProvinceName (OID: 2.5.4.8)

Country: subject:countryName (OID: 2.5.4.6)

Postal/Zip code: subject:postalCode (OID: 2.5.4.17)

Required/Optional: The organization name is OPTIONAL. If organization name is present, then localityName, stateOrProvinceName (where applicable), and countryName are REQUIRED and streetAddress and postalCode are OPTIONAL. If organization name is absent, then the Certificate MUST NOT contain a streetAddress, localityName, stateOrProvinceName, or postalCode attribute. The CA MAY include the Subject's countryName field without including other Subject Identity Information pursuant to Section 9.2.5.

Contents: If the organizationName field is present, the field MUST contain the Subject's name or DBA and the required address fields MUST contain a location of the Subject as verified by the CA pursuant to Section 11.2. If the

Subject is a natural person, because Subject name attributes for individuals (e.g. givenName (2.5.4.42) and surname (2.5.4.4)) are not broadly supported by application software, the CA MAY use the organizationName field to convey the Subject's name or DBA.

If the fields include discrepancies that the CA considers minor, such as common variations and abbreviations, then the CA SHALL document the discrepancy and SHALL use locally accepted abbreviations when abbreviating the organization name, e.g., if the official record shows "Company Name Incorporated", the CA MAY include "Company Name, Inc."

The organizationName field may include a verified DBA or tradename of the Subject.

9.2.5 Subject Country Name Field

Certificate Field: subject:countryName (OID: 2.5.4.6)

Required/Optional: Optional

Contents: If the subject:countryName field is present, then the CA SHALL verify the country associated with the Subject in accordance with Section 11.2.5 and use its two-letter ISO 3166-1 country code.

9.2.6 Other Subject Attributes

With the exception of the subject:organizationalUnitName (OU) attribute, optional attributes, when present within the subject field, MUST contain information that has been verified by the CA. Metadata such as '.', '-', and ' ' (i.e. space) characters, and/or any other indication that the value is absent, incomplete, or not applicable, SHALL NOT be used.

CAs SHALL NOT include Fully-Qualified Domain Names in Subject attributes except as specified in Sections 9.2.1 and 9.2.2, above.

The CA SHALL implement a process that prevents an OU attribute from including a name, DBA, tradename, trademark, address, location, or other text that refers to a specific natural person or Legal Entity unless the CA has verified this information in accordance with Section 11.2 and the Certificate also contains subject:organizationName, subject:localityName, and subject:countryName attributes, also verified in accordance with Section 11.2.

9.3 Certificate Policy Identification

This section describes the content requirements for the Root CA, Subordinate CA, and Subscriber Certificates, as they relate to the identification of Certificate Policy.

9.3.1 Reserved Certificate Policy Identifiers

The following Certificate Policy identifiers are reserved for use by CAs as an optional means of asserting compliance with these Requirements as follows:

> {joint-iso-itu-t(2) international-organizations(23) ca-browser-forum(140) certificate-policies(1) baseline-requirements(2) domain-validated(1)} (2.23.140.1.2.1), if the Certificate complies with these Requirements but lacks Subject Identity Information that is verified in accordance with Section 11.2.

If the Certificate asserts the policy identifier of 2.23.140.1.2.1, then it MUST NOT include organizationName, streetAddress, localityName, stateOrProvinceName, or postalCode in the Subject field.

> {joint-iso-itu-t(2) international-organizations(23) ca-browser-forum(140) certificate-policies(1) baseline-requirements(2) subject-identity-validated(2)} (2.23.140.1.2.2), if the Certificate complies with these Requirements and includes Subject Identity Information that is verified in accordance with Section 11.2.

If the Certificate asserts the policy identifier of 2.23.140.1.2.2, then it MUST also include organizationName, localityName, stateOrProvinceName (if applicable), and countryName in the Subject field.

9.3.2 Root CA Certificates

A Root CA Certificate SHOULD NOT contain the certificatePolicies extension.

9.3.3 Subordinate CA Certificates

A Certificate issued after the Effective Date to a Subordinate CA that is not an Affiliate of the Issuing CA:

1. MUST include one or more explicit policy identifiers that indicates the Subordinate CA's adherence to and compliance with these Requirements (i.e. either the CA/Browser Forum reserved identifiers or identifiers defined by the CA in its Certificate Policy and/or Certification Practice Statement) and
2. MUST NOT contain the "anyPolicy" identifier (2.5.29.32.0).

A Certificate issued after the Effective Date to a Subordinate CA that is an affiliate of the Issuing CA:

1. MAY include the CA/Browser Forum reserved identifiers or an identifier defined by the CA in its Certificate Policy and/or Certification Practice Statement to indicate the Subordinate CA's compliance with these Requirements and
2. MAY contain the "anyPolicy" identifier (2.5.29.32.0) in place of an explicit policy identifier.

A Subordinate CA SHALL represent, in its Certificate Policy and/or Certification Practice Statement, that all Certificates containing a policy identifier indicating compliance with these Requirements are issued and managed in accordance with these Requirements.

9.3.4 Subscriber Certificates

A Certificate issued to a Subscriber MUST contain one or more policy identifier(s), defined by the Issuing CA, in the Certificate's certificatePolicies extension that indicates adherence to and compliance with these Requirements. CAs complying with these Requirements MAY also assert one of the reserved policy OIDs in such Certificates.

The issuing CA SHALL document in its Certificate Policy or Certification Practice Statement that the Certificates it issues containing the specified policy identifier(s) are managed in accordance with these Requirements.

9.4 Validity Period

Certificates issued after the Effective Date MUST have a Validity Period no greater than 60 months.

Except as provided for below, Certificates issued after 1 April 2015 MUST have a Validity Period no greater than 39 months.

Beyond 1 April 2015, CAs MAY continue to issue Certificates with a Validity Period greater than 39 months but not greater than 60 months provided that the CA documents that the Certificate is for a system or software that:

(a) was in use prior to the Effective Date;

(b) is currently in use by either the Applicant or a substantial number of Relying Parties;

(c) fails to operate if the Validity Period is shorter than 60 months;

(d) does not contain known security risks to Relying Parties; and

(e) is difficult to patch or replace without substantial economic outlay.

9.5 Subscriber Public Key

The CA SHALL reject a certificate request if the requested Public Key does not meet the requirements set forth in Appendix A or if it has a known weak Private Key (such as a Debian weak key, see http://wiki.debian.org/SSLkeys).

9.6 Certificate Serial Number

CAs SHOULD generate non-sequential Certificate serial numbers that exhibit at least 20 bits of entropy.

9.7 Additional Technical Requirements

The CA SHALL meet the technical requirements set forth in Appendix A - Cryptographic Algorithm and Key Requirements, and

Appendix B – Certificate Extensions, and Appendix C – User Agent Verification.

10. Certificate Application

10.1 Documentation Requirements

Prior to the issuance of a Certificate, the CA SHALL obtain the following documentation from the Applicant:

1. A certificate request, which may be electronic; and
2. An executed Subscriber or Terms of Use Agreement, which may be electronic.

The CA SHOULD obtain any additional documentation the CA determines necessary to meet these Requirements.

10.2 Certificate Request

10.2.1 General

Prior to the issuance of a Certificate, the CA SHALL obtain from the Applicant a certificate request in a form prescribed by the CA and that complies with these Requirements. One certificate request MAY suffice for multiple Certificates to be issued to the same Applicant, subject to the aging and updating requirement in Section 11.3, provided that each Certificate is supported by a valid, current certificate request signed by the appropriate Applicant Representative on behalf of the Applicant. The certificate request MAY be made, submitted and/or signed electronically.

10.2.2 Request and Certification

The certificate request MUST contain a request from, or on behalf of, the Applicant for the issuance of a Certificate, and a certification by, or on behalf of, the Applicant that all of the information contained therein is correct.

10.2.3 Information Requirements

The certificate request MAY include all factual information about the Applicant to be included in the Certificate, and such additional information as is necessary for the CA to obtain from the Applicant in order to comply with these Requirements and the CA's Certificate Policy and/or Certification Practice Statement. In cases where the certificate request does not contain all the necessary information about the Applicant, the CA SHALL obtain the remaining information from the Applicant or, having obtained it from a reliable, independent, third-party data source, confirm it with the Applicant.

Applicant information MUST include, but not be limited to, at least one Fully-Qualified Domain Name or IP address to be included in the Certificate's SubjectAltName extension.

10.2.4 Subscriber Private Key

Parties other than the Subscriber SHALL NOT archive the Subscriber Private Key.

If the CA or any of its designated RAs generated the Private Key on behalf of the Subscriber, then the CA SHALL encrypt the Private Key for transport to the Subscriber.

If the CA or any of its designated RAs become aware that a Subscriber's Private Key has been communicated to an unauthorized person or an organization not affiliated with the Subscriber, then the CA SHALL revoke all certificates that include the Public Key corresponding to the communicated Private Key.

10.3 Subscriber and Terms of Use Agreement

10.3.1 General

Prior to the issuance of a Certificate, the CA SHALL obtain, for the express benefit of the CA and the Certificate Beneficiaries, either:

1. The Applicant's agreement to the Subscriber Agreement with the CA, or
2. The Applicant's agreement to the Terms of Use agreement.

The CA SHALL implement a process to ensure that each Subscriber or Terms of Use Agreement is legally enforceable against the Applicant. In either case, the Agreement MUST apply to the Certificate to be issued pursuant to the certificate request. The CA MAY use an electronic or "click-through" Agreement provided that the CA has determined that such agreements are legally enforceable. A separate Agreement MAY be used for each certificate request, or a single Agreement MAY be used to cover multiple future certificate requests and the resulting Certificates, so long as each Certificate that the CA issues to the Applicant is clearly covered by that Subscriber or Terms of Use Agreement.

10.3.2 Agreement Requirements

The Subscriber or Terms of Use Agreement MUST contain provisions imposing on the Applicant itself (or made by the Applicant on behalf of its principal or agent under a subcontractor or hosting service relationship) the following obligations and warranties:

1. **Accuracy of Information:** An obligation and warranty to provide accurate and complete information at all times to the CA, both in the certificate request and as otherwise requested by the CA in connection with the issuance of the Certificate(s) to be supplied by the CA;
2. **Protection of Private Key:** An obligation and warranty by the Applicant to take all reasonable measures to maintain sole control of, keep confidential, and properly protect at all times the Private Key that corresponds to the Public Key to be included in the requested Certificate(s) (and any associated activation data or device, e.g. password or token);
3. **Acceptance of Certificate:** An obligation and warranty that the Subscriber will review and verify the Certificate contents for accuracy;
4. **Use of Certificate:** An obligation and warranty to install the Certificate only on servers that are accessible at the subjectAltName(s) listed in the Certificate, and to use the Certificate solely in compliance with all applicable laws and solely in accordance with the Subscriber or Terms of Use Agreement;
5. **Reporting and Revocation:** An obligation and warranty to promptly cease using a Certificate and its associated Private Key, and promptly request the CA to revoke the Certificate, in the event that: (a) any information in the Certificate is, or becomes, incorrect or inaccurate, or (b) there is any actual or suspected misuse or compromise of the Subscriber's Private Key associated with the Public Key included in the Certificate;
6. **Termination of Use of Certificate:** An obligation and warranty to promptly cease all use of the Private Key corresponding to the Public Key included in the Certificate upon revocation of that Certificate for reasons of Key Compromise.
7. **Responsiveness:** An obligation to respond to the CA's instructions concerning Key Compromise or Certificate misuse within a specified time period.
8. **Acknowledgment and Acceptance:** An acknowledgment and acceptance that the CA is entitled to revoke the certificate immediately if the Applicant were to violate the terms of the Subscriber or Terms of Use

Agreement or if the CA discovers that the Certificate is being used to enable criminal activities such as phishing attacks, fraud, or the distribution of malware.

11. Verification Practices

11.1 Authorization by Domain Name Registrant

The CA SHALL confirm that, as of the date the Certificate was issued, the Applicant either had the right to use, or had control of, the Fully-Qualified Domain Name(s) and IP address(es) listed in the Certificate, or was authorized by a person having such right or control (e.g. under a Principal-Agent or Licensor-Licensee relationship) to obtain a Certificate containing the Fully-Qualified Domain Name(s) and IP address(es).

If the CA relies on a confirmation of the right to use or control the Registered Domain Name(s) from a Domain Name Registrar, and the top-level Domain is a two-letter country code (ccTLD), the CA SHALL obtain the confirmation directly from the Domain Name Registrar for the Domain Name level to which the rules of the ccTLD apply. For example, if the requested FQDN is www.mysite.users.example.co.uk, then the CA SHALL obtain confirmation from the Domain Name Registrant of the Domain Name example.co.uk, because applications for Domain Names immediately subordinate to .co.uk are governed by the rules of the .uk registry.

If the CA uses the Internet mail system to confirm that the Applicant has authorization from the Domain Name Registrant to obtain a Certificate for the requested Fully-Qualified Domain Name, the CA SHALL use a mail system address formed in one of the following ways:

1. Supplied by the Domain Name Registrar;
2. Taken from the Domain Name Registrant's "registrant", "technical", or "administrative" contact information, as it appears in the Domain's WHOIS record; or;
3. By pre-pending a local part to a Domain Name as follows:
    a. Local part - One of the following: 'admin', 'administrator', 'webmaster', 'hostmaster', or 'postmaster'; and
    b. Domain Name – Formed by pruning zero or more components from the Registered Domain Name or the requested Fully-Qualified Domain Name.

If the Domain Name Registrant has used a private, anonymous, or proxy registration service, and the CA relies upon a Domain Authorization as an alternative to the foregoing, the Domain Authorization MUST be received directly from the private, anonymous, or proxy registration service identified in the WHOIS record for the Registered Domain Name. The document MUST contain the letterhead of the private, anonymous, or proxy registration service, the signature of the General Manager, or equivalent, or an authorized representative of such officer, dated on or after the certificate request date, and the Fully-Qualified Domain Name(s) to be included in the Certificate. If the WHOIS record identifies the private, anonymous, or proxy registration service as the Domain Name Registrant, then the Domain Authorization MUST contain a statement granting the Applicant the right to use the Fully-Qualified Domain Name in a Certificate. The CA SHALL contact the private, anonymous, or proxy registration service directly, using contact information obtained from a reliable, independent, third-party data source, and obtain confirmation from the Domain Name Registrant that the Domain Authorization is authentic.

11.2 Verification of Subject Identity Information

If the Applicant requests a Certificate that will contain Subject Identity Information comprised only of the countryName field, then the CA SHALL verify the country associated with the Subject using a verification process meeting the requirements of Section 11.2.5 and that is described in the CA's Certificate Policy and/or Certification Practice Statement. If the Applicant requests a Certificate that will contain the countryName field and other Subject Identity Information, then the CA SHALL verify the identity of the Applicant, and the authenticity of the Applicant Representative's certificate request using a verification process meeting the requirements of this Section 11.2 and that is described in the CA's Certificate Policy and/or Certification Practice Statement. The CA SHALL inspect any document relied upon under this Section for alteration or falsification.

11.2.1 Identity

If the Subject Identity Information is to include the name or address of an organization, the CA SHALL verify the identity and address of the organization and that the address is the Applicant's address of existence or operation. The CA SHALL verify the identity and address of the Applicant using documentation provided by, or through communication with, at least one of the following:

1. A government agency in the jurisdiction of the Applicant's legal creation, existence, or recognition;
2. A third party database that is periodically updated, which the CA has evaluated in accordance with Section 11.6;
3. A site visit by the CA or a third party who is acting as an agent for the CA; or
4. An Attestation Letter.

The CA MAY use the same documentation or communication described in 1 through 4 above to verify both the Applicant's identity and address.

Alternatively, the CA MAY verify the address of the Applicant (but not the identity of the Applicant) using a utility bill, bank statement, credit card statement, government-issued tax document, or other form of identification that meets the requirements of Section 11.6.

11.2.2 DBA/Tradename

If the Subject Identity Information is to include a DBA or tradename, the CA SHALL verify the Applicant's right to use the DBA/tradename using at least one of the following:

1. Documentation provided by, or communication with, a government agency in the jurisdiction of the Applicant's legal creation, existence, or recognition;
2. Documentation or communication provided by a third party source that meets the requirements of Section 11.6;
3. Communication with a government agency responsible for the management of such DBAs or tradenames;
4. An Attestation Letter accompanied by documentary support that meets the requirements of Section 11.6; or
5. A utility bill, bank statement, credit card statement, government-issued tax document, or other form of identification that meets the requirements of Section 11.6.

11.2.3 Authenticity of Certificate Request

If the Applicant for a Certificate containing Subject Identity Information is an organization, the CA SHALL use a Reliable Method of Communication to verify the authenticity of the Applicant Representative's certificate request.

The CA MAY use the sources listed in section 11.2.1 to verify the Reliable Method of Communication. Provided that the CA uses a Reliable Method of Communication, the CA MAY establish the authenticity of the certificate request directly with the Applicant Representative or with an authoritative source within the Applicant's organization, such as the Applicant's main business offices, corporate offices, human resource offices, information technology offices, or other department that the CA deems appropriate.

In addition, the CA SHALL establish a process that allows an Applicant to specify the individuals who may request Certificates. If an Applicant specifies, in writing, the individuals who may request a Certificate, then the CA SHALL NOT accept any certificate requests that are outside this specification. The CA SHALL provide an Applicant with a list of its authorized certificate requesters upon the Applicant's verified written request.

11.2.4 Verification of Individual Applicant

If an Applicant subject to this Section 11.2 is a natural person, then the CA SHALL verify the Applicant's name, Applicant's address, and the authenticity of the certificate request.

The CA SHALL verify the Applicant's name using a legible copy, which discernibly shows the Applicant's face, of at least one currently valid government-issued photo ID (passport, drivers license, military ID, national ID, or equivalent document type). The CA SHALL inspect the copy for any indication of alteration or falsification.

The CA SHALL verify the Applicant's address using a form of identification that meets Section 11.6, such as a government ID, utility bill, or bank or credit card statement. The CA MAY rely on the same government-issued ID that was used to verify the Applicant's name.

The CA SHALL verify the certificate request with the Applicant using a Reliable Method of Communication.

11.2.5 Verification of Country

If the subject:countryName field is present, then the CA SHALL verify the country associated with the Subject using one of the following: (a) the IP Address range assignment by country for either (i) the web site's IP address, as indicated by the DNS record for the web site or (ii) the Applicant's IP address; (b) the ccTLD of the requested Domain Name; (c) information provided by the Domain Name Registrar; or (d) a method identified in Section 11.2.1. The CA SHOULD implement a process to screen proxy servers in order to prevent reliance upon IP addresses assigned in countries other than where the Applicant is actually located.

11.3 Age of Certificate Data

Section 9.4 limits the validity period of Subscriber Certificates. The CA SHALL NOT use any data or document to validate a certificate request if the data or document was obtained more than thirty-nine (39) months prior to the Certificates' issuance.

11.4 Denied List

In accordance with Section 15.3.2, the CA SHALL maintain an internal database of all previously revoked Certificates and previously rejected certificate requests due to suspected phishing or other fraudulent usage or concerns. The CA SHALL use this information to identify subsequent suspicious certificate requests.

11.5 High Risk Requests

The CA SHALL identify high risk certificate requests, and conduct such additional verification activity, and take such additional precautions, as are reasonably necessary to ensure that such requests are properly verified under these Requirements.

The CA MAY identify high risk requests by checking appropriate lists of organization names that are most commonly targeted in phishing and other fraudulent schemes, and by automatically flagging certificate requests that match these lists for further scrutiny before issuance. Examples of such lists include: internal databases maintained by the CA that include previously revoked Certificates and previously rejected certificate requests due to suspected phishing or other fraudulent usage.

The CA SHALL use information identified by the CA's high-risk criteria to flag suspicious certificate requests. The CA SHALL follow a documented procedure for performing additional verification of any certificate request flagged as suspicious or high risk.

11.6 Data Source Accuracy

Before relying on a data source to verify Subject Identity Information, the CA SHALL evaluate the data source's accuracy and reliability. The CA SHALL NOT use a data source to verify Subject Identity Information if the CA's evaluation determines that the data source is not reasonably accurate or reliable.

12. Certificate Issuance by a Root CA

Certificate issuance by the Root CA SHALL require an individual authorized by the CA (i.e. the CA system operator, system officer, or PKI administrator) to deliberately issue a direct command in order for the Root CA to perform a certificate signing operation.

Root CA Private Keys MUST NOT be used to sign Certificates except in the following cases:

1. Self-signed Certificates to represent the Root CA itself;

2. Certificates for Subordinate CAs and Cross Certificates;

3. Certificates for infrastructure purposes (e.g. administrative role certificates, internal CA operational device certificates, and OCSP Response verification Certificates);

4. Certificates issued solely for the purpose of testing products with Certificates issued by a Root CA; and

5. Subscriber Certificates, provided that:

    a. The Root CA uses a 1024-bit RSA signing key that was created prior to the Effective Date;

    b. The Applicant's application was deployed prior to the Effective Date;

    c. The Applicant's application is in active use by the Applicant or the CA uses a documented process to establish that the Certificate's use is required by a substantial number of Relying Parties;

    d. The CA follows a documented process to determine that the Applicant's application poses no known security risks to Relying Parties; and

    e. The CA documents that the Applicant's application cannot be patched or replaced without substantial economic outlay.

13. Certificate Revocation and Status Checking

13.1 Revocation

13.1.1 Revocation Request

The CA SHALL provide a process for Subscribers to request revocation of their own Certificates. The process MUST be described in the CA's Certificate Policy or Certification Practice Statement. The CA SHALL maintain a continuous 24x7 ability to accept and respond to revocation requests and related inquiries.

13.1.2 Certificate Problem Reporting

The CA SHALL provide Subscribers, Relying Parties, Application Software Suppliers, and other third parties with clear instructions for reporting suspected Private Key Compromise, Certificate misuse, or other types of fraud, compromise, misuse, inappropriate conduct, or any other matter related to Certificates. The CA SHALL publicly disclose the instructions through a readily accessible online means.

13.1.3 Investigation

The CA SHALL begin investigation of a Certificate Problem Report within twenty-four hours of receipt, and decide whether revocation or other appropriate action is warranted based on at least the following criteria:

1. The nature of the alleged problem;

2. The number of Certificate Problem Reports received about a particular Certificate or Subscriber;

3. The entity making the complaint (for example, a complaint from a law enforcement official that a Web site is engaged in illegal activities should carry more weight than a complaint from a consumer alleging that she didn't receive the goods she ordered); and

4. Relevant legislation.

13.1.4 Response

The CA SHALL maintain a continuous 24x7 ability to respond internally to a high-priority Certificate Problem Report, and where appropriate, forward such a complaint to law enforcement authorities, and/or revoke a Certificate that is the subject of such a complaint.

13.1.5 Reasons for Revocation

The CA SHALL revoke a Certificate within 24 hours if one or more of the following occurs:

1. The Subscriber requests in writing that the CA revoke the Certificate;
2. The Subscriber notifies the CA that the original certificate request was not authorized and does not retroactively grant authorization;
3. The CA obtains evidence that the Subscriber's Private Key (corresponding to the Public Key in the Certificate) has suffered a Key Compromise, or that the Certificate has otherwise been misused (also see Section 10.2.4);
4. The CA is made aware that a Subscriber has violated one or more of its material obligations under the Subscriber or Terms of Use Agreement;
5. The CA is made aware of any circumstance indicating that use of a Fully-Qualified Domain Name or IP address in the Certificate is no longer legally permitted (e.g. a court or arbitrator has revoked a Domain Name Registrant's right to use the Domain Name, a relevant licensing or services agreement between the Domain Name Registrant and the Applicant has terminated, or the Domain Name Registrant has failed to renew the Domain Name);
6. The CA is made aware that a Wildcard Certificate has been used to authenticate a fraudulently misleading subordinate Fully-Qualified Domain Name;
7. The CA is made aware of a material change in the information contained in the Certificate;
8. The CA is made aware that the Certificate was not issued in accordance with these Requirements or the CA's Certificate Policy or Certification Practice Statement;
9. The CA determines that any of the information appearing in the Certificate is inaccurate or misleading;
10. The CA ceases operations for any reason and has not made arrangements for another CA to provide revocation support for the Certificate;
11. The CA's right to issue Certificates under these Requirements expires or is revoked or terminated, unless the CA has made arrangements to continue maintaining the CRL/OCSP Repository;
12. The CA is made aware of a possible compromise of the Private Key of the Subordinate CA used for issuing the Certificate;
13. Revocation is required by the CA's Certificate Policy and/or Certification Practice Statement; or
14. The technical content or format of the Certificate presents an unacceptable risk to Application Software Suppliers or Relying Parties (e.g. the CA/Browser Forum might determine that a deprecated cryptographic/signature algorithm or key size presents an unacceptable risk and that such Certificates should be revoked and replaced by CAs within a given period of time).

13.2 Certificate Status Checking

13.2.1 Mechanisms

The CA SHALL make revocation information for Subordinate Certificates and Subscriber Certificates available in accordance with Appendix B.

If the Subscriber Certificate is for a high-traffic FQDN, the CA MAY rely on stapling, in accordance with [RFC4366], to distribute its OCSP responses. In this case, the CA SHALL ensure that the Subscriber "staples" the OCSP response for the Certificate in its TLS handshake. The CA SHALL enforce this requirement on the

Subscriber either contractually, through the Subscriber or Terms of Use Agreement, or by technical review measures implement by the CA.

13.2.2 Repository

The CA SHALL maintain an online 24x7 Repository that application software can use to automatically check the current status of all unexpired Certificates issued by the CA.

For the status of Subscriber Certificates:

1. If the CA publishes a CRL, then the CA SHALL update and reissue CRLs at least once every seven days, and the value of the nextUpdate field MUST NOT be more than ten days beyond the value of the thisUpdate field; and
2. The CA SHALL update information provided via an Online Certificate Status Protocol at least every four days. OCSP responses from this service MUST have a maximum expiration time of ten days.

For the status of Subordinate CA Certificates:

1. The CA SHALL update and reissue CRLs at least (i) once every twelve months and (ii) within 24 hours after revoking a Subordinate CA Certificate, and the value of the nextUpdate field MUST NOT be more than twelve months beyond the value of the thisUpdate field; and
2. The CA SHALL update information provided via an Online Certificate Status Protocol at least (i) every twelve months and (ii) within 24 hours after revoking a Subordinate CA Certificate.

Effective 1 January 2013, the CA SHALL support an OCSP capability using the GET method for Certificates issued in accordance with these Requirements.

13.2.3 Response Time

The CA SHALL operate and maintain its CRL and OCSP capability with resources sufficient to provide a response time of ten seconds or less under normal operating conditions.

13.2.4 Deletion of Entries

Revocation entries on a CRL or OCSP Response MUST NOT be removed until after the Expiry Date of the revoked Certificate.

13.2.5 OCSP Signing

OCSP responses MUST conform to RFC2560 and/or RFC5019. OCSP responses MUST either:

1. Be signed by the CA that issued the Certificates whose revocation status is being checked, or
2. Be signed by an OCSP Responder whose Certificate is signed by the CA that issued the Certificate whose revocation status is being checked.

In the latter case, the OCSP signing Certificate MUST contain an extension of type id-pkix-ocsp-nocheck, as defined by RFC2560.

14. Employees and Third Parties

14.1 Trustworthiness and Competence

14.1.1 Identity and Background Verification

Prior to the engagement of any person in the Certificate Management Process, whether as an employee, agent, or an independent contractor of the CA, the CA SHALL verify the identity and trustworthiness of such person.

14.1.2 Training and Skill Level

The CA SHALL provide all personnel performing information verification duties with skills-training that covers basic Public Key Infrastructure knowledge, authentication and vetting policies and procedures (including the CA's Certificate Policy and/or Certification Practice Statement), common threats to the information verification process (including phishing and other social engineering tactics), and these Requirements.

The CA SHALL maintain records of such training and ensure that personnel entrusted with Validation Specialist duties maintain a skill level that enables them to perform such duties satisfactorily.

Validation Specialists engaged in Certificate issuance SHALL maintain skill levels consistent with the CA's training and performance programs.

The CA SHALL document that each Validation Specialist possesses the skills required by a task before allowing the Validation Specialist to perform that task.

The CA SHALL require all Validation Specialists to pass an examination provided by the CA on the information verification requirements outlined in these Requirements.

14.2 Delegation of Functions

14.2.1 General

The CA MAY delegate the performance of all, or any part, of Section 11 of these Requirements to a Delegated Third Party, provided that the process as a whole fulfills all of the requirements of Section 11.

Before the CA authorizes a Delegated Third Party to perform a delegated function, the CA SHALL contractually require the Delegated Third Party to:

1) Meet the qualification requirements of Section 14.1, when applicable to the delegated function;
2) Retain documentation in accordance with Section 15.3.2;
3) Abide by the other provisions of these Requirements that are applicable to the delegated function; and
4) Comply with (a) the CA's Certificate Policy/Certification Practice Statement or (b) the Delegated Third Party's practice statement that the CA has verified complies with these Requirements.

The CA SHALL verify that the Delegated Third Party's personnel involved in the issuance of a Certificate meet the training and skills requirements of Section 14 and the document retention and event logging requirements of Section 15.

14.2.2 Compliance Obligation

The CA SHALL internally audit each Delegated Third Party's compliance with these Requirements on an annual basis.

14.2.3 Allocation of Liability

For delegated tasks, the CA and any Delegated Third Party MAY allocate liability between themselves contractually as they determine, but the CA SHALL remain fully responsible for the performance of all parties in accordance with these Requirements, as if the tasks had not been delegated.

14.2.4 Enterprise RAs

The CA MAY designate an Enterprise RA to verify certificate requests from the Enterprise RA's own organization.

The CA SHALL NOT accept certificate requests authorized by an Enterprise RA unless the following requirements are satisfied:

1. The CA SHALL confirm that the requested Fully-Qualified Domain Name(s) are within the Enterprise RA's verified Domain Namespace (see Section 7.1.2 para 1).

2. If the certificate request includes a Subject name of a type other than a Fully-Qualified Domain Name, the CA SHALL confirm that the name is either that of the delegated enterprise, or an Affiliate of the delegated enterprise, or that the delegated enterprise is an agent of the named Subject. For example, the CA SHALL NOT issue a Certificate containing the Subject name "XYZ Co." on the authority of Enterprise RA "ABC Co.", unless the two companies are affiliated (see Section 11.1) or "ABC Co." is the agent of "XYZ Co". This requirement applies regardless of whether the accompanying requested Subject FQDN falls within the Domain Namespace of ABC Co.'s Registered Domain Name.

The CA SHALL impose these limitations as a contractual requirement on the Enterprise RA and monitor compliance by the Enterprise RA.

15. Data Records

15.1 Documentation and Event Logging

The CA and each Delegated Third Party SHALL record details of the actions taken to process a certificate request and to issue a Certificate, including all information generated and documentation received in connection with the certificate request; the time and date; and the personnel involved. The CA SHALL make these records available to its Qualified Auditor as proof of the CA's compliance with these Requirements.

15.2 Events and Actions

The CA SHALL record at least the following events:

1. CA key lifecycle management events, including:
    a. Key generation, backup, storage, recovery, archival, and destruction; and
    b. Cryptographic device lifecycle management events.
2. CA and Subscriber Certificate lifecycle management events, including:
    a. Certificate requests, renewal, and re-key requests, and revocation;
    b. All verification activities stipulated in these Requirements and the CA's Certification Practice Statement;
    c. Date, time, phone number used, persons spoken to, and end results of verification telephone calls;
    d. Acceptance and rejection of certificate requests;
    e. Issuance of Certificates; and
    f. Generation of Certificate Revocation Lists and OCSP entries.
3. Security events, including:
    a. Successful and unsuccessful PKI system access attempts;
    b. PKI and security system actions performed;
    c. Security profile changes;
    d. System crashes, hardware failures, and other anomalies;
    e. Firewall and router activities; and
    f. Entries to and exits from the CA facility.

Log entries MUST include the following elements:

1. Date and time of entry;
2. Identity of the person making the journal entry; and
3. Description of the entry.

15.3 Retention

15.3.1 Audit Log Retention

The CA SHALL retain any audit logs generated after the Effective Date for at least seven years. The CA SHALL make these audit logs available to its Qualified Auditor upon request.

15.3.2 Documentation Retention

The CA SHALL retain all documentation relating to certificate requests and the verification thereof, and all Certificates and revocation thereof, for at least seven years after any Certificate based on that documentation ceases to be valid.

16. Data Security

16.1 Objectives

The CA SHALL develop, implement, and maintain a comprehensive security program designed to:

1. Protect the confidentiality, integrity, and availability of Certificate Data and Certificate Management Processes;
2. Protect against anticipated threats or hazards to the confidentiality, integrity, and availability of the Certificate Data and Certificate Management Processes;
3. Protect against unauthorized or unlawful access, use, disclosure, alteration, or destruction of any Certificate Data or Certificate Management Processes;
4. Protect against accidental loss or destruction of, or damage to, any Certificate Data or Certificate Management Processes; and
5. Comply with all other security requirements applicable to the CA by law.

16.2 Risk Assessment

The CA's security program MUST include an annual Risk Assessment that:

1. Identifies foreseeable internal and external threats that could result in unauthorized access, disclosure, misuse, alteration, or destruction of any Certificate Data or Certificate Management Processes;
2. Assesses the likelihood and potential damage of these threats, taking into consideration the sensitivity of the Certificate Data and Certificate Management Processes; and
3. Assesses the sufficiency of the policies, procedures, information systems, technology, and other arrangements that the CA has in place to counter such threats.

16.3 Security Plan

Based on the Risk Assessment, the CA SHALL develop, implement, and maintain a security plan consisting of security procedures, measures, and products designed to achieve the objectives set forth above and to manage and control the risks identified during the Risk Assessment, commensurate with the sensitivity of the Certificate Data and Certificate Management Processes. The security plan MUST include administrative, organizational, technical, and physical safeguards appropriate to the sensitivity of the Certificate Data and Certificate Management Processes. The security plan MUST also take into account then-available technology and the cost of implementing the specific measures, and SHALL implement a reasonable level of security appropriate to the harm that might result from a breach of security and the nature of the data to be protected.

16.4 Business Continuity

In addition, the CA SHALL document a business continuity and disaster recovery procedures designed to notify and reasonably protect Application Software Suppliers, Subscribers, and Relying Parties in the event of a disaster,

security compromise, or business failure. The CA is not required to publicly disclose its business continuity plans but SHALL make the business continuity plan and security plan of Section 15.3 available to the CA's auditors upon request. The CA SHALL annually test, review, and update these procedures.

The business continuity plan MUST include:

1. The conditions for activating the plan,
2. Emergency procedures,
3. Fallback procedures,
4. Resumption procedures,
5. A maintenance schedule for the plan;
6. Awareness and education requirements;
7. The responsibilities of the individuals;
8. Recovery time objective (RTO);
9. Regular testing of contingency plans.
10. The CA's plan to maintain or restore the CA's business operations in a timely manner following interruption to or failure of critical business processes
11. A requirement to store critical cryptographic materials (i.e., secure cryptographic device and activation materials) at an alternate location;
12. What constitutes an acceptable system outage and recovery time
13. How frequently backup copies of essential business information and software are taken;
14. The distance of recovery facilities to the CA's main site; and
15. Procedures for securing its facility to the extent possible during the period of time following a disaster and prior to restoring a secure environment either at the original or a remote site.

16.5 System Security[1]

The Certificate Management Process MUST include:

1. physical security and environmental controls;
2. system integrity controls, including configuration management, integrity maintenance of trusted code, and malware detection/prevention;
3. network security and firewall management, including port restrictions and IP address filtering;
4. user management, separate trusted-role assignments, education, awareness, and training; and
5. logical access controls, activity logging, and inactivity time-outs to provide individual accountability.

The CA SHALL enforce multi-factor authentication for all accounts capable of directly causing certificate issuance.

16.6 Private Key Protection

The CA SHALL protect its Private Key in a system or device that has been validated as meeting at least FIPS 140 level 3 or an appropriate Common Criteria Protection Profile or Security Target, EAL 4 (or higher), which includes requirements to protect the Private Key and other assets against known threats. The CA SHALL implement physical and logical safeguards to prevent unauthorized certificate issuance. Protection of the Private Key outside the validated system or device specified above MUST consist of physical security, encryption, or a combination of both, implemented in a manner that prevents disclosure of the Private Key. The CA SHALL encrypt its Private Key with an algorithm and key-length that, according to the state of the art, are capable of withstanding cryptanalytic attacks for the residual life of the encrypted key or key part. The Private Key SHALL be backed up, stored, and recovered only by personnel in trusted roles using, at least, dual control in a physically secured environment.

[1] The CA/Browser Forum will enact additional security requirements after the adoption of v1.0 of the Requirements.

17. Audit

17.1 Eligible Audit Schemes

The CA SHALL undergo an audit in accordance with one of the following schemes:

1. WebTrust for Certification Authorities v2.0 or later;
2. A national scheme that audits conformance to ETSI TS 101 456 v1.2.1 or later;
3. A national scheme that audits conformance to ETSI TS 102 042 V1.1.1 or later;
4. A scheme that audits conformance to ISO 21188:2006, completed by a Qualified Auditor; or
5. If a Government CA is required by its Certificate Policy to use a different internal audit scheme, it may use such scheme provided that: (a) the audit either (i) encompasses all requirements of one of the above schemes or (ii) consists of comparable criteria that are available for public review, and (b) the audit is performed by a Qualified Auditor, who is separate from the CA and who meets the requirements of Section 17.6.

17.2 Audit Period

The period during which the CA issues Certificates SHALL be divided into an unbroken sequence of audit periods. An audit period MUST NOT exceed one year in duration.

17.3 Audit Report

The CA SHALL make the Audit Report publicly available. The CA is not required to make publicly available any general audit findings that do not impact the overall audit opinion. For both government and commercial CAs, the CA SHOULD make its Audit Report publicly available no later than three months after the end of the audit period. In the event of a delay greater than three months, and if so requested by an Application Software Supplier, the CA SHALL provide an explanatory letter signed by the Qualified Auditor.

17.4 Pre-Issuance Readiness Audit

If the CA has a currently valid Audit Report indicating compliance with an audit scheme listed in Section 17.1, then no pre-issuance readiness assessment is necessary.

If the CA does not have a currently valid Audit Report indicating compliance with one of the audit schemes listed in Section 17.1, then, before issuing Publicly-Trusted Certificates, the CA SHALL successfully complete a point-in-time readiness assessment performed in accordance with applicable standards under one of the audit schemes listed in Section 17.1. The point-in-time readiness assessment SHALL be completed no earlier than twelve (12) months prior to issuing Publicly-Trusted Certificates and SHALL be followed by a complete audit under such scheme within ninety (90) days of issuing the first Publicly-Trusted Certificate.

17.5 Audit of Delegated Functions

If a Delegated Third Party is not currently audited in accordance with Section 17 and is not an Enterprise RA, then prior to certificate issuance the CA SHALL ensure that the domain control validation process required under Section 11.1 has been properly performed by the Delegated Third Party by either (1) using an out-of-band mechanism involving at least one human who is acting either on behalf of the CA or on behalf of the Delegated Third Party to confirm the authenticity of the certificate request or the information supporting the certificate request or (2) performing the domain control validation process itself.

If the CA is not using one of the above procedures and the Delegated Third Party is not an Enterprise RA, then the CA SHALL obtain an audit report, issued under the auditing standards that underlie the accepted audit schemes found in Section 17.1, that provides an opinion whether the Delegated Third Party's performance complies with either the Delegated Third Party's practice statement or the CA's Certificate Policy and/or Certification Practice Statement. If the opinion is that the Delegated Third Party does not comply, then the CA SHALL not allow the Delegated Third Party to continue performing delegated functions.

The audit period for the Delegated Third Party SHALL NOT exceed one year (ideally aligned with the CA's audit). However, if the CA or Delegated Third Party is under the operation, control, or supervision of a Government Entity and the audit scheme is completed over multiple years, then the annual audit MUST cover at least the core controls that are required to be audited annually by such scheme plus that portion of all non-core controls that are allowed to be conducted less frequently, but in no case may any non-core control be audited less often than once every three years.

17.6 Auditor Qualifications

The CA's audit SHALL be performed by a Qualified Auditor. A Qualified Auditor means a natural person, Legal Entity, or group of natural persons or Legal Entities that collectively possess the following qualifications and skills:

1. Independence from the subject of the audit;
2. The ability to conduct an audit that addresses the criteria specified in an Eligible Audit Scheme;
3. Employs individuals who have proficiency in examining Public Key Infrastructure technology, information security tools and techniques, information technology and security auditing, and the third-party attestation function;
4. Certified, accredited, licensed, or otherwise assessed as meeting the qualification requirements of auditors under the audit scheme;
5. Bound by law, government regulation, or professional code of ethics; and
6. Except in the case of an Internal Government Auditing Agency, maintains Professional Liability/Errors & Omissions insurance with policy limits of at least one million US dollars in coverage.

17.7 Key Generation Ceremony

For Root CA Key Pairs created after the Effective Date that are either (i) used as Root CA Key Pairs or (ii) Key Pairs generated for a subordinate CA that is not the operator of the Root CA or an Affiliate of the Root CA, the CA SHALL:

1. prepare and follow a Key Generation Script,
2. have a Qualified Auditor witness the Root CA Key Pair generation process or record a video of the entire Root CA Key Pair generation process, and
3. have a Qualified Auditor issue a report opining that the CA followed its key ceremony during its Key and Certificate generation process and the controls used to ensure the integrity and confidentiality of the Key Pair.

For other CA Key Pairs created after the Effective Date that are for the operator of the Root CA or an Affiliate of the Root CA, the CA SHOULD:

1. prepare and follow a Key Generation Script and
2. have a Qualified Auditor witness the Root CA Key Pair generation process or record a video of the entire Root CA Key Pair generation process.

In all cases, the CA SHALL:

1. generate the keys in a physically secured environment as described in the CA's Certificate Policy and/or Certification Practice Statement;
2. generate the CA keys using personnel in trusted roles under the principles of multiple person control and split knowledge;
3. generate the CA keys within cryptographic modules meeting the applicable technical and business requirements as disclosed in the CA's Certificate Policy and/or Certification Practice Statement;
4. log its CA key generation activities; and
5. maintain effective controls to provide reasonable assurance that the Private Key was generated and protected in conformance with the procedures described in its Certificate Policy and/or Certification Practice Statement and (if applicable) its Key Generation Script.

17.8 Regular Quality Assessment Self Audits

During the period in which the CA issues Certificates, the CA SHALL monitor adherence to its Certificate Policy, Certification Practice Statement and these Requirements and strictly control its service quality by performing self audits on at least a quarterly basis against a randomly selected sample of the greater of one certificate or at least three percent of the Certificates issued by it during the period commencing immediately after the previous self-audit sample was taken. Except for Delegated Third Parties that undergo an annual audit that meets the criteria specified in Section 16.3, the CA SHALL strictly control the service quality of Certificates issued or containing information verified by a Delegated Third Party by having a Validation Specialist employed by the CA perform ongoing quarterly audits against a randomly selected sample of at least the greater of one certificate or three percent of the Certificates verified by the Delegated Third Party in the period beginning immediately after the last sample was taken. The CA SHALL review each Delegated Third Party's practices and procedures to ensure that the Delegated Third Party is in compliance with these Requirements and the relevant Certificate Policy and/or Certification Practice Statement.

18. Liability and Indemnification

18.1 Liability to Subscribers and Relying Parties

If the CA has issued and managed the Certificate in compliance with these Requirements and its Certificate Policy and/or Certification Practice Statement, the CA MAY disclaim liability to the Certificate Beneficiaries or any other third parties for any losses suffered as a result of use or reliance on such Certificate beyond those specified in the CA's Certificate Policy and/or Certification Practice Statement. If the CA has not issued or managed the Certificate in compliance with these Requirements and its Certificate Policy and/or Certification Practice Statement, the CA MAY seek to limit its liability to the Subscriber and to Relying Parties, regardless of the cause of action or legal theory involved, for any and all claims, losses or damages suffered as a result of the use or reliance on such Certificate by any appropriate means that the CA desires. If the CA chooses to limit its liability for Certificates that are not issued or managed in compliance with these Requirements or its Certificate Policy and/or Certification Practice Statement, then the CA SHALL include the limitations on liability in the CA's Certificate Policy and/or Certification Practice Statement.

18.2 Indemnification of Application Software Suppliers

Notwithstanding any limitations on its liability to Subscribers and Relying Parties, the CA understands and acknowledges that the Application Software Suppliers who have a Root Certificate distribution agreement in place with the Root CA do not assume any obligation or potential liability of the CA under these Requirements or that otherwise might exist because of the issuance or maintenance of Certificates or reliance thereon by Relying Parties or others. Thus, except in the case where the CA is a government entity, the CA SHALL defend, indemnify, and hold harmless each Application Software Supplier for any and all claims, damages, and losses suffered by such Application Software Supplier related to a Certificate issued by the CA, regardless of the cause of action or legal theory involved. This does not apply, however, to any claim, damages, or loss suffered by such Application Software Supplier related to a Certificate issued by the CA where such claim, damage, or loss was directly caused by such Application Software Supplier's software displaying as not trustworthy a Certificate that is still valid, or displaying as trustworthy: (1) a Certificate that has expired, or (2) a Certificate that has been revoked (but only in cases where the revocation status is currently available from the CA online, and the application software either failed to check such status or ignored an indication of revoked status).

18.3 Root CA Obligations

The Root CA SHALL be responsible for the performance and warranties of the Subordinate CA, for the Subordinate CA's compliance with these Requirements, and for all liabilities and indemnification obligations of the Subordinate CA under these Requirements, as if the Root CA were the Subordinate CA issuing the Certificates.

Appendix A - Cryptographic Algorithm and Key Requirements (Normative)

Certificates MUST meet the following requirements for algorithm type and key size.

(1) Root CA Certificates

	Validity period beginning on or before 31 Dec 2010	Validity period beginning after 31 Dec 2010
Digest algorithm	MD5 (NOT RECOMMENDED), SHA-1, SHA-256, SHA-384 or SHA-512	SHA-1*, SHA-256, SHA-384 or SHA-512
Minimum RSA modulus size (bits)	2048**	2048
ECC curve	NIST P-256, P-384, or P-521	NIST P-256, P-384, or P-521

(2) Subordinate CA Certificates

	Validity period beginning on or before 31 Dec 2010 and ending on or before 31 Dec 2013	Validity period beginning after 31 Dec 2010 or ending after 31 Dec 2013
Digest algorithm	SHA-1, SHA-256, SHA-384 or SHA-512	SHA-1*, SHA-256, SHA-384 or SHA-512
Minimum RSA modulus size (bits)	1024	2048
ECC curve	NIST P-256, P-384, or P-521	NIST P-256, P-384, or P-521

(3) Subscriber Certificates

	Validity period ending on or before 31 Dec 2013	Validity period ending after 31 Dec 2013
Digest algorithm	SHA1*, SHA-256, SHA-384 or SHA-512	SHA1*, SHA-256, SHA-384 or SHA-512
Minimum RSA modulus size (bits)	1024	2048
ECC curve	NIST P-256, P-384, or P-521	NIST P-256, P-384, or P-521

* SHA-1 MAY be used until SHA-256 is supported widely by browsers used by a substantial portion of relying-parties worldwide.

** A Root CA Certificate issued prior to 31 Dec. 2010 with an RSA key size less than 2048 bits MAY still serve as a trust anchor for Subscriber Certificates issued in accordance with these Requirements .

Appendix B – Certificate Extensions (Normative)

This appendix specifies the requirements for Certificate extensions for Certificates generated after the Effective Date.

Root CA Certificate

Root Certificates MUST be of type X.509 v3.

A. basicConstraints

This extension MUST appear as a critical extension. The cA field MUST be set true. The pathLenConstraint field SHOULD NOT be present.

B. keyUsage

This extension MUST be present and MUST be marked critical. Bit positions for keyCertSign and cRLSign MUST be set. If the Root CA Private Key is used for signing OCSP responses, then the digitalSignature bit MUST be set.

C. certificatePolicies

This extension SHOULD NOT be present.

D. extendedKeyUsage

This extension MUST NOT be present.

All other fields and extensions MUST be set in accordance to RFC 5280.

Subordinate CA Certificate

Subordinate CA Certificates MUST be of type X.509 v3.

A. certificatePolicies

This extension MUST be present and SHOULD NOT be marked critical.

certificatePolicies:policyIdentifier (Required)

The following fields MAY be present if the Subordinate CA is not an Affiliate of the entity that controls the Root CA.

certificatePolicies:policyQualifiers:policyQualifierId (Optional)

- id-qt 1 [RFC 5280].

certificatePolicies:policyQualifiers:qualifier:cPSuri (Optional)

- HTTP URL for the Root CA's Certificate Policies, Certification Practice Statement, Relying Party Agreement, or other pointer to online policy information provided by the CA.

B. cRLDistributionPoints

This extension MUST be present and MUST NOT be marked critical. It MUST contain the HTTP URL of the CA's CRL service.

C. authorityInformationAccess

With the exception of stapling, which is noted below, this extension MUST be present. It MUST NOT be marked critical, and it MUST contain the HTTP URL of the Issuing CA's OCSP responder (accessMethod = 1.3.6.1.5.5.7.48.1). It SHOULD also contain the HTTP URL of the Issuing CA's certificate (accessMethod = 1.3.6.1.5.5.7.48.2). See Section 13.2.1 for details.

The HTTP URL of the Issuing CA's OCSP responder MAY be omitted, provided that the Subscriber "staples" the OCSP response for the Certificate in its TLS handshakes [RFC4366].

D. basicConstraints

This extension MUST be present and MUST be marked critical. The cA field MUST be set true. The pathLenConstraint field MAY be present.

E. keyUsage

This extension MUST be present and MUST be marked critical. Bit positions for keyCertSign and cRLSign MUST be set. If the Subordinate CA Private Key is used for signing OCSP responses, then the digitalSignature bit MUST be set.

All other fields and extensions MUST be set in accordance to RFC 5280.

Subscriber Certificate

A. certificatePolicies

This extension MUST be present and SHOULD NOT be marked critical.

certificatePolicies:policyIdentifier (Required)

- A Policy Identifier, defined by the issuing CA, that indicates a Certificate Policy asserting the issuing CA's adherence to and compliance with these Requirements.

The following extensions MAY be present:

certificatePolicies:policyQualifiers:policyQualifierId (Recommended)

- id-qt 1 [RFC 5280].

certificatePolicies:policyQualifiers:qualifier:cPSuri (Optional)

- HTTP URL for the Subordinate CA's Certification Practice Statement, Relying Party Agreement or other pointer to online information provided by the CA.

B. cRLDistributionPoints

This extension MAY be present. If present, it MUST NOT be marked critical, and it MUST contain the HTTP URL of the CA's CRL service. See Section 13.2.1 for details.

C. authorityInformationAccess

With the exception of stapling, which is noted below, this extension MUST be present. It MUST NOT be marked critical, and it MUST contain the HTTP URL of the Issuing CA's OCSP responder (accessMethod = 1.3.6.1.5.5.7.48.1). It SHOULD also contain the HTTP URL of the Issuing CA's certificate (accessMethod = 1.3.6.1.5.5.7.48.2). See Section 13.2.1 for details.

The HTTP URL of the Issuing CA's OCSP responder MAY be omitted provided that the Subscriber "staples" OCSP responses for the Certificate in its TLS handshakes [RFC4366].

D. basicConstraints (optional)

If present, the cA field MUST be set false.

E. keyUsage (optional)

If present, bit positions for keyCertSign and cRLSign MUST NOT be set.

F. extKeyUsage (required)

Either the value id-kp-serverAuth [RFC5280] or id-kp-clientAuth [RFC5280] or both values MUST be present. id-kp-emailProtection [RFC5280] MAY be present. Other values SHOULD NOT be present.

All other fields and extensions MUST be set in accordance to RFC 5280.

Appendix C - User Agent Verification (Normative)

The CA SHALL host test Web pages that allow Application Software Suppliers to test their software with Subscriber Certificates that chain up to each publicly trusted Root Certificate. At a minimum, the CA SHALL host separate Web pages using Subscriber Certificates that are (i) valid, (ii) revoked, and (iii) expired.