

Baseline Requirements for the Issuance and Management of Publicly-Trusted Certificates

Version 1.7.4



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DRAFT

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Table of Contents

1. INTRODUCTION	8
1.1 Overview	8
1.2 Document name and identification	8
1.2.1 Revisions	9
1.2.2 Relevant Dates	11
1.3 PKI Participants.....	12
1.3.1 Certification Authorities.....	12
1.3.2 Registration Authorities	12
1.3.3 Subscribers	13
1.3.4 Relying Parties	13
1.3.5 Other Participants	13
1.4 Certificate Usage	13
1.4.1 Appropriate Certificate Uses	13
1.4.2 Prohibited Certificate Uses.....	13
1.5 Policy administration	14
1.5.1 Organization Administering the Document.....	14
1.5.2 Contact Person	14
1.5.3 Person Determining CPS suitability for the policy.....	14
1.5.4 CPS approval procedures.....	14
1.6 Definitions and Acronyms	14
1.6.1 Definitions	14
1.6.2 Acronyms	20
1.6.3 References	21
1.6.4 Conventions	22
2. PUBLICATION AND REPOSITORY RESPONSIBILITIES	22
2.1 Repositories	23
2.2 Publication of information	23
2.3 Time or frequency of publication	23
2.4 Access controls on repositories	23
3. IDENTIFICATION AND AUTHENTICATION	23
3.1 Naming	24
3.1.1 Types of names	24
3.1.2 Need for names to be meaningful	24
3.1.3 Anonymity or pseudonymity of subscribers	24
3.1.4 Rules for interpreting various name forms	24
3.1.5 Uniqueness of names	24
3.1.6 Recognition, authentication, and role of trademarks	24
3.2 Initial identity validation.....	24
3.2.1 Method to prove possession of private key.....	24
3.2.2 Authentication of Organization and Domain Identity	24
3.2.2.1 Identity	24
3.2.2.2 DBA/Tradename	24
3.2.2.3 Verification of Country	25
3.2.2.4 Validation of Domain Authorization or Control.....	25

3.2.2.5 Authentication for an IP Address	31
3.2.2.6 Wildcard Domain Validation	33
3.2.2.7 Data Source Accuracy.....	33
3.2.2.8 CAA Records	34
3.2.3 Authentication of individual identity	34
3.2.4 Non-verified subscriber information	35
3.2.5 Validation of authority	35
3.2.6 Criteria for Interoperation or Certification	35
3.3 Identification and authentication for re-key requests	35
3.3.1 Identification and authentication for routine re-key	35
3.3.2 Identification and authentication for re-key after revocation	35
3.4 Identification and authentication for revocation request	35
4. CERTIFICATE LIFE-CYCLE OPERATIONAL REQUIREMENTS	35
4.1 Certificate Application	36
4.1.1 Who can submit a certificate application.....	36
4.1.2 Enrollment process and responsibilities	36
4.2 Certificate application processing.....	36
4.2.1 Performing identification and authentication functions	36
4.2.2 Approval or rejection of certificate applications.....	37
4.2.3 Time to process certificate applications.....	37
4.3 Certificate issuance	37
4.3.1 CA actions during certificate issuance	37
4.3.2 Notification to subscriber by the CA of issuance of certificate	37
4.4 Certificate acceptance	37
4.4.1 Conduct constituting certificate acceptance	37
4.4.2 Publication of the certificate by the CA.....	37
4.4.3 Notification of certificate issuance by the CA to other entities	37
4.5 Key pair and certificate usage	37
4.5.1 Subscriber private key and certificate usage.....	37
4.5.2 Relying party public key and certificate usage	37
4.6 Certificate renewal	37
4.6.1 Circumstance for certificate renewal	38
4.6.2 Who may request renewal	38
4.6.3 Processing certificate renewal requests	38
4.6.4 Notification of new certificate issuance to subscriber	38
4.6.5 Conduct constituting acceptance of a renewal certificate.....	38
4.6.6 Publication of the renewal certificate by the CA	38
4.6.7 Notification of certificate issuance by the CA to other entities	38
4.7 Certificate re-key	38
4.7.1 Circumstance for certificate re-key	38
4.7.2 Who may request certification of a new public key	38
4.7.3 Processing certificate re-keying requests.....	38
4.7.4 Notification of new certificate issuance to subscriber	38
4.7.5 Conduct constituting acceptance of a re-keyed certificate	38
4.7.6 Publication of the re-keyed certificate by the CA.....	38
4.7.7 Notification of certificate issuance by the CA to other entities	38
4.8 Certificate modification	38
4.8.1 Circumstance for certificate modification	38
4.8.2 Who may request certificate modification.....	39
4.8.3 Processing certificate modification requests	39
4.8.4 Notification of new certificate issuance to subscriber	39
4.8.5 Conduct constituting acceptance of modified certificate	39
4.8.6 Publication of the modified certificate by the CA.....	39

4.8.7 Notification of certificate issuance by the CA to other entities	39
4.9 Certificate revocation and suspension.....	39
4.9.1 Circumstances for revocation	39
4.9.1.1 Reasons for Revoking a Subscriber Certificate.....	39
4.9.1.2 Reasons for Revoking a Subordinate CA Certificate	40
4.9.2 Who can request revocation	40
4.9.3 Procedure for revocation request.....	40
4.9.4 Revocation request grace period	41
4.9.5 Time within which CA must process the revocation request	41
4.9.6 Revocation checking requirement for relying parties.....	41
4.9.7 CRL issuance frequency (if applicable)	41
4.9.8 Maximum latency for CRLs (if applicable)	41
4.9.9 On-line revocation/status checking availability	41
4.9.10 On-line revocation checking requirements	42
4.9.11 Other forms of revocation advertisements available	43
4.9.12 Special requirements re key compromise.....	43
4.9.13 Circumstances for suspension	43
4.9.14 Who can request suspension	43
4.9.15 Procedure for suspension request	43
4.9.16 Limits on suspension period	43
4.10 Certificate status services.....	43
4.10.1 Operational characteristics	43
4.10.2 Service availability	43
4.10.3 Optional features	43
4.11 End of subscription	43
4.12 Key escrow and recovery	43
4.12.1 Key escrow and recovery policy and practices	43
4.12.2 Session key encapsulation and recovery policy and practices	43
5. MANAGEMENT, OPERATIONAL, AND PHYSICAL CONTROLS	43
5.1 PHYSICAL SECURITY CONTROLS	44
5.1.1 Site location and construction.....	44
5.1.2 Physical access	44
5.1.3 Power and air conditioning	44
5.1.4 Water exposures	45
5.1.5 Fire prevention and protection.....	45
5.1.6 Media storage.....	45
5.1.7 Waste disposal.....	45
5.1.8 Off-site backup	45
5.2 Procedural controls	45
5.2.1 Trusted roles.....	45
5.2.2 Number of Individuals Required per Task.....	45
5.2.3 Identification and authentication for each role	45
5.2.4 Roles requiring separation of duties	45
5.3 Personnel controls	45
5.3.1 Qualifications, experience, and clearance requirements.....	45
5.3.2 Background check procedures.....	45
5.3.3 Training Requirements and Procedures.....	45
5.3.4 Retraining frequency and requirements	45
5.3.5 Job rotation frequency and sequence	45
5.3.6 Sanctions for unauthorized actions	45
5.3.7 Independent Contractor Controls	46
5.3.8 Documentation supplied to personnel	46
5.4 Audit logging procedures	46

5.4.1	Types of events recorded	46
5.4.2	Frequency for Processing and Archiving Audit Logs	46
5.4.3	Retention Period for Audit Logs	46
5.4.4	Protection of Audit Log	47
5.4.5	Audit Log Backup Procedures	47
5.4.6	Audit Log Accumulation System (internal vs. external)	47
5.4.7	Notification to event-causing subject	47
5.4.8	Vulnerability assessments	47
5.5	Records archival	47
5.5.1	Types of records archived	47
5.5.2	Retention period for archive	47
5.5.3	Protection of archive	47
5.5.4	Archive backup procedures.....	47
5.5.5	Requirements for time-stamping of records.....	47
5.5.6	Archive collection system (internal or external).....	47
5.5.7	Procedures to obtain and verify archive information	47
5.6	Key changeover	47
5.7	Compromise and disaster recovery	47
5.7.1	Incident and compromise handling procedures	47
5.7.2	Recovery Procedures if Computing resources, software, and/or data are corrupted .	48
5.7.3	Recovery Procedures after Key Compromise	48
5.7.4	Business continuity capabilities after a disaster.....	48
5.8	CA or RA termination.....	48
6.	TECHNICAL SECURITY CONTROLS	48
6.1	Key pair generation and installation	49
6.1.1	Key pair generation.....	49
6.1.1.1	CA Key Pair Generation	49
6.1.1.2	RA Key Pair Generation.....	49
6.1.1.3	Subscriber Key Pair Generation	49
6.1.2	Private key delivery to subscriber	50
6.1.3	Public key delivery to certificate issuer.....	50
6.1.4	CA public key delivery to relying parties	50
6.1.5	Key sizes.....	50
6.1.6	Public key parameters generation and quality checking	50
6.1.7	Key usage purposes (as per X.509 v3 key usage field)	50
6.2	Private Key Protection and Cryptographic Module Engineering Controls	51
6.2.1	Cryptographic module standards and controls.....	51
6.2.2	Private key (n out of m) multi-person control	51
6.2.3	Private key escrow	51
6.2.4	Private key backup	51
6.2.5	Private key archival	51
6.2.6	Private key transfer into or from a cryptographic module	51
6.2.7	Private key storage on cryptographic module	51
6.2.8	Activating Private Keys	51
6.2.9	Deactivating Private Keys	51
6.2.10	Destroying Private Keys	51
6.2.11	Cryptographic Module Capabilities	51
6.3	Other aspects of key pair management.....	51
6.3.1	Public key archival	51
6.3.2	Certificate operational periods and key pair usage periods	51
6.4	Activation data	52
6.4.1	Activation data generation and installation	52
6.4.2	Activation data protection	52

6.4.3 Other aspects of activation data.....	52
6.5 Computer security controls	52
6.5.1 Specific computer security technical requirements	52
6.5.2 Computer security rating	52
6.6 Life cycle technical controls.....	52
6.6.1 System development controls	52
6.6.2 Security management controls	52
6.6.3 Life cycle security controls	52
6.7 Network security controls	52
6.8 Time-stamping.....	52
7. CERTIFICATE, CRL, AND OCSP PROFILES.....	52
7.1 Certificate profile	53
7.1.1 Version number(s)	53
7.1.2 Certificate Content and Extensions	53
7.1.2.1 Root CA Certificate Profile.....	53
7.1.2.2 Cross-Certified Subordinate CA Certificate Profile.....	54
7.1.2.3 Technically Constrained Non-TLS Subordinate CA Certificate Profile	57
7.1.2.4 Technically Constrained TLS Subordinate CA Certificate Profile.....	58
7.1.2.5 TLS Subordinate CA Certificate Profile.....	60
7.1.2.6 Subscriber (Server) Certificate Profile.....	61
7.1.2.7 OCSP Responder Certificate Profile.....	68
7.1.2.8 Common CA Fields	70
7.1.2.9 Common Certificate Fields	75
7.1.2.4 All Certificates	76
7.1.2.5 Application of RFC 5280	77
7.1.3 Algorithm object identifiers.....	77
7.1.3.1 SubjectPublicKeyInfo.....	77
7.1.3.2 Signature AlgorithmIdentifier	77
7.1.4 Name Forms	79
7.1.4.1 Name Encoding.....	79
7.1.4.2 Subject Attribute Encoding.....	80
7.1.4.3 Other Subject Attributes	80
7.1.4.2 Subject Information - Subscriber Certificates.....	81
7.1.6 Certificate policy object identifier	81
7.1.6.1 Reserved Certificate Policy Identifiers.....	81
7.1.7 Usage of Policy Constraints extension.....	81
7.1.8 Policy qualifiers syntax and semantics.....	81
7.1.9 Processing semantics for the critical Certificate Policies extension	81
7.2 CRL profile.....	81
7.2.1 Version number(s)	81
7.2.2 CRL and CRL entry extensions	81
7.3 OCSP profile	82
7.3.1 Version number(s)	82
7.3.2 OCSP extensions	82
8. COMPLIANCE AUDIT AND OTHER ASSESSMENTS	82
8.1 Frequency or circumstances of assessment	83
8.2 Identity/qualifications of assessor.....	83
8.3 Assessor's relationship to assessed entity	84
8.4 Topics covered by assessment.....	84
8.5 Actions taken as a result of deficiency.....	84
8.6 Communication of results	84
8.7 Self-Audits	85
9. OTHER BUSINESS AND LEGAL MATTERS	86

9.1 Fees.....	87
9.1.1 Certificate issuance or renewal fees	87
9.1.2 Certificate access fees.....	87
9.1.3 Revocation or status information access fees.....	87
9.1.4 Fees for other services	87
9.1.5 Refund policy	87
9.2 Financial responsibility	87
9.2.1 Insurance coverage.....	87
9.2.2 Other assets.....	87
9.2.3 Insurance or warranty coverage for end-entities	87
9.3 Confidentiality of business information.....	87
9.3.1 Scope of confidential information	87
9.3.2 Information not within the scope of confidential information.....	87
9.3.3 Responsibility to protect confidential information	87
9.4 Privacy of personal information	87
9.4.1 Privacy plan	87
9.4.2 Information treated as private	87
9.4.3 Information not deemed private.....	87
9.4.4 Responsibility to protect private information	87
9.4.5 Notice and consent to use private information.....	87
9.4.6 Disclosure pursuant to judicial or administrative process	87
9.4.7 Other information disclosure circumstances.....	87
9.5 Intellectual property rights	87
9.6 Representations and warranties	87
9.6.1 CA representations and warranties.....	87
9.6.2 RA representations and warranties	89
9.6.3 Subscriber representations and warranties.....	89
9.6.4 Relying party representations and warranties.....	90
9.6.5 Representations and warranties of other participants	90
9.7 Disclaimers of warranties	90
9.8 Limitations of liability	90
9.9 Indemnities.....	90
9.10 Term and termination	90
9.10.1 Term	90
9.10.2 Termination	90
9.10.3 Effect of termination and survival.....	91
9.11 Individual notices and communications with participants	91
9.12 Amendments.....	91
9.12.1 Procedure for amendment	91
9.12.2 Notification mechanism and period	91
9.12.3 Circumstances under which OID must be changed	91
9.13 Dispute resolution provisions	91
9.14 Governing law	91
9.15 Compliance with applicable law	91
9.16 Miscellaneous provisions	91
9.16.1 Entire agreement	91
9.16.2 Assignment.....	91
9.16.3 Severability	91
9.16.4 Enforcement (attorneys' fees and waiver of rights)	91
9.16.5 Force Majeure.....	91
9.17 Other provisions	91
APPENDIX A – CAA Contact Tag	91
A.1. CAA Methods.....	92

A.1.1. CAA contactemail Property	92
A.1.2. CAA contactphone Property.....	92
A.2. DNS TXT Methods.....	92
A.2.1. DNS TXT Record Email Contact.....	92
A.2.2. DNS TXT Record Phone Contact.....	92
APPENDIX B – Issuance of Certificates for .onion Domain Names.....	92

DRAFT

1. INTRODUCTION

1.1 Overview

This document describes 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

The CP 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. This document serves two purposes: to specify Baseline Requirements and to provide guidance and requirements for what a CA should include in its CPS. Except where explicitly stated otherwise, these Requirements apply only to relevant events that occur on or after 1 July 2012 (the original effective date of these requirements).

These Requirements do not address all of the issues relevant to the issuance and management of Publicly-Trusted Certificates. In accordance with RFC 3647 and to facilitate a comparison of other certificate policies and CPSs (e.g. for policy mapping), this document includes all sections of the RFC 3647 framework. However, rather than beginning with a “no stipulation” comment in all empty sections, the CA/Browser Forum is leaving such sections initially blank until a decision of “no stipulation” is made. The CA/Browser Forum may update these 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.

These Requirements only address 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.

These Requirements are applicable to all Certification Authorities within a chain of trust. They are to be flowed down from the Root Certification Authority through successive Subordinate Certification Authorities.

1.2 Document name and identification

This certificate policy (CP) contains the requirements for the issuance and management of publicly-trusted SSL certificates, as adopted by the CA/Browser Forum.

The following Certificate Policy identifiers are reserved for use by CAs as an optional means of asserting compliance with this document (OID arc 2.23.140.1.2) 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); and
```

```
{joint-iso-itu-t(2) international-organizations(23) ca-browser-forum(140)
certificate-policies(1) baseline-requirements(2)
organization-validated(2)} (2.23.140.1.2.2); and
```

{joint-iso-itu-t(2) international-organizations(23) ca-browser-forum(140) certificate-policies(1) baseline-requirements(2) individual-validated(3)} (2.23.140.1.2.3).

1.2.1 Revisions

Ver.	Ballot	Description	Adopted	Effective*
1.0.0	62	Version 1.0 of the Baseline Requirements Adopted	22-Nov-11	01-Jul-12
1.0.1	71	Revised Auditor Qualifications	08-May-12	01-Jan-13
1.0.2	75	Non-critical Name Constraints allowed as exception to RFC 5280	08-Jun-12	08-Jun-12
1.0.3	78	Revised Domain/IP Address Validation, High Risk Requests, and Data Sources	22-Jun-12	22-Jun-12
1.0.4	80	OCSP responses for non-issued certificates	02-Aug-12	01-Feb-13 01-Aug-13
-	83	Network and Certificate System Security Requirements adopted	03-Aug-13	01-Jan-13
1.0.5	88	User-assigned country code of XX allowed	12-Sep-12	12-Sep-12
1.1.0	-	Published as Version 1.1 with no changes from 1.0.5	14-Sep-12	14-Sep-12
1.1.1	93	Reasons for Revocation and Public Key Parameter checking	07-Nov-12	07-Nov-12 01-Jan-13
1.1.2	96	Wildcard certificates and new gTLDs	20-Feb-13	20-Feb-13 01-Sep-13
1.1.3	97	Prevention of Unknown Certificate Contents	21-Feb-13	21-Feb-13
1.1.4	99	Add DSA Keys (BR v.1.1.4)	3-May-2013	3-May-2013
1.1.5	102	Revision to subject domainComponent language in Section 9.2.3	31-May-2013	31-May-2013
1.1.6	105	Technical Constraints for Subordinate Certificate Authorities	29-July-2013	29-July-2013
1.1.7	112	Replace Definition of "Internal Server Name" with "Internal Name"	3-April-2014	3-April-2014
1.1.8	120	Affiliate Authority to Verify Domain	5-June-2014	5-June-2014
1.1.9	129	Clarification of PSL mentioned in Section 11.1.3	4-Aug-2014	4-Aug-2014
1.2.0	125	CAA Records	14-Oct-2014	15-Apr-2015
1.2.1	118	SHA-1 Sunset	16-Oct-2014	16-Jan-2015 1-Jan-2016 1-Jan-2017
1.2.2	134	Application of RFC 5280 to Pre-certificates	16-Oct-2014	16-Oct-2014
1.2.3	135	ETSI Auditor Qualifications	16-Oct-2014	16-Oct-2014
1.2.4	144	Validation Rules for .onion Names	18-Feb-2015	18-Feb-2015
1.2.5	148	Issuer Field Correction	2-April-2015	2-April-2015
1.3.0	146	Convert Baseline Requirements to RFC 3647 Framework	16-Apr-2015	16-Apr-2015
1.3.1	151	Addition of Optional OIDs for Indicating Level of Validation	28-Sep-2015	28-Sep-2015
1.3.2	156	Amend Sections 1 and 2 of Baseline Requirements	3-Dec-2015	3-Dec-2016
1.3.3	160	Amend Section 4 of Baseline Requirements	4-Feb-2016	4-Feb-2016
1.3.4	162	Sunset of Exceptions	15-Mar-2016	15-Mar-2016

Ver.	Ballot	Description	Adopted	Effective*
1.3.5	168	Baseline Requirements Corrections (Revised)	10-May-2016	10-May-2016
1.3.6	171	Updating ETSI Standards in CABF documents	1-July-2016	1-July-2016
1.3.7	164	Certificate Serial Number Entropy	8-July-2016	30-Sep-2016
1.3.8	169	Revised Validation Requirements	5-Aug-2016	1-Mar-2017
1.3.9	174	Reform of Requirements Relating to Conflicts with Local Law	29-Aug-2016	27-Nov-2016
1.4.0	173	Removal of requirement to cease use of public key due to incorrect info	28-July-2016	11-Sept-2016
1.4.1	175	Addition of givenName and surname	7-Sept-2016	7-Sept-2016
1.4.2	181	Removal of some validation methods listed in Section 3.2.2.4	7-Jan-2017	7-Jan-2017
1.4.3	187	Make CAA Checking Mandatory	8-Mar-2017	8-Sep-2017
1.4.4	193	825-day Certificate Lifetimes	17-Mar-2017	1-Mar-2018
1.4.5	189	Amend Section 6.1.7 of Baseline Requirements	14-Apr-2017	14-May-2017
1.4.6	195	CAA Fixup	17-Apr-2017	18-May-2017
1.4.7	196	Define "Audit Period"	17-Apr-2017	18-May-2017
1.4.8	199	Require commonName in Root and Intermediate Certificates	9-May-2017	8-June-2017
1.4.9	204	Forbid DTPs from doing Domain/IP Ownership	11-July-2017	11-Aug-2017
1.5.0	212	Canonicalise formal name of the Baseline Requirements	1-Sept-2017	1-Oct-2017
1.5.1	197	Effective Date of Ballot 193 Provisions	1-May-2017	2-June-2017
1.5.2	190	Add Validation Methods with Minor Corrections	19-Sept-2017	19-Oct-2017
1.5.3	214	CAA Discovery CNAME Errata	27-Sept-2017	27-Oct-2017
1.5.4	215	Fix Ballot 190 Errata	4-Oct-2017	5-Nov-2017
1.5.5	217	Sunset RFC 2527	21-Dec-2017	9-Mar-2018
1.5.6	218	Remove validation methods #1 and #5	5-Feb-2018	9-Mar-2018
1.5.7	220	Minor Cleanups (Spring 2018)	30-Mar-2018	29-Apr-2018
1.5.8	219	Clarify handling of CAA Record Sets with no "issue"/"issuewild" property tag	10-Apr-2018	10-May-2018
1.5.9	223	Update BR Section 8.4 for CA audit criteria	15-May-2018	14-June-2018
1.6.0	224	WhoIs and RDAP	22-May-2018	22-June-2018
1.6.1	SC6	Revocation Timeline Extension	14-Sep-2018	14-Oct-2018
1.6.2	SC12	Sunset of Underscores in dNSNames	9-Nov-2018	10-Dec-2018
1.6.3	SC13	CAA Contact Property and Associated E-mail Validation Methods	25-Dec-2018	1-Feb-2019
1.6.4	SC14	Updated Phone Validation Methods	31-Jan-2019	16-Mar-2019
1.6.4	SC15	Remove Validation Method Number 9	5-Feb-2019	16-Mar-2019
1.6.4	SC7	Update IP Address Validation Methods	8-Feb-2019	16-Mar-2019
1.6.5	SC16	Other Subject Attributes	15-Mar-2019	16-Apr-2019
1.6.6	SC19	Phone Contact with DNS CAA Phone Contact v2	20-May-2019	9-Sep-2019
1.6.7	SC23	Precertificates	14-Nov-2019	19-Dec-2019
1.6.7	SC24	Fall Cleanup v2	12-Nov-2019	19-Dec-2019

Ver.	Ballot	Description	Adopted	Effective*
1.6.8	SC25	Define New HTTP Domain Validation Methods v2	31-Jan-2020	3-Mar-2020
1.6.9	SC27	Version 3 Onion Certificates	19-Feb-2020	27-Mar-2020
1.7.0	SC29	Pandoc-Friendly Markdown Formatting Changes	20-Mar-2020	4-May-2020
1.7.1	SC30	Disclosure of Registration / Incorporating Agency	13-Jul-2020	20-Aug-2020
1.7.1	SC31	Browser Alignment	16-Jul-2020	20-Aug-2020
1.7.2	SC33	TLS Using ALPN Method	14-Aug-2020	22-Sept-2020
1.7.3	SC28	Logging and Log Retention	10-Sep-2020	19-Oct-2020
1.7.3	SC35	Cleanups and Clarifications	9-Sep-2020	19-Oct-2020
1.7.4	SC41	Reformat the BRs, EVGs, and NCSSRs	24-Feb-2021	26-Mar-2021

* Effective Date and Additionally Relevant Compliance Date(s)

1.2.2 Relevant Dates

Compliance	Section(s)	Summary Description (See Full Text for Details)
2013-01-01	6.1.6	For RSA public keys, CAs SHALL confirm that the value of the public exponent is an odd number equal to 3 or more.
2013-01-01	4.9.10	CAs SHALL support an OCSP capability using the GET method.
2013-01-01	5	CAs SHALL comply with the Network and Certificate System Security Requirements.
2013-08-01	4.9.10	OCSP Responders SHALL NOT respond “Good” for Unissued Certificates.
2013-09-01	3.2.2.6	CAs SHALL revoke any certificate where wildcard character occurs in the first label position immediately to the left of a “registry-controlled” label or “public suffix”.
2013-12-31	6.1.5	CAs SHALL confirm that the RSA Public Key is at least 2048 bits or that one of the following ECC curves is used: P-256, P-384, or P-521. 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.
2015-01-16	7.1.3	CAs SHOULD NOT issue Subscriber Certificates utilizing the SHA-1 algorithm with an Expiry Date greater than 1 January 2017.
2015-04-01	6.3.2	CAs SHALL NOT issue certificates with validity periods longer than 39 months, except under certain circumstances.
2015-04-15	2.2	A CA’s CPS must state whether it reviews CAA Records, and if so, its policy or practice on processing CAA records for Fully Qualified Domain Names.
2015-11-01	7.1.4.2.1	Issuance of Certificates with Reserved IP Address or Internal Name prohibited.
2016-01-01	7.1.3	CAs MUST NOT issue any new Subscriber certificates or Subordinate CA certificates using the SHA-1 hash algorithm.
2016-06-30	6.1.7	CAs MUST NOT issue Subscriber Certificates directly from Root CAs.
2016-06-30	6.3.2	CAs MUST NOT issue Subscriber Certificates with validity periods longer than 39 months, regardless of circumstance.
2016-09-30	7.1	CAs SHALL generate Certificate serial numbers greater than zero (0) containing at least 64 bits of output from a CSPRNG
2016-10-01	7.1.4.2.1	All Certificates with Reserved IP Address or Internal Name must be revoked.
2016-12-03	1 and 2	Ballot 156 amendments to sections 1.5.2, 2.3, and 2.4 are applicable

Compliance	Section(s)	Summary Description (See Full Text for Details)
2017-01-01	7.1.3	CAs MUST NOT issue OCSP responder certificates using SHA-1 (inferred).
2017-03-01	3.2.2.4	CAs MUST follow revised validation requirements in Section 3.2.2.4.
2017-09-08	3.2.2.8	CAs MUST check and process CAA records
2018-03-01	4.2.1 and 6.3.2	Certificates issued MUST have a Validity Period no greater than 825 days and re-use of validation information limited to 825 days
2018-05-31	2.2	CP and CPS must follow RFC 3647 format
2018-08-01	3.2.2.4.1 and .5	CAs must stop using domain validation methods BR 3.2.2.4.1 and 3.2.2.4.5, stop reusing validation data from those methods
2019-01-15	7.1.4.2.1	All certificates containing an underscore character in any dNSName entry and having a validity period of more than 30 days MUST be revoked prior to January 15, 2019
2019-05-01	7.1.4.2.1	underscore characters (“_”) MUST NOT be present in dNSName entries
2019-06-01	3.2.2.4.3	CAs SHALL NOT perform validations using this method after May 31, 2019. Completed validations using this method SHALL continue to be valid for subsequent issuance per the applicable certificate data reuse periods.
2019-08-01	3.2.2.5	CAs SHALL maintain a record of which IP validation method, including the relevant BR version number, was used to validate every IP Address
2019-08-01	3.2.2.5.4	CAs SHALL NOT perform validations using this method after July 31, 2019. Completed validations using this method SHALL NOT be re-used for certificate issuance after July 31, 2019. Any certificate issued prior to August 1, 2019 containing an IP Address that was validated using any method that was permitted under the prior version of this Section 3.2.2.5 MAY continue to be used without revalidation until such certificate naturally expires
2020-06-03	3.2.2.4.6	CAs MUST NOT perform validation using this method after 3 months from the IPR review date of Ballot SC25
2020-08-01	8.6	Audit Reports for periods on-or-after 2020-08-01 MUST be structured as defined.
2020-09-01	6.3.2	Certificates issued SHOULD NOT have a Validity Period greater than 397 days and MUST NOT have a Validity Period greater than 398 days.
2020-09-30	4.9.10	OCSP responses MUST conform to the validity period requirements specified.
2020-09-30	7.1.4.1	Subject and Issuer Names for all possible certification paths MUST be byte-for-byte identical.
2020-09-30	7.1.6.4	Subscriber Certificates MUST include a CA/Browser Form Reserved Policy Identifier in the Certificate Policies extension.
2020-09-30	7.2 and 7.3	All OCSP and CRL responses for Subordinate CA Certificates MUST include a meaningful reason code.

1.3 PKI Participants

The CA/Browser Forum is a voluntary organization of Certification Authorities and suppliers of Internet browser and other relying-party software applications.

1.3.1 Certification Authorities

Certification Authority (CA) is defined in [Section 1.6](#). Current CA Members of the CA/Browser Forum are listed here: <https://cabforum.org/members>.

1.3.2 Registration Authorities

With the exception of [Section 3.2.2.4](#) and [Section 3.2.2.5](#), the CA MAY delegate the performance of all, or any part, of [Section 3.2](#) requirements to a Delegated Third Party, provided that the process as a whole fulfills all of the requirements of [Section 3.2](#).

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 5.3.1](#), when applicable to the delegated function;
2. Retain documentation in accordance with [Section 5.5.2](#);
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 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.
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 3.2](#)) 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.

1.3.3 Subscribers

As defined in [Section 1.6.1](#).

1.3.4 Relying Parties

"Relying Party" and "Application Software Supplier" are defined in [Section 1.6.1](#). Current Members of the CA/Browser Forum who are Application Software Suppliers are listed here: <https://cabforum.org/members>.

1.3.5 Other Participants

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.

1.4 Certificate Usage

1.4.1 Appropriate Certificate Uses

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

1.4.2 Prohibited Certificate Uses

No stipulation.

1.5 Policy administration

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. This document 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 this document 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.

1.5.1 Organization Administering the Document

No stipulation.

1.5.2 Contact Person

Contact information for the CA/Browser Forum is available here: <https://cabforum.org/leadership/>. In this section of a CA's CPS, the CA shall provide a link to a web page or an email address for contacting the person or persons responsible for operation of the CA.

1.5.3 Person Determining CPS suitability for the policy

No stipulation.

1.5.4 CPS approval procedures

No stipulation.

1.6 Definitions and Acronyms

1.6.1 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 the Terms of Use on behalf of the Applicant when the Applicant is an Affiliate of the CA or is 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 Period: In a period-of-time audit, the period between the first day (start) and the last day of operations (end) covered by the auditors in their engagement. (This is not the same as the period

of time when the auditors are on-site at the CA.) The coverage rules and maximum length of audit periods are defined in [Section 8.1](#).

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.

Authorization Domain Name: The Domain Name used to obtain authorization for certificate issuance for a given FQDN. The CA may use the FQDN returned from a DNS CNAME lookup as the FQDN for the purposes of domain validation. If the FQDN contains a wildcard character, then the CA MUST remove all wildcard labels from the left most portion of requested FQDN. The CA may prune zero or more labels from left to right until encountering a Base Domain Name and may use any one of the intermediate values for the purpose of domain validation.

Authorized Ports: One of the following ports: 80 (http), 443 (https), 25 (smtp), 22 (ssh).

Base Domain Name: The portion of an applied-for FQDN that is the first domain name node left of a registry-controlled or public suffix plus the registry-controlled or public suffix (e.g. “example.co.uk” or “example.com”). For FQDNs where the right-most domain name node is a gTLD having ICANN Specification 13 in its registry agreement, the gTLD itself may be used as the Base Domain Name.

CAA: From RFC 8659 (<http://tools.ietf.org/html/rfc8659>): “The Certification Authority Authorization (CAA) DNS Resource Record allows a DNS domain name holder to specify one or more Certification Authorities (CAs) authorized to issue certificates for that domain name. CAA Resource Records allow a public CA to implement additional controls to reduce the risk of unintended certificate mis-issue.”

CA Key Pair: A Key Pair where the Public Key appears as the Subject Public Key Info in one or more Root CA Certificate(s) and/or Subordinate CA Certificate(s).

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.

Certificate Profile: A set of documents or files that defines requirements for Certificate content and Certificate extensions in accordance with [Section 7](#). e.g. a Section in a CA’s CPS or a certificate template file used by CA software.

Control: “Control” (and its correlative meanings, “controlled by” and “under common control with”) means possession, directly or indirectly, of the power to: (1) direct the management,

personnel, finances, or plans of such entity; (2) control the election of a majority of the directors ; or (3) vote that portion of voting shares required for “control” under the law of the entity’s Jurisdiction of Incorporation or Registration but in no case less than 10%.

Country: Either a member of the United Nations OR a geographic region recognized as a Sovereign State by at least two UN member nations.

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

CSPRNG: A random number generator intended for use in cryptographic system.

Delegated Third Party: A natural person or Legal Entity that is not the CA but is authorized by the CA, and whose activities are not within the scope of the appropriate CA audits, to assist in the Certificate Management Process by performing or fulfilling one or more of the CA requirements found herein.

DNS CAA Email Contact: The email address defined in [Appendix A.1.1](#).

DNS CAA Phone Contact: The phone number defined in [Appendix A.1.2](#).

DNS TXT Record Email Contact: The email address defined in [Appendix A.2.1](#).

DNS TXT Record Phone Contact: The phone number defined in [Appendix A.2.2](#).

Domain Authorization Document: Documentation provided by, or a CA’s documentation of a communication with, a Domain Name Registrar, the Domain Name Registrant, or the person or entity listed in WHOIS as the Domain Name Registrant (including any private, anonymous, or proxy registration service) attesting to the authority of an Applicant to request a Certificate for a specific Domain Namespace.

Domain Contact: The Domain Name Registrant, technical contact, or administrative contact (or the equivalent under a ccTLD) as listed in the WHOIS record of the Base Domain Name or in a DNS SOA record, or as obtained through direct contact with the Domain Name Registrar.

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 assignees).

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.).

High Risk Certificate Request: A Request that the CA flags for additional scrutiny by reference to internal criteria and databases maintained by the CA, which may include names at higher risk for phishing or other fraudulent usage, names contained in previously rejected certificate requests or revoked Certificates, names listed on the Miller Smiles phishing list or the Google Safe Browsing list, or names that the CA identifies using its own risk-mitigation criteria.

Internal Name: A string of characters (not an IP address) in a Common Name or Subject Alternative Name field of a Certificate that cannot be verified as globally unique within the public DNS at the time of certificate issuance because it does not end with a Top Level Domain registered in IANA's Root Zone Database.

IP Address: A 32-bit or 128-bit label assigned to a device that uses the Internet Protocol for communication.

IP Address Contact: The person(s) or entity(ies) registered with an IP Address Registration Authority as having the right to control how one or more IP Addresses are used.

IP Address Registration Authority: The Internet Assigned Numbers Authority (IANA) or a Regional Internet Registry (RIPE, APNIC, ARIN, AfriNIC, LACNIC).

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, or an unauthorized person has had access to it.

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.

Parent Company: A company that Controls a Subsidiary Company.

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 8.2](#).

Random Value: A value specified by a CA to the Applicant that exhibits at least 112 bits of entropy.

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 Data Source: An identification document or source of data used to verify Subject Identity Information that is generally recognized among commercial enterprises and governments as reliable, and which was created by a third party for a purpose other than the Applicant obtaining a Certificate.

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.

Request Token: A value, derived in a method specified by the CA which binds this demonstration of control to the certificate request. The CA SHOULD define within its CPS (or a document clearly referenced by the CPS) the format and method of Request Tokens it accepts.

The Request Token SHALL incorporate the key used in the certificate request.

A Request Token MAY include a timestamp to indicate when it was created.

A Request Token MAY include other information to ensure its uniqueness.

A Request Token that includes a timestamp SHALL remain valid for no more than 30 days from the time of creation.

A Request Token that includes a timestamp SHALL be treated as invalid if its timestamp is in the future.

A Request Token that does not include a timestamp is valid for a single use and the CA SHALL NOT re-use it for a subsequent validation.

The binding SHALL use a digital signature algorithm or a cryptographic hash algorithm at least as strong as that to be used in signing the certificate request.

Note: Examples of Request Tokens include, but are not limited to:

- i. a hash of the public key; or
- ii. a hash of the Subject Public Key Info [X.509]; or
- iii. a hash of a PKCS#10 CSR.

A Request Token may also be concatenated with a timestamp or other data. If a CA wanted to always use a hash of a PKCS#10 CSR as a Request Token and did not want to incorporate a timestamp and did want to allow certificate key re-use then the applicant might use the challenge password in the creation of a CSR with OpenSSL to ensure uniqueness even if the subject and key are identical between subsequent requests.

Note: This simplistic shell command produces a Request Token which has a timestamp and a hash of a CSR. `echo `date -u +%Y%m%d%H%M` `sha256sum <r2.csr` \| sed "s/[-]//g"`
The script outputs:

```
201602251811c9c863405fe7675a3988b97664ea6baf442019e4e52fa335f406f7c5f26cf14f
```

Required Website Content: Either a Random Value or a Request Token, together with additional information that uniquely identifies the Subscriber, as specified by the CA.

Requirements: The Baseline Requirements found in 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.

Sovereign State: A state or country that administers its own government, and is not dependent upon, or subject to, another power.

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 Agreement or Terms of Use.

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

Subsidiary Company: A company that is controlled by a Parent Company.

Technically Constrained Subordinate CA Certificate: A Subordinate CA certificate which uses a combination of Extended Key Usage settings and Name Constraint settings to limit the scope within which the Subordinate CA Certificate may issue Subscriber or additional Subordinate CA Certificates.

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 or is the CA.

Test Certificate: This term is no longer used in these Baseline Requirements.

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: Prior to 2020-09-01, the period of time measured from the date when the Certificate is issued until the Expiry Date. For Certificates issued on or after 2020-09-01, the validity period is as defined within RFC 5280, Section 4.1.2.5: the period of time from notBefore through notAfter, inclusive.

WHOIS: Information retrieved directly from the Domain Name Registrar or registry operator via the protocol defined in RFC 3912, the Registry Data Access Protocol defined in RFC 7482, or an HTTPS website.

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.

Wildcard Domain Name: A Domain Name consisting of a single asterisk character followed by a single full stop character (“*.”) followed by a Fully-Qualified Domain Name.

1.6.2 Acronyms

Acronym	Meaning
AICPA	American Institute of Certified Public Accountants
ADN	Authorization Domain Name
CA	Certification Authority
CAA	Certification Authority Authorization
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

Acronym	Meaning
RA	Registration Authority
S/MIME	Secure MIME (Multipurpose Internet Mail Extensions)
SSL	Secure Sockets Layer
TLS	Transport Layer Security
VoIP	Voice Over Internet Protocol

1.6.3 References

ETSI EN 319 403, Electronic Signatures and Infrastructures (ESI); Trust Service Provider Conformity Assessment - Requirements for conformity assessment bodies assessing Trust Service Providers

ETSI EN 319 411-1, Electronic Signatures and Infrastructures (ESI); Policy and security requirements for Trust Service Providers issuing certificates; Part 1: General requirements

ETSI TS 102 042, 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.

FIPS 186-4, Federal Information Processing Standards Publication - Digital Signature Standard (DSS), Information Technology Laboratory, National Institute of Standards and Technology, July 2013.

ISO 21188:2006, Public key infrastructure for financial services – Practices and policy framework. Network and Certificate System Security Requirements, v.1.0, 1/1/2013.

NIST SP 800-89, Recommendation for Obtaining Assurances for Digital Signature Applications, http://csrc.nist.gov/publications/nistpubs/800-89/SP-800-89_November2006.pdf.

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.

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

RFC3912, Request for Comments: 3912, WHOIS Protocol Specification, Daigle, September 2004.

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.

RFC8659, Request for Comments: 8659, DNS Certification Authority Authorization (CAA) Resource Record, Hallam-Baker, Stradling, Hoffman-Andrews, November 2019.

RFC6960, Request for Comments: 6960, X.509 Internet Public Key Infrastructure Online Certificate Status Protocol - OCSP. Santesson, Myers, Ankney, Malpani, Galperin, Adams, June 2013.

RFC6962, Request for Comments: 6962, Certificate Transparency. B. Laurie, A. Langley, E. Kasper. June 2013.

RFC7482, Request for Comments: 7482, Registration Data Access Protocol (RDAP) Query Format, Newton, et al, March 2015.

WebTrust for Certification Authorities, SSL Baseline with Network Security, Version 2.3, available at <https://www.cpacanada.ca/-/media/site/business-and-accounting-resources/docs/webtrust/wt-pcca-ss-lbns2-3.pdf>.

X.509, Recommendation ITU-T X.509 (10/2012) | ISO/IEC 9594-8:2014 (E), Information technology – Open Systems Interconnection – The Directory: Public-key and attribute certificate frameworks.

1.6.4 Conventions

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.

By convention, this document omits time and timezones when listing effective requirements such as dates. Except when explicitly specified, the associated time with a date shall be 00:00:00 UTC.

DRAFT

2. PUBLICATION AND REPOSITORY RESPONSIBILITIES

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.

2.1 Repositories

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

2.2 Publication of information

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 8.4](#)).

The Certificate Policy and/or Certification Practice Statement MUST be structured in accordance with RFC 3647 and MUST include all material required by RFC 3647.

Section 4.2 of a CA's Certificate Policy and/or Certification Practice Statement SHALL state the CA's policy or practice on processing CAA Records for Fully Qualified Domain Names; that policy shall be consistent with these Requirements. It shall clearly specify the set of Issuer Domain Names that the CA recognizes in CAA "issue" or "issuwild" records as permitting it to issue. The CA SHALL log all actions taken, if any, consistent with its processing practice.

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.

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.

2.3 Time or frequency of publication

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. The CA SHALL indicate conformance with this requirement by incrementing the version number and adding a dated changelog entry, even if no other changes are made to the document.

2.4 Access controls on repositories

The CA shall make its Repository publicly available in a read-only manner.

3. IDENTIFICATION AND AUTHENTICATION

3.1 Naming

3.1.1 Types of names

3.1.2 Need for names to be meaningful

3.1.3 Anonymity or pseudonymity of subscribers

3.1.4 Rules for interpreting various name forms

3.1.5 Uniqueness of names

3.1.6 Recognition, authentication, and role of trademarks

3.2 Initial identity validation

3.2.1 Method to prove possession of private key

3.2.2 Authentication of Organization and Domain Identity

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 3.2.2.3](#) 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 3.2.2.1](#) 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.

3.2.2.1 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 and considered a Reliable Data Source;
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 the CA determines to be reliable.

3.2.2.2 DBA/Tradenname

If the Subject Identity Information is to include a DBA or tradenname, the CA SHALL verify the Applicant's right to use the DBA/tradenname 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. A Reliable Data Source;
3. Communication with a government agency responsible for the management of such DBAs or tradenames;
4. An Attestation Letter accompanied by documentary support; or
5. A utility bill, bank statement, credit card statement, government-issued tax document, or other form of identification that the CA determines to be reliable.

3.2.2.3 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 3.2.2.1](#).

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.

3.2.2.4 Validation of Domain Authorization or Control

This section defines the permitted processes and procedures for validating the Applicant's ownership or control of the domain.

The CA SHALL confirm that prior to issuance, the CA has validated each Fully-Qualified Domain Name (FQDN) listed in the Certificate as follows:

1. When the FQDN does not contain "onion" as the rightmost label, the CA SHALL validate the FQDN using at least one of the methods listed below; and
2. When the FQDN contains "onion" as the rightmost label, the CA SHALL validate the FQDN in accordance with Appendix B.

Completed validations of Applicant authority may be valid for the issuance of multiple Certificates over time. In all cases, the validation must have been initiated within the time period specified in the relevant requirement (such as [Section 4.2.1](#) of this document) prior to Certificate issuance. For purposes of domain validation, the term Applicant includes the Applicant's Parent Company, Subsidiary Company, or Affiliate.

CAs SHALL maintain a record of which domain validation method, including relevant BR version number, they used to validate every domain.

Note: FQDNs may be listed in Subscriber Certificates using `dnsNames` in the `subjectAltName` extension or in Subordinate CA Certificates via `dnsNames` in `permittedSubtrees` within the Name Constraints extension.

3.2.2.4.1 Validating the Applicant as a Domain Contact

This method has been retired and MUST NOT be used. Prior validations using this method and validation data gathered according to this method SHALL NOT be used to issue certificates.

3.2.2.4.2 Email, Fax, SMS, or Postal Mail to Domain Contact

Confirming the Applicant's control over the FQDN by sending a Random Value via email, fax, SMS,

or postal mail and then receiving a confirming response utilizing the Random Value. The Random Value MUST be sent to an email address, fax/SMS number, or postal mail address identified as a Domain Contact.

Each email, fax, SMS, or postal mail MAY confirm control of multiple Authorization Domain Names.

The CA MAY send the email, fax, SMS, or postal mail identified under this section to more than one recipient provided that every recipient is identified by the Domain Name Registrar as representing the Domain Name Registrant for every FQDN being verified using the email, fax, SMS, or postal mail.

The Random Value SHALL be unique in each email, fax, SMS, or postal mail.

The CA MAY resend the email, fax, SMS, or postal mail in its entirety, including re-use of the Random Value, provided that the communication's entire contents and recipient(s) remain unchanged.

The Random Value SHALL remain valid for use in a confirming response for no more than 30 days from its creation. The CPS MAY specify a shorter validity period for Random Values, in which case the CA MUST follow its CPS.

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.3 Phone Contact with Domain Contact

Confirming the Applicant's control over the FQDN by calling the Domain Name Registrant's phone number and obtaining a response confirming the Applicant's request for validation of the FQDN. The CA MUST place the call to a phone number identified by the Domain Name Registrar as the Domain Contact.

Each phone call SHALL be made to a single number and MAY confirm control of multiple FQDNs, provided that the phone number is identified by the Domain Registrar as a valid contact method for every Base Domain Name being verified using the phone call.

CAs SHALL NOT perform validations using this method after May 31, 2019. Completed validations using this method SHALL continue to be valid for subsequent issuance per the applicable certificate data reuse periods.

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.4 Constructed Email to Domain Contact

Confirm the Applicant's control over the FQDN by

1. Sending an email to one or more addresses created by using 'admin', 'administrator', 'webmaster', 'hostmaster', or 'postmaster' as the local part, followed by the at-sign ("@"), followed by an Authorization Domain Name; and
2. including a Random Value in the email; and
3. receiving a confirming response utilizing the Random Value.

Each email MAY confirm control of multiple FQDNs, provided the Authorization Domain Name used in the email is an Authorization Domain Name for each FQDN being confirmed

The Random Value SHALL be unique in each email.

The email MAY be re-sent in its entirety, including the re-use of the Random Value, provided that its entire contents and recipient SHALL remain unchanged.

The Random Value SHALL remain valid for use in a confirming response for no more than 30 days from its creation. The CPS MAY specify a shorter validity period for Random Values.

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.5 Domain Authorization Document

This method has been retired and MUST NOT be used. Prior validations using this method and validation data gathered according to this method SHALL NOT be used to issue certificates.

3.2.2.4.6 Agreed-Upon Change to Website

Confirming the Applicant's control over the FQDN by confirming one of the following under the "/well-known/pki-validation" directory, or another path registered with IANA for the purpose of Domain Validation, on the Authorization Domain Name that is accessible by the CA via HTTP/HTTPS over an Authorized Port:

1. The presence of Required Website Content contained in the content of a file. The entire Required Website Content MUST NOT appear in the request used to retrieve the file or web page, or
2. The presence of the Request Token or Random Value contained in the content of a file where the Request Token or Random Value MUST NOT appear in the request.

If a Random Value is used, the CA SHALL provide a Random Value unique to the Certificate request and SHALL not use the Random Value after the longer of

- i. 30 days or
- ii. if the Applicant submitted the Certificate request, the timeframe permitted for reuse of validated information relevant to the certificate (such as in [Section 4.2.1](#) of these Guidelines or Section 11.14.3 of the EV Guidelines).

CAs SHALL NOT perform validations using this method after June 3, 2020. CAs MAY continue to re-use information and validations for domains validated under this method per the applicable certificate data reuse periods.

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.7 DNS Change

Confirming the Applicant's control over the FQDN by confirming the presence of a Random Value or Request Token for either in a DNS CNAME, TXT or CAA record for either 1) an Authorization Domain Name; or 2) an Authorization Domain Name that is prefixed with a label that begins with an underscore character.

If a Random Value is used, the CA SHALL provide a Random Value unique to the Certificate request and SHALL not use the Random Value after

- i. 30 days or
- ii. if the Applicant submitted the Certificate request, the timeframe permitted for reuse of validated information relevant to the Certificate (such as in [Section 4.2.1](#) of these Guidelines or Section 11.14.3 of the EV Guidelines).

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.8 IP Address

Confirming the Applicant's control over the FQDN by confirming that the Applicant controls an IP address returned from a DNS lookup for A or AAAA records for the FQDN in accordance with [Section 3.2.2.5](#).

Note: Once the FQDN has been validated using this method, the CA MAY NOT also issue Certificates for other FQDNs that end with all the labels of the validated FQDN unless the CA performs a separate validation for that FQDN using an authorized method. This method is NOT suitable for validating Wildcard Domain Names.

3.2.2.4.9 Test Certificate

This method has been retired and MUST NOT be used. Prior validations using this method and validation data gathered according to this method SHALL NOT be used to issue certificates.

3.2.2.4.10 TLS Using a Random Number

This method has been retired and MUST NOT be used. Prior validations using this method and validation data gathered according to this method SHALL NOT be used to issue certificates.

3.2.2.4.11 Any Other Method

This method has been retired and MUST NOT be used.

3.2.2.4.12 Validating Applicant as a Domain Contact

Confirming the Applicant's control over the FQDN by validating the Applicant is the Domain Contact. This method may only be used if the CA is also the Domain Name Registrar, or an Affiliate of the Registrar, of the Base Domain Name.

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.13 Email to DNS CAA Contact

Confirming the Applicant's control over the FQDN by sending a Random Value via email and then receiving a confirming response utilizing the Random Value. The Random Value MUST be sent to a DNS CAA Email Contact. The relevant CAA Resource Record Set MUST be found using the search algorithm defined in RFC 8659, Section 3.

Each email MAY confirm control of multiple FQDNs, provided that each email address is a DNS CAA Email Contact for each Authorization Domain Name being validated. The same email MAY be sent to multiple recipients as long as all recipients are DNS CAA Email Contacts for each Authorization Domain Name being validated.

The Random Value SHALL be unique in each email. The email MAY be re-sent in its entirety, including the re-use of the Random Value, provided that its entire contents and recipient(s) SHALL remain unchanged. The Random Value SHALL remain valid for use in a confirming response for no more than 30 days from its creation. The CPS MAY specify a shorter validity period for Random Values.

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for

other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.14 Email to DNS TXT Contact

Confirming the Applicant's control over the FQDN by sending a Random Value via email and then receiving a confirming response utilizing the Random Value. The Random Value MUST be sent to a DNS TXT Record Email Contact for the Authorization Domain Name selected to validate the FQDN.

Each email MAY confirm control of multiple FQDNs, provided that each email address is DNS TXT Record Email Contact for each Authorization Domain Name being validated. The same email MAY be sent to multiple recipients as long as all recipients are DNS TXT Record Email Contacts for each Authorization Domain Name being validated.

The Random Value SHALL be unique in each email. The email MAY be re-sent in its entirety, including the re-use of the Random Value, provided that its entire contents and recipient(s) SHALL remain unchanged. The Random Value SHALL remain valid for use in a confirming response for no more than 30 days from its creation. The CPS MAY specify a shorter validity period for Random Values.

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.15 Phone Contact with Domain Contact

Confirm the Applicant's control over the FQDN by calling the Domain Contact's phone number and obtain a confirming response to validate the ADN. Each phone call MAY confirm control of multiple ADNs provided that the same Domain Contact phone number is listed for each ADN being verified and they provide a confirming response for each ADN.

In the event that someone other than a Domain Contact is reached, the CA MAY request to be transferred to the Domain Contact.

In the event of reaching voicemail, the CA may leave the Random Value and the ADN(s) being validated. The Random Value MUST be returned to the CA to approve the request.

The Random Value SHALL remain valid for use in a confirming response for no more than 30 days from its creation. The CPS MAY specify a shorter validity period for Random Values.

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.16 Phone Contact with DNS TXT Record Phone Contact

Confirm the Applicant's control over the FQDN by calling the DNS TXT Record Phone Contact's phone number and obtain a confirming response to validate the ADN. Each phone call MAY confirm control of multiple ADNs provided that the same DNS TXT Record Phone Contact phone number is listed for each ADN being verified and they provide a confirming response for each ADN.

The CA MAY NOT knowingly be transferred or request to be transferred as this phone number has been specifically listed for the purposes of Domain Validation.

In the event of reaching voicemail, the CA may leave the Random Value and the ADN(s) being validated. The Random Value MUST be returned to the CA to approve the request.

The Random Value SHALL remain valid for use in a confirming response for no more than 30 days from its creation. The CPS MAY specify a shorter validity period for Random Values.

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.17 Phone Contact with DNS CAA Phone Contact

Confirm the Applicant's control over the FQDN by calling the DNS CAA Phone Contact's phone number and obtain a confirming response to validate the ADN. Each phone call MAY confirm control of multiple ADNs provided that the same DNS CAA Phone Contact phone number is listed for each ADN being verified and they provide a confirming response for each ADN. The relevant CAA Resource Record Set MUST be found using the search algorithm defined in RFC 8659 Section 3.

The CA MUST NOT be transferred or request to be transferred as this phone number has been specifically listed for the purposes of Domain Validation.

In the event of reaching voicemail, the CA may leave the Random Value and the ADN(s) being validated. The Random Value MUST be returned to the CA to approve the request.

The Random Value SHALL remain valid for use in a confirming response for no more than 30 days from its creation. The CPS MAY specify a shorter validity period for Random Values.

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.18 Agreed-Upon Change to Website v2

Confirming the Applicant's control over the FQDN by verifying that the Request Token or Random Value is contained in the contents of a file.

1. The entire Request Token or Random Value MUST NOT appear in the request used to retrieve the file, and
2. the CA MUST receive a successful HTTP response from the request (meaning a 2xx HTTP status code must be received).

The file containing the Request Token or Random Number:

1. MUST be located on the Authorization Domain Name, and
2. MUST be located under the "/well-known/pki-validation" directory, and
3. MUST be retrieved via either the "http" or "https" scheme, and
4. MUST be accessed over an Authorized Port.

If the CA follows redirects the following apply:

1. Redirects MUST be initiated at the HTTP protocol layer (e.g. using a 3xx status code).
2. Redirects MUST be the result of an HTTP status code result within the 3xx Redirection class of status codes, as defined in RFC 7231, Section 6.4.
3. Redirects MUST be to resource URLs with either via the "http" or "https" scheme.
4. Redirects MUST be to resource URLs accessed via Authorized Ports.

If a Random Value is used, then:

1. The CA MUST provide a Random Value unique to the certificate request.
2. The Random Value MUST remain valid for use in a confirming response for no more than 30 days from its creation. The CPS MAY specify a shorter validity period for Random Values, in which case the CA MUST follow its CPS.

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.19 Agreed-Upon Change to Website - ACME

Confirming the Applicant's control over a FQDN by validating domain control of the FQDN using the ACME HTTP Challenge method defined in Section 8.3 of RFC 8555. The following are additive requirements to RFC 8555.

The CA MUST receive a successful HTTP response from the request (meaning a 2xx HTTP status code must be received).

The token (as defined in RFC 8555, Section 8.3) MUST NOT be used for more than 30 days from its creation. The CPS MAY specify a shorter validity period for Random Values, in which case the CA MUST follow its CPS.

If the CA follows redirects:

1. Redirects MUST be initiated at the HTTP protocol layer (e.g. using a 3xx status code).
2. Redirects MUST be the result of an HTTP status code result within the 3xx Redirection class of status codes, as defined in RFC 7231, Section 6.4.
3. Redirects MUST be to resource URLs with either via the "http" or "https" scheme.
4. Redirects MUST be to resource URLs accessed via Authorized Ports.

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.20 TLS Using ALPN

Confirming the Applicant's control over a FQDN by validating domain control of the FQDN by negotiating a new application layer protocol using the TLS Application-Layer Protocol Negotiation (ALPN) Extension [RFC7301] as defined in RFC 8737. The following are additive requirements to RFC 8737.

The token (as defined in RFC 8737, Section 3) MUST NOT be used for more than 30 days from its creation. The CPS MAY specify a shorter validity period for the token, in which case the CA MUST follow its CPS.

Note: Once the FQDN has been validated using this method, the CA MAY NOT also issue Certificates for other FQDNs that end with all the labels of the validated FQDN unless the CA performs a separate validation for that FQDN using an authorized method. This method is NOT suitable for validating Wildcard Domain Names.

3.2.2.5 Authentication for an IP Address

This section defines the permitted processes and procedures for validating the Applicant's ownership or control of an IP Address listed in a Certificate.

The CA SHALL confirm that prior to issuance, the CA has validated each IP Address listed in the Certificate using at least one of the methods specified in this section.

Completed validations of Applicant authority may be valid for the issuance of multiple Certificates over time. In all cases, the validation must have been initiated within the time period specified in the relevant requirement (such as [Section 4.2.1](#) of this document) prior to Certificate issuance. For purposes of IP Address validation, the term Applicant includes the Applicant's Parent Company, Subsidiary Company, or Affiliate.

After July 31, 2019, CAs SHALL maintain a record of which IP validation method, including the relevant BR version number, was used to validate every IP Address.

Note: IP Addresses verified in accordance with this [Section 3.2.2.5](#) may be listed in Subscriber Certificates as defined in [Section 7.1.4.2](#) or in Subordinate CA Certificates via ipAddress in

permittedSubtrees within the Name Constraints extension. CAs are not required to verify IP Addresses listed in Subordinate CA Certificates via ipAddress in excludedSubtrees in the Name Constraints extension prior to inclusion in the Subordinate CA Certificate.

3.2.2.5.1 Agreed-Upon Change to Website

Confirming the Applicant's control over the requested IP Address by confirming the presence of a Request Token or Random Value contained in the content of a file or webpage in the form of a meta tag under the "/well-known/pki-validation" directory, or another path registered with IANA for the purpose of validating control of IP Addresses, on the IP Address that is accessible by the CA via HTTP/HTTPS over an Authorized Port. The Request Token or Random Value MUST NOT appear in the request.

If a Random Value is used, the CA SHALL provide a Random Value unique to the certificate request and SHALL not use the Random Value after the longer of

- i. 30 days or
- ii. if the Applicant submitted the certificate request, the timeframe permitted for reuse of validated information relevant to the certificate (such as in [Section 4.2.1](#) of this document).

3.2.2.5.2 Email, Fax, SMS, or Postal Mail to IP Address Contact

Confirming the Applicant's control over the IP Address by sending a Random Value via email, fax, SMS, or postal mail and then receiving a confirming response utilizing the Random Value. The Random Value MUST be sent to an email address, fax/SMS number, or postal mail address identified as an IP Address Contact.

Each email, fax, SMS, or postal mail MAY confirm control of multiple IP Addresses.

The CA MAY send the email, fax, SMS, or postal mail identified under this section to more than one recipient provided that every recipient is identified by the IP Address Registration Authority as representing the IP Address Contact for every IP Address being verified using the email, fax, SMS, or postal mail.

The Random Value SHALL be unique in each email, fax, SMS, or postal mail.

The CA MAY resend the email, fax, SMS, or postal mail in its entirety, including re-use of the Random Value, provided that the communication's entire contents and recipient(s) remain unchanged.

The Random Value SHALL remain valid for use in a confirming response for no more than 30 days from its creation. The CPS MAY specify a shorter validity period for Random Values, in which case the CA MUST follow its CPS.

3.2.2.5.3 Reverse Address Lookup

Confirming the Applicant's control over the IP Address by obtaining a Domain Name associated with the IP Address through a reverse-IP lookup on the IP Address and then verifying control over the FQDN using a method permitted under [Section 3.2.2.4](#).

3.2.2.5.4 Any Other Method

Using any other method of confirmation, including variations of the methods defined in [Section 3.2.2.5](#), provided that the CA maintains documented evidence that the method of confirmation establishes that the Applicant has control over the IP Address to at least the same level of assurance as the methods previously described in version 1.6.2 of these Requirements.

CAs SHALL NOT perform validations using this method after July 31, 2019. Completed validations using this method SHALL NOT be re-used for certificate issuance after July 31, 2019. Any certificate

issued prior to August 1, 2019 containing an IP Address that was validated using any method that was permitted under the prior version of this [Section 3.2.2.5](#) MAY continue to be used without revalidation until such certificate naturally expires.

3.2.2.5.5 Phone Contact with IP Address Contact

Confirming the Applicant's control over the IP Address by calling the IP Address Contact's phone number and obtaining a response confirming the Applicant's request for validation of the IP Address. The CA MUST place the call to a phone number identified by the IP Address Registration Authority as the IP Address Contact. Each phone call SHALL be made to a single number.

In the event that someone other than an IP Address Contact is reached, the CA MAY request to be transferred to the IP Address Contact.

In the event of reaching voicemail, the CA may leave the Random Value and the IP Address(es) being validated. The Random Value MUST be returned to the CA to approve the request.

The Random Value SHALL remain valid for use in a confirming response for no more than 30 days from its creation. The CPS MAY specify a shorter validity period for Random Values.

3.2.2.5.6 ACME "http-01" method for IP Addresses

Confirming the Applicant's control over the IP Address by performing the procedure documented for an "http-01" challenge in draft 04 of "ACME IP Identifier Validation Extension," available at <https://tools.ietf.org/html/draft-ietf-acme-ip-04#section-4>.

3.2.2.5.7 ACME "tls-alpn-01" method for IP Addresses

Confirming the Applicant's control over the IP Address by performing the procedure documented for a "tls-alpn-01" challenge in draft 04 of "ACME IP Identifier Validation Extension," available at <https://tools.ietf.org/html/draft-ietf-acme-ip-04#section-4>.

3.2.2.6 Wildcard Domain Validation

Before issuing a certificate with a wildcard character (*) in a CN or subjectAltName of type DNS-ID, the CA MUST establish and follow a documented procedure that determines if the wildcard character occurs in the first label position to the left of a "registry-controlled" label or "public suffix" (e.g. "*.com", "*.co.uk", see RFC 6454 Section 8.2 for further explanation).

If a wildcard would fall within the label immediately to the left of a registry-controlled or public suffix, CAs MUST refuse issuance unless the applicant proves its rightful control of the entire Domain Namespace. (e.g. CAs MUST NOT issue "*.co.uk" or "*.local", but MAY issue "*.example.com" to Example Co.).

Determination of what is "registry-controlled" versus the registerable portion of a Country Code Top-Level Domain Namespace is not standardized at the time of writing and is not a property of the DNS itself. Current best practice is to consult a "public suffix list" such as the [Public Suffix List \(PSL\)](#), and to retrieve a fresh copy regularly.

If using the PSL, a CA SHOULD consult the "ICANN DOMAINS" section only, not the "PRIVATE DOMAINS" section. The PSL is updated regularly to contain new gTLDs delegated by ICANN, which are listed in the "ICANN DOMAINS" section. A CA is not prohibited from issuing a Wildcard Certificate to the Registrant of an entire gTLD, provided that control of the entire namespace is demonstrated in an appropriate way.

3.2.2.7 Data Source Accuracy

Prior to using any data source as a Reliable Data Source, the CA SHALL evaluate the source for its

reliability, accuracy, and resistance to alteration or falsification. The CA SHOULD consider the following during its evaluation:

1. The age of the information provided,
2. The frequency of updates to the information source,
3. The data provider and purpose of the data collection,
4. The public accessibility of the data availability, and
5. The relative difficulty in falsifying or altering the data.

Databases maintained by the CA, its owner, or its affiliated companies do not qualify as a Reliable Data Source if the primary purpose of the database is to collect information for the purpose of fulfilling the validation requirements under this [Section 3.2](#).

3.2.2.8 CAA Records

As part of the issuance process, the CA MUST check for CAA records and follow the processing instructions found, for each `dnsName` in the `subjectAltName` extension of the certificate to be issued, as specified in RFC 8659. If the CA issues, they MUST do so within the TTL of the CAA record, or 8 hours, whichever is greater.

This stipulation does not prevent the CA from checking CAA records at any other time.

When processing CAA records, CAs MUST process the `issuewild`, and `iodef` property tags as specified in RFC 8659, although they are not required to act on the contents of the `iodef` property tag. Additional property tags MAY be supported, but MUST NOT conflict with or supersede the mandatory property tags set out in this document. CAs MUST respect the critical flag and not issue a certificate if they encounter an unrecognized property tag with this flag set.

RFC 8659 requires that CAs “MUST NOT issue a certificate unless the CA determines that either (1) the certificate request is consistent with the applicable CAA RRset or (2) an exception specified in the relevant CP or CPS applies.” For issuances conforming to these Baseline Requirements, CAs MUST NOT rely on any exceptions specified in their CP or CPS unless they are one of the following:

- CAA checking is optional for certificates for which a Certificate Transparency pre-certificate was created and logged in at least two public logs, and for which CAA was checked.
- CAA checking is optional for certificates issued by a Technically Constrained Subordinate CA Certificate as set out in [Section 7.1.2.3](#) or [Section 7.1.2.4](#), where the lack of CAA checking is an explicit contractual provision in the contract with the Applicant.
- CAA checking is optional if the CA or an Affiliate of the CA is the DNS Operator (as defined in RFC 7719) of the domain’s DNS.

CAs are permitted to treat a record lookup failure as permission to issue if:

- the failure is outside the CA’s infrastructure; and
- the lookup has been retried at least once; and
- the domain’s zone does not have a DNSSEC validation chain to the ICANN root.

CAs MUST document potential issuances that were prevented by a CAA record in sufficient detail to provide feedback to the CAB Forum on the circumstances, and SHOULD dispatch reports of such issuance requests to the contact(s) stipulated in the CAA `iodef` record(s), if present. CAs are not expected to support URL schemes in the `iodef` record other than `mailto:` or `https:`.

3.2.3 Authentication of individual identity

If an Applicant subject to this [Section 3.2.3](#) 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 the CA determines to be reliable, 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.

3.2.4 Non-verified subscriber information

3.2.5 Validation of authority

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 3.2.2.1](#) 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.

3.2.6 Criteria for Interoperation or Certification

The CA SHALL disclose all Cross-Certified Subordinate CA 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-Certified Subordinate CA Certificate at issue).

3.3 Identification and authentication for re-key requests

3.3.1 Identification and authentication for routine re-key

3.3.2 Identification and authentication for re-key after revocation

3.4 Identification and authentication for revocation request

4. CERTIFICATE LIFE-CYCLE OPERATIONAL REQUIREMENTS

4.1 Certificate Application

4.1.1 Who can submit a certificate application

In accordance with [Section 5.5.2](#), 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.

4.1.2 Enrollment process and responsibilities

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 Agreement or Terms of Use, which may be electronic.

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

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 4.2.1](#), 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.

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.

4.2 Certificate application processing

4.2.1 Performing identification and authentication functions

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. The CA SHALL establish and follow a documented procedure for verifying all data requested for inclusion in the Certificate by 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.

[Section 6.3.2](#) limits the validity period of Subscriber Certificates. The CA MAY use the documents and data provided in [Section 3.2](#) to verify certificate information, or may reuse previous validations themselves, provided that the CA obtained the data or document from a source specified under [Section 3.2](#) or completed the validation itself no more than 825 days prior to issuing the Certificate.

In no case may a prior validation be reused if any data or document used in the prior validation was obtained more than the maximum time permitted for reuse of the data or document prior to issuing the Certificate.

After the change to any validation method specified in the Baseline Requirements or EV Guidelines, a CA may continue to reuse validation data or documents collected prior to the change, or the validation itself, for the period stated in this BR 4.2.1 unless otherwise specifically provided in a ballot.

The CA SHALL develop, maintain, and implement documented procedures that identify and require additional verification activity for High Risk Certificate Requests prior to the Certificate's approval, as reasonably necessary to ensure that such requests are properly verified under these Requirements.

If a Delegated Third Party fulfills any of the CA's obligations under this section, the CA SHALL verify that the process used by the Delegated Third Party to identify and further verify High Risk Certificate Requests provides at least the same level of assurance as the CA's own processes.

4.2.2 Approval or rejection of certificate applications

CAs SHALL NOT issue certificates containing Internal Names or Reserved IP Addresses, as such names cannot be validated according to [Section 3.2.2.4](#) or [Section 3.2.2.5](#).

4.2.3 Time to process certificate applications

No stipulation.

4.3 Certificate issuance

4.3.1 CA actions during certificate issuance

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.

4.3.2 Notification to subscriber by the CA of issuance of certificate

No stipulation.

4.4 Certificate acceptance

4.4.1 Conduct constituting certificate acceptance

No stipulation.

4.4.2 Publication of the certificate by the CA

No stipulation.

4.4.3 Notification of certificate issuance by the CA to other entities

No stipulation.

4.5 Key pair and certificate usage

4.5.1 Subscriber private key and certificate usage

See [Section 9.6.3](#), provisions 2. and 4.

4.5.2 Relying party public key and certificate usage

No stipulation.

4.6 Certificate renewal

4.6.1 Circumstance for certificate renewal

No stipulation.

4.6.2 Who may request renewal

No stipulation.

4.6.3 Processing certificate renewal requests

No stipulation.

4.6.4 Notification of new certificate issuance to subscriber

No stipulation.

4.6.5 Conduct constituting acceptance of a renewal certificate

No stipulation.

4.6.6 Publication of the renewal certificate by the CA

No stipulation.

4.6.7 Notification of certificate issuance by the CA to other entities

No stipulation.

4.7 Certificate re-key

4.7.1 Circumstance for certificate re-key

No stipulation.

4.7.2 Who may request certification of a new public key

No stipulation.

4.7.3 Processing certificate re-keying requests

No stipulation.

4.7.4 Notification of new certificate issuance to subscriber

No stipulation.

4.7.5 Conduct constituting acceptance of a re-keyed certificate

No stipulation.

4.7.6 Publication of the re-keyed certificate by the CA

No stipulation.

4.7.7 Notification of certificate issuance by the CA to other entities

No stipulation.

4.8 Certificate modification

4.8.1 Circumstance for certificate modification

No stipulation.

4.8.2 Who may request certificate modification

No stipulation.

4.8.3 Processing certificate modification requests

No stipulation.

4.8.4 Notification of new certificate issuance to subscriber

No stipulation.

4.8.5 Conduct constituting acceptance of modified certificate

No stipulation.

4.8.6 Publication of the modified certificate by the CA

No stipulation.

4.8.7 Notification of certificate issuance by the CA to other entities

No stipulation.

4.9 Certificate revocation and suspension

4.9.1 Circumstances for revocation

4.9.1.1 Reasons for Revoking a Subscriber Certificate

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 suffered a Key Compromise;
4. The CA is made aware of a demonstrated or proven method that can easily compute the Subscriber's Private Key based on the Public Key in the Certificate (such as a Debian weak key, see <https://wiki.debian.org/SSLkeys>);
5. The CA obtains evidence that the validation of domain authorization or control for any Fully-Qualified Domain Name or IP address in the Certificate should not be relied upon.

The CA SHOULD revoke a certificate within 24 hours and MUST revoke a Certificate within 5 days if one or more of the following occurs:

1. The Certificate no longer complies with the requirements of [Section 6.1.5](#) and [Section 6.1.6](#);
2. The CA obtains evidence that the Certificate was misused;
3. The CA is made aware that a Subscriber has violated one or more of its material obligations under the Subscriber Agreement or Terms of Use;
4. 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);
5. The CA is made aware that a Wildcard Certificate has been used to authenticate a fraudulently misleading subordinate Fully-Qualified Domain Name;
6. The CA is made aware of a material change in the information contained in the Certificate;
7. 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;

8. The CA determines or is made aware that any of the information appearing in the Certificate is inaccurate;
9. 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;
10. Revocation is required by the CA's Certificate Policy and/or Certification Practice Statement; or
11. The CA is made aware of a demonstrated or proven method that exposes the Subscriber's Private Key to compromise or if there is clear evidence that the specific method used to generate the Private Key was flawed.

4.9.1.2 Reasons for Revoking a Subordinate CA Certificate

The Issuing CA SHALL revoke a Subordinate CA Certificate within seven (7) days if one or more of the following occurs:

1. The Subordinate CA requests revocation in writing;
2. The Subordinate CA notifies the Issuing CA that the original certificate request was not authorized and does not retroactively grant authorization;
3. The Issuing CA obtains evidence that the Subordinate CA's Private Key corresponding to the Public Key in the Certificate suffered a Key Compromise or no longer complies with the requirements of [Section 6.1.5](#) and [Section 6.1.6](#);
4. The Issuing CA obtains evidence that the Certificate was misused;
5. The Issuing CA is made aware that the Certificate was not issued in accordance with or that Subordinate CA has not complied with this document or the applicable Certificate Policy or Certification Practice Statement;
6. The Issuing CA determines that any of the information appearing in the Certificate is inaccurate or misleading;
7. The Issuing CA or Subordinate CA ceases operations for any reason and has not made arrangements for another CA to provide revocation support for the Certificate;
8. The Issuing CA's or Subordinate CA's right to issue Certificates under these Requirements expires or is revoked or terminated, unless the Issuing CA has made arrangements to continue maintaining the CRL/OCSP Repository; or
9. Revocation is required by the Issuing CA's Certificate Policy and/or Certification Practice Statement.

4.9.2 Who can request revocation

The Subscriber, RA, or Issuing CA can initiate revocation. Additionally, Subscribers, Relying Parties, Application Software Suppliers, and other third parties may submit Certificate Problem Reports informing the issuing CA of reasonable cause to revoke the certificate.

4.9.3 Procedure for 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 Certificate Problem Reports.

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 and in Section 1.5.2 of their CPS.

4.9.4 Revocation request grace period

No stipulation.

4.9.5 Time within which CA must process the revocation request

Within 24 hours after receiving a Certificate Problem Report, the CA SHALL investigate the facts and circumstances related to a Certificate Problem Report and provide a preliminary report on its findings to both the Subscriber and the entity who filed the Certificate Problem Report. After reviewing the facts and circumstances, the CA SHALL work with the Subscriber and any entity reporting the Certificate Problem Report or other revocation-related notice to establish whether or not the certificate will be revoked, and if so, a date which the CA will revoke the certificate. The period from receipt of the Certificate Problem Report or revocation-related notice to published revocation MUST NOT exceed the time frame set forth in [Section 4.9.1.1](#). The date selected by the CA SHOULD consider the following criteria:

1. The nature of the alleged problem (scope, context, severity, magnitude, risk of harm);
2. The consequences of revocation (direct and collateral impacts to Subscribers and Relying Parties);
3. The number of Certificate Problem Reports received about a particular Certificate or Subscriber;
4. 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 they didn't receive the goods they ordered); and
5. Relevant legislation.

4.9.6 Revocation checking requirement for relying parties

No stipulation.

Note: Following certificate issuance, a certificate may be revoked for reasons stated in [Section 4.9](#). Therefore, relying parties should check the revocation status of all certificates that contain a CDP or OCSP pointer.

4.9.7 CRL issuance frequency (if applicable)

For the status of Subscriber Certificates:

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.

For the status of Subordinate CA Certificates:

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.

The value of the `nextUpdate` field MUST NOT be more than twelve months beyond the value of the `thisUpdate` field.

4.9.8 Maximum latency for CRLs (if applicable)

No stipulation.

4.9.9 On-line revocation/status checking availability

OCSP responses MUST conform to RFC6960 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 RFC6960.

4.9.10 On-line revocation checking requirements

OCSP responders operated by the CA SHALL support the HTTP GET method, as described in RFC 6960 and/or RFC 5019.

The validity interval of an OCSP response is the difference in time between the `thisUpdate` and `nextUpdate` field, inclusive. For purposes of computing differences, a difference of 3,600 seconds shall be equal to one hour, and a difference of 86,400 seconds shall be equal to one day, ignoring leap-seconds.

For the status of Subscriber Certificates:

Prior to 2020-09-30: 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.

Effective 2020-09-30:

1. OCSP responses MUST have a validity interval greater than or equal to eight hours;
2. OCSP responses MUST have a validity interval less than or equal to ten days;
3. For OCSP responses with validity intervals less than sixteen hours, then the CA SHALL update the information provided via an Online Certificate Status Protocol prior to one-half of the validity period before the `nextUpdate`.
4. For OCSP responses with validity intervals greater than or equal to sixteen hours, then the CA SHALL update the information provided via an Online Certificate Status Protocol at least eight hours prior to the `nextUpdate`, and no later than four days after the `thisUpdate`.

For the status of Subordinate CA Certificates:

- The CA SHALL update information provided via an Online Certificate Status Protocol
 - i. at least every twelve months; and
 - ii. within 24 hours after revoking a Subordinate CA Certificate.

If the OCSP responder receives a request for the status of a certificate serial number that is “unused”, then the responder SHOULD NOT respond with a “good” status. If the OCSP responder is for a CA that is not Technically Constrained in line with [Section 7.1.2.3](#) or [Section 7.1.2.4](#), the responder MUST NOT respond with a “good” status for such requests.

The CA SHOULD monitor the OCSP responder for requests for “unused” serial numbers as part of its security response procedures.

The OCSP responder MAY provide definitive responses about “reserved” certificate serial numbers, as if there was a corresponding Certificate that matches the Precertificate [RFC6962].

A certificate serial number within an OCSP request is one of the following three options:

1. “assigned” if a Certificate with that serial number has been issued by the Issuing CA, using any current or previous key associated with that CA subject; or
2. “reserved” if a Precertificate [RFC6962] with that serial number has been issued by
 - a. the Issuing CA; or
 - b. a Precertificate Signing Certificate [RFC6962] associated with the Issuing CA; or
3. “unused” if neither of the previous conditions are met.

4.9.11 Other forms of revocation advertisements available

No Stipulation.

4.9.12 Special requirements re key compromise

See [Section 4.9.1](#).

4.9.13 Circumstances for suspension

The Repository **MUST NOT** include entries that indicate that a Certificate is suspended.

4.9.14 Who can request suspension

Not applicable.

4.9.15 Procedure for suspension request

Not applicable.

4.9.16 Limits on suspension period

Not applicable.

4.10 Certificate status services

4.10.1 Operational characteristics

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

4.10.2 Service availability

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.

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.

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.

4.10.3 Optional features

No stipulation.

4.11 End of subscription

No stipulation.

4.12 Key escrow and recovery

4.12.1 Key escrow and recovery policy and practices

No stipulation.

4.12.2 Session key encapsulation and recovery policy and practices

Not applicable.

5. MANAGEMENT, OPERATIONAL, AND PHYSICAL CONTROLS

The CA/Browser Forum's Network and Certificate System Security Requirements are incorporated by reference as if fully set forth herein.

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.

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'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.

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.

5.1 PHYSICAL SECURITY CONTROLS

5.1.1 Site location and construction

5.1.2 Physical access

5.1.3 Power and air conditioning

5.1.4 Water exposures

5.1.5 Fire prevention and protection

5.1.6 Media storage

5.1.7 Waste disposal

5.1.8 Off-site backup

5.2 Procedural controls

5.2.1 Trusted roles

5.2.2 Number of Individuals Required per Task

The CA 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.

5.2.3 Identification and authentication for each role

5.2.4 Roles requiring separation of duties

5.3 Personnel controls

5.3.1 Qualifications, experience, and clearance requirements

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.

5.3.2 Background check procedures

5.3.3 Training Requirements and Procedures

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.

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.

5.3.4 Retraining frequency and requirements

All personnel in Trusted roles SHALL maintain skill levels consistent with the CA's training and performance programs.

5.3.5 Job rotation frequency and sequence

5.3.6 Sanctions for unauthorized actions

5.3.7 Independent Contractor Controls

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 5.3.3](#) and the document retention and event logging requirements of [Section 5.4.1](#).

5.3.8 Documentation supplied to personnel

5.4 Audit logging procedures

5.4.1 Types of events recorded

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.

The CA SHALL record at least the following events:

1. CA certificate and key lifecycle events, including:
 1. Key generation, backup, storage, recovery, archival, and destruction;
 2. Certificate requests, renewal, and re-key requests, and revocation;
 3. Approval and rejection of certificate requests;
 4. Cryptographic device lifecycle management events;
 5. Generation of Certificate Revocation Lists and OCSP entries;
 6. Introduction of new Certificate Profiles and retirement of existing Certificate Profiles.
2. Subscriber Certificate lifecycle management events, including:
 1. Certificate requests, renewal, and re-key requests, and revocation;
 2. All verification activities stipulated in these Requirements and the CA's Certification Practice Statement;
 3. Approval and rejection of certificate requests;
 4. Issuance of Certificates; and
 5. Generation of Certificate Revocation Lists and OCSP entries.
3. Security events, including:
 1. Successful and unsuccessful PKI system access attempts;
 2. PKI and security system actions performed;
 3. Security profile changes;
 4. Installation, update and removal of software on a Certificate System;
 5. System crashes, hardware failures, and other anomalies;
 6. Firewall and router activities; and
 7. Entries to and exits from the CA facility.

Log records MUST include the following elements:

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

5.4.2 Frequency for Processing and Archiving Audit Logs

5.4.3 Retention Period for Audit Logs

The CA SHALL retain, for at least two years:

1. CA certificate and key lifecycle management event records (as set forth in [Section 5.4.1 \(1\)](#)) after the later occurrence of:
 1. the destruction of the CA Private Key; or

2. the revocation or expiration of the final CA Certificate in that set of Certificates that have an X.509v3 basicConstraints extension with the cA field set to true and which share a common Public Key corresponding to the CA Private Key;
2. Subscriber Certificate lifecycle management event records (as set forth in [Section 5.4.1 \(2\)](#)) after the revocation or expiration of the Subscriber Certificate;
3. Any security event records (as set forth in [Section 5.4.1 \(3\)](#)) after the event occurred.

5.4.4 Protection of Audit Log

5.4.5 Audit Log Backup Procedures

5.4.6 Audit Log Accumulation System (internal vs. external)

5.4.7 Notification to event-causing subject

5.4.8 Vulnerability assessments

Additionally, 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.

5.5 Records archival

5.5.1 Types of records archived

5.5.2 Retention period for archive

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.

5.5.3 Protection of archive

5.5.4 Archive backup procedures

5.5.5 Requirements for time-stamping of records

5.5.6 Archive collection system (internal or external)

5.5.7 Procedures to obtain and verify archive information

5.6 Key changeover

5.7 Compromise and disaster recovery

5.7.1 Incident and compromise handling procedures

CA organizations shall have an Incident Response Plan and a Disaster Recovery Plan.

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 its business continuity plan and security

plans 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.

5.7.2 Recovery Procedures if Computing resources, software, and/or data are corrupted

5.7.3 Recovery Procedures after Key Compromise

5.7.4 Business continuity capabilities after a disaster

5.8 CA or RA termination

6. TECHNICAL SECURITY CONTROLS

6.1 Key pair generation and installation

6.1.1 Key pair generation

6.1.1.1 CA Key Pair Generation

For CA Key Pairs that are either

- i. used as a CA Key Pair for a Root Certificate or
- ii. used as a CA Key Pair for a Subordinate CA Certificate, where the Subordinate CA 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 CA Key Pair generation process or record a video of the entire 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 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 CA Key Pair generation process or record a video of the entire CA Key Pair generation process.

In all cases, the CA SHALL:

1. generate the CA Key Pair in a physically secured environment as described in the CA's Certificate Policy and/or Certification Practice Statement;
2. generate the CA Key Pair using personnel in Trusted Roles under the principles of multiple person control and split knowledge;
3. generate the CA Key Pair 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 Pair 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.

6.1.1.2 RA Key Pair Generation

6.1.1.3 Subscriber Key Pair Generation

The CA SHALL reject a certificate request if one or more of the following conditions are met:

1. The Key Pair does not meet the requirements set forth in [Section 6.1.5](#) and/or [Section 6.1.6](#);
2. There is clear evidence that the specific method used to generate the Private Key was flawed;
3. The CA is aware of a demonstrated or proven method that exposes the Applicant's Private Key to compromise;
4. The CA has previously been made aware that the Applicant's Private Key has suffered a Key Compromise, such as through the provisions of [Section 4.9.1.1](#);
5. The CA is aware of a demonstrated or proven method to easily compute the Applicant's Private Key based on the Public Key (such as a Debian weak key, see

<https://wiki.debian.org/SSLkeys>).

If the Subscriber Certificate will contain an `extKeyUsage` extension containing either the values `id-kp-serverAuth` [RFC5280] or `anyExtendedKeyUsage` [RFC5280], the CA SHALL NOT generate a Key Pair on behalf of a Subscriber, and SHALL NOT accept a certificate request using a Key Pair previously generated by the CA.

6.1.2 Private key delivery to subscriber

Parties other than the Subscriber SHALL NOT archive the Subscriber Private Key without authorization by 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.

6.1.3 Public key delivery to certificate issuer

6.1.4 CA public key delivery to relying parties

6.1.5 Key sizes

For RSA key pairs the CA SHALL:

- Ensure that the modulus size, when encoded, is at least 2048 bits, and;
- Ensure that the modulus size, in bits, is evenly divisible by 8.

For ECDSA key pairs, the CA SHALL:

- Ensure that the key represents a valid point on the NIST P-256, NIST P-384 or NIST P-521 elliptic curve.

No other algorithms or key sizes are permitted.

6.1.6 Public key parameters generation and quality checking

RSA: The CA SHALL confirm that the value of the public exponent is an odd number equal to 3 or more. Additionally, the public exponent SHOULD be in the range between $2^{16} + 1$ and $2^{256} - 1$. The modulus SHOULD also have the following characteristics: an odd number, not the power of a prime, and have no factors smaller than 752. [Source: Section 5.3.3, NIST SP 800-89]

ECDSA: The CA SHOULD confirm the validity of all keys using either the ECC Full Public Key Validation Routine or the ECC Partial Public Key Validation Routine. [Source: Sections 5.6.2.3.2 and 5.6.2.3.3, respectively, of NIST SP 800-56A: Revision 2]

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

Private Keys corresponding to Root Certificates 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-Certified Subordinate CA Certificates;
3. Certificates for infrastructure purposes (administrative role certificates, internal CA operational device certificates); and
4. Certificates for OCSP Response verification.

6.2 Private Key Protection and Cryptographic Module Engineering Controls

The CA SHALL implement physical and logical safeguards to prevent unauthorized certificate issuance. Protection of the CA 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.

6.2.1 Cryptographic module standards and controls

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

6.2.3 Private key escrow

6.2.4 Private key backup

See [Section 5.2.2](#).

6.2.5 Private key archival

Parties other than the Subordinate CA SHALL NOT archive the Subordinate CA Private Keys without authorization by the Subordinate CA.

6.2.6 Private key transfer into or from a cryptographic module

If the Issuing CA generated the Private Key on behalf of the Subordinate CA, then the Issuing CA SHALL encrypt the Private Key for transport to the Subordinate CA. If the Issuing CA becomes aware that a Subordinate CA's Private Key has been communicated to an unauthorized person or an organization not affiliated with the Subordinate CA, then the Issuing CA SHALL revoke all certificates that include the Public Key corresponding to the communicated Private Key.

6.2.7 Private key storage on cryptographic module

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.

6.2.8 Activating Private Keys

6.2.9 Deactivating Private Keys

6.2.10 Destroying Private Keys

6.2.11 Cryptographic Module Capabilities

6.3 Other aspects of key pair management

6.3.1 Public key archival

6.3.2 Certificate operational periods and key pair usage periods

Subscriber Certificates issued on or after 1 September 2020 SHOULD NOT have a Validity Period greater than 397 days and MUST NOT have a Validity Period greater than 398 days. Subscriber Certificates issued after 1 March 2018, but prior to 1 September 2020, MUST NOT have a Validity Period greater than 825 days. Subscriber Certificates issued after 1 July 2016 but prior to 1 March 2018 MUST NOT have a Validity Period greater than 39 months.

For the purpose of calculations, a day is measured as 86,400 seconds. Any amount of time greater than this, including fractional seconds and/or leap seconds, shall represent an additional day. For this reason, Subscriber Certificates SHOULD NOT be issued for the maximum permissible time by default, in order to account for such adjustments.

6.4 Activation data

6.4.1 Activation data generation and installation

6.4.2 Activation data protection

6.4.3 Other aspects of activation data

6.5 Computer security controls

6.5.1 Specific computer security technical requirements

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

6.5.2 Computer security rating

6.6 Life cycle technical controls

6.6.1 System development controls

6.6.2 Security management controls

6.6.3 Life cycle security controls

6.7 Network security controls

6.8 Time-stamping

DRAFT

7. CERTIFICATE, CRL, AND OCSP PROFILES

7.1 Certificate profile

The CA SHALL meet the technical requirements set forth in [Section 2.2 - Publication of Information](#), [Section 6.1.5 - Key Sizes](#), and [Section 6.1.6 - Public Key Parameters Generation and Quality Checking](#).

TODO(sleevi): FIXME

CAs SHALL generate non-sequential Certificate serial numbers greater than zero (0) containing at least 64 bits of output from a CSPRNG.

7.1.1 Version number(s)

Certificates MUST be of type X.509 v3.

7.1.2 Certificate Content and Extensions

If the CA asserts compliance with these Baseline Requirements, all certificates that it issues MUST comply with one of the following certificate profiles:

- CA Certificates
 - [Section 7.1.2.1.- Root CA Certificate Profile](#)
 - Subordinate CA Certificates
 - Cross Certificates
 - [Section 7.1.2.2 - Cross-Certified Subordinate CA Certificate Profile](#)
 - Technically Constrained CA Certificates
 - [Section 7.1.2.3 - Technically-Constrained Non-TLS Subordinate CA Certificate Profile](#)
 - [Section 7.1.2.4 - Technically-Constrained TLS Subordinate CA Certificate Profile](#)
 - [Section 7.1.2.5 - TLS Subordinate CA Certificate Profile](#)
 - [Section 7.1.2.6 - Subscriber \(End-Entity\) Certificate Profile](#)
 - Domain Validated
 - Individual Validated
 - Organization Validated
 - Extended Validation
 - **TBD: Infrastructure Certificates**
 - [Section 7.1.2.7 - OCSP Responder Certificate Profile](#)
 - **TBD: Infrastructure Cert**
 - **TBD: Precert Signing CA**
 - **TBD: Interoperability Testing Certs (valid/revoked/expired)?**

7.1.2.1 Root CA Certificate Profile

Field	Description
tbsCertificate	
version	MUST be v3(2)
serialNumber	MUST be a non-sequential number greater than zero (0) containing at least 64 bits of output from a CSPRNG.
signature	See Section 7.1.3.2
issuer	Encoded value MUST be byte-for-byte identical to the encoded subject
validity	TBD
subject	See Section 7.1.2.8.1
subjectPublicKeyInfo	See Section 7.1.3.1

Field	Description
issuerUniqueID	MUST NOT be present
subjectUniqueID	MUST NOT be present
extensions	See Section 7.1.2.1.1
signatureAlgorithm	Encoded value MUST be byte-for-byte identical to the <code>tbsCertificate.signature</code> .
signature	

7.1.2.1.1 Root CA Extensions

Extension	Presence	Critical	Description
authorityKeyIdentifier	SHOULD	N	See Section 7.1.2.1.2
basicConstraints	MUST	Y	See Section 7.1.2.1.3
keyUsage	MUST	Y	See Section 7.1.2.8.6
subjectKeyIdentifier	MUST	N	See Section 7.1.2.9.5
extKeyUsage	MUST NOT	N	-
certificatePolicies	SHOULD NOT	N	See Section 7.1.2.8.4
Signed Certificate Timestamp List	MAY	N	See Section 7.1.2.9.4
Any other extension	SHOULD NOT	-	TBD

7.1.2.1.2 Authority Key Identifier

Field	Description
keyIdentifier	MUST be present. MUST be identical to the <code>subjectKeyIdentifier</code> field.
authorityCertIssuer	MUST NOT be present
authorityCertSerialNumber	MUST NOT be present

7.1.2.1.3 Basic Constraints

Field	Description
ca	MUST be set TRUE
pathLenConstraint	SHOULD NOT be present

7.1.2.2 Cross-Certified Subordinate CA Certificate Profile

This Certificate Profile MAY be used when issuing a CA Certificate using the same Subject Name and Subject Public Key Information as an existing CA Certificate, whether a Root CA Certificate or Subordinate CA Certificate.

Before issuing a CA Certificate using this Profile, the Issuing CA MUST confirm that the existing CA Certificate(s) are subject to these Baseline Requirements and were issued in compliance with the then-current version of the Baseline Requirements at time of issuance.

TBD: Remarks about audits

Field	Description
tbsCertificate	
version	MUST be v3(2)
serialNumber	MUST be a non-sequential number greater than zero (0) containing at least 64 bits of output from a CSPRNG.
signature	See Section 7.1.3.2
issuer	MUST be byte-for-byte identical to the subject field of the Issuing CA. See Section 7.1.4.1
validity	TBD
subject	See Section 7.1.2.2.1
subjectPublicKeyInfo	See Section 7.1.3.1
issuerUniqueID	MUST NOT be present
subjectUniqueID	MUST NOT be present
extensions	See Section 7.1.2.2.2
signatureAlgorithm	Encoded value MUST be byte-for-byte identical to the tbsCertificate.signature.
signature	

7.1.2.2.1 Cross-Certified Subordinate CA Naming

Provided that the Issuing CA has confirmed that the existing CA Certificate was issued in compliance with the then-current version of the Baseline Requirements, the Issuing CA MAY deviate from the requirements in [Section 7.1.4](#) as follows:

The encoded subject name shall be byte-for-byte identical to the encoded subject name of the existing CA Certificate.

7.1.2.2.2 Cross-Certified Subordinate CA Extensions

The acceptable extensions and the requirements for those extensions in a Cross-Certified Subordinate CA vary based on whether or not the Subordinate CA is issued to and operated by the same organization as the Issuing CA or an Affiliate of the Issuing CA organization.

Table 9: Extensions when the Subordinate CA is operated by the Issuing CA or an Affiliate of the Issuing CA.

Extension	Presence	Critical	Description
authorityKeyIdentifier	MUST	N	See Section 7.1.2.9.2
basicConstraints	MUST	Y	See Section 7.1.2.8.3
certificatePolicies	MUST	N	See Section 7.1.2.8.4 (Affiliated CA)
crlDistributionPoints	MUST	N	See Section 7.1.2.9.3
keyUsage	MUST	Y	See Section 7.1.2.8.6
subjectKeyIdentifier	MUST	N	See Section 7.1.2.9.5
extKeyUsage	SHOULD ¹	-	See Section 7.1.2.2.3
authorityInformationAccess	SHOULD	N	See Section 7.1.2.8.2

¹While [RFC 5280, Section 4.2.1.12](#) notes that this extension will generally only appear within end-entity certificates, these Requirements make use of this extension to further protect relying parties by limiting the scope of CA Certificates, as implemented by a number of Application Software Suppliers.

Extension	Presence	Critical	Description
nameConstraints	MAY	*2	See Section 7.1.2.8.7
Signed Certificate Timestamp List	MAY	N	See Section 7.1.2.9.4
Any other extension	SHOULD NOT	-	TBD

Table 10: Extensions when the Subordinate CA is operated by an entity that is not the Issuing CA or an Affiliate of the Issuing CA.

Extension	Presence	Critical	Description
authorityKeyIdentifier	MUST	N	See Section 7.1.2.9.2
basicConstraints	MUST	Y	See Section 7.1.2.8.3
certificatePolicies	MUST	N	See Section 7.1.2.8.5 (Non-Affiliated CA)
crLdDistributionPoints	MUST	N	See Section 7.1.2.9.3
keyUsage	MUST	Y	See Section 7.1.2.8.6
subjectKeyIdentifier	MUST	N	See Section 7.1.2.9.5
extKeyUsage	MUST ³	-	See Section 7.1.2.2.4
authorityInformationAccess	SHOULD	N	See Section 7.1.2.8.2
nameConstraints	MAY	*4	See Section 7.1.2.8.7
Signed Certificate Timestamp List	MAY	N	See Section 7.1.2.9.4
Any other extension	SHOULD NOT	-	TBD

7.1.2.2.3 Extended Key Usage - Unrestricted Affiliated Cross-Certified CA

When the Cross-Certified Subordinate CA is issued to and operated by the same organization as the Issuing CA or an Affiliate of the Issuing CA, the Extended Key Usage extension MAY be encoded as follows:

Table 11: Unrestricted Extended Key Usage (Affiliated Cross-Certified CA)

Key Purpose	Description
anyExtendedKeyUsage	The special extended key usage to indicate there are no restrictions applied. If present, this MUST be the only key usage present.
Any other value	CAs MUST NOT include any other key usage with the anyExtendedKeyUsage key usage present.

Alternatively, if the Issuing CA does not use this form, then the Extended Key Usage extension MUST be encoded as specified in [Section 7.1.2.2.4, Extended Key Usage - Restricted Cross-Certified CA](#).

7.1.2.2.4 Extended Key Usage - Restricted Cross-Certified CA

²See [Section 7.1.2.8.7](#) for further requirements, including regarding criticality of this extension.

³While [RFC 5280, Section 4.2.1.12](#) notes that this extension will generally only appear within end-entity certificates, these Requirements make use of this extension to further protect relying parties by limiting the scope of CA Certificates, as implemented by a number of Application Software Suppliers.

⁴See [Section 7.1.2.8.7](#) for further requirements, including regarding criticality of this extension.

If present, the Extended Key Usage extension **MUST** only contain key usage purposes for which the Issuing CA has verified the Cross-Certified Subordinate CA is authorized to assert.

7.1.2.3 Technically Constrained Non-TLS Subordinate CA Certificate Profile

This Certificate Profile **MAY** be used when issuing a CA Certificate that will be considered Technically Constrained, and which will not be used to issue TLS certificates directly or transitively. If the CA Certificate does not conform to this profile, or the profile specified in [Section 7.1.2.d](#), then it is not Technically Constrained.

Field	Description
tbsCertificate	
version	MUST be v3(2)
serialNumber	MUST be a non-sequential number greater than zero (0) containing at least 64 bits of output from a CSPRNG.
signature	See Section 7.1.3.2
issuer	MUST be byte-for-byte identical to the subject field of the Issuing CA. See Section 7.1.4.1
validity	TBD
subject	See Section 7.1.2.8.1
subjectPublicKeyInfo	See Section 7.1.3.1
issuerUniqueID	MUST NOT be present
subjectUniqueID	MUST NOT be present
extensions	See Section 7.1.2.3.1
signatureAlgorithm	Encoded value MUST be byte-for-byte identical to the tbsCertificate.signature.
signature	

7.1.2.3.1 Technically Constrained Non-TLS Subordinate CA Extensions

Extension	Presence	Critical	Description
authorityKeyIdentifier	MUST	N	See Section 7.1.2.9.2
basicConstraints	MUST	Y	See Section 7.1.2.8.3
certificatePolicies	MUST	N	See Section 7.1.2.8.4 (Affiliated CA)
crlDistributionPoints	MUST	N	See Section 7.1.2.9.3
keyUsage	MUST	Y	See Section 7.1.2.8.6
subjectKeyIdentifier	MUST	N	See Section 7.1.2.9.5
extKeyUsage	MUST ⁵	-	See Section 7.1.2.8.5 (Non-TLS CA)
authorityInformationAccess	SHOULD	N	See Section 7.1.2.8.2
nameConstraints	MAY	* ⁶	See Section 7.1.2.8.7
Signed Certificate Timestamp List	MAY	N	See Section 7.1.2.9.4
Any other extension	SHOULD NOT	-	TBD

⁵While [RFC 5280, Section 4.2.1.12](#) notes that this extension will generally only appear within end-entity certificates, these Requirements make use of this extension to further protect relying parties by limiting the scope of CA Certificates, as implemented by a number of Application Software Suppliers.

⁶See [Section 7.1.2.8.7](#) for further requirements, including regarding criticality of this extension.

7.1.2.4 Technically Constrained TLS Subordinate CA Certificate Profile

This Certificate Profile MAY be used when issuing a CA Certificate that will be considered Technically Constrained, and which will be used to issue TLS certificates directly or transitively. If the CA Certificate does not conform to this profile, or the profile specified in [Section 7.1.2.c](#), then it is not Technically Constrained.

Field	Description
tbsCertificate	
version	MUST be v3(2)
serialNumber	MUST be a non-sequential number greater than zero (0) containing at least 64 bits of output from a CSPRNG.
signature	See Section 7.1.3.2
issuer	MUST be byte-for-byte identical to the subject field of the Issuing CA. See Section 7.1.4.1
validity	TBD
subject	See Section 7.1.2.8.1
subjectPublicKeyInfo	See Section 7.1.3.1
issuerUniqueID	MUST NOT be present
subjectUniqueID	MUST NOT be present
extensions	See Section 7.1.2.4.1
signatureAlgorithm	Encoded value MUST be byte-for-byte identical to the tbsCertificate.signature.
signature	

7.1.2.4.1 Technically Constrained TLS Subordinate CA Extensions

Extension	Presence	Critical	Description
authorityKeyIdentifier	MUST	N	See Section 7.1.2.9.2
basicConstraints	MUST	Y	See Section 7.1.2.8.3
certificatePolicies	MUST	N	See Section 7.1.2.8.4 (Affiliated CA)
crlDistributionPoints	MUST	N	See Section 7.1.2.9.3
keyUsage	MUST	Y	See Section 7.1.2.8.6
subjectKeyIdentifier	MUST	N	See Section 7.1.2.9.5
extKeyUsage	MUST ⁷	-	See Section 7.1.2.8.6 (TLS CA)
nameConstraints	MUST	* ⁸	See Section 7.1.2.4.2
authorityInformationAccess	SHOULD	N	See Section 7.1.2.8.2
Signed Certificate Timestamp List	MAY	N	See Section 7.1.2.9.4
Any other extension	SHOULD NOT	-	TBD

7.1.2.4.2 Name Constraints

⁷While [RFC 5280, Section 4.2.1.12](#) notes that this extension will generally only appear within end-entity certificates, these Requirements make use of this extension to further protect relying parties by limiting the scope of CA Certificates, as implemented by a number of Application Software Suppliers.

⁸See [Section 7.1.2.8.7](#) for further requirements, including regarding criticality of this extension.

For a TLS Subordinate CA to be Technically Constrained, Name Constraints extension MUST be encoded as follows. As an explicit exception from RFC 5280, this extension SHOULD be marked critical, but MAY be marked non-critical if compatibility with certain legacy applications that do not support Name Constraints is necessary.

Table 16: nameConstraints requirements

Field	Description
permittedSubtrees	The permittedSubtrees MUST contain at least one GeneralSubtree for both of the dNSName and iPAddress GeneralName name types, UNLESS the specified GeneralName appears within the excludedSubtrees to exclude all names of that name type. Additionally, the permittedSubtrees MUST contain at least one GeneralSubtree of the directoryName GeneralName name type.
GeneralSubtree	The requirements for a GeneralSubtree that appears within a permittedSubtrees.
base	See following table.
minimum	MUST NOT be present.
maximum	MUST NOT be present.
excludedSubtrees	The excludedSubtrees MUST contain at least one GeneralSubtree for each of the dNSName and iPAddress GeneralName name types, unless there is an instance present of that name type in the permittedSubtrees. The directoryName name type SHOULD NOT be present.
GeneralSubtree	The requirements for a GeneralSubtree that appears within a permittedSubtrees.
base	See following table.
minimum	MUST NOT be present.
maximum	MUST NOT be present.

The following table contains the requirements for the GeneralName that appears within the base of a GeneralSubtree in either the permittedSubtrees or excludedSubtrees.

Table 17: GeneralName requirements for the base field

Name Type	Presence	Permitted Subtrees	Excluded Subtrees	Entire Namespace Exclusion
dnsName	MUST	The CA MUST confirm that the Applicant has registered the dNSName or has been authorized by the domain registrant to act on the registrant's behalf. See Section 3.2.2.4 .	If at least one dNSName instance is present in the permittedSubtrees, the CA MAY indicate one or more subordinate domains to be excluded.	If no dNSName instance is present in the permittedSubtrees, then the CA MUST include a zero-length dNSName to indicate no domain names are permitted.

Name Type	Presence	Permitted Subtrees	Excluded Subtrees	Entire Namespace Exclusion
iPAddress	MUST	The CA MUST confirm that the Applicant has been assigned the iPAddress range or has been authorized by the assigner to act on the assignee's behalf. See Section 3.2.2.5 .	If at least one iPAddress instance is present in the permittedSubtrees, the CA MAY indicate one or more subdivisions of those ranges to be excluded.	If no IPv4 iPAddress is present in the permittedSubtrees, the CA MUST include an iPAddress of 8 zero octets, indicating the IPv4 range of 0.0.0.0/0 being excluded. If no IPv6 iPAddress is present in the permittedSubtrees, the CA MUST include an iPAddress of 32 zero octets, indicating the IPv6 range of ::0/0 being excluded.
directoryName	MUST	The CA MUST confirm the Applicant's and/or Subsidiary's name attributes such that all certificates issued will comply with the relevant Certificate Profile (see Section 7.1.2), including Name Forms (See Section 7.1.4).	The CA SHOULD NOT include values within excludedSubtrees.	The CA MUST include a value within permittedSubtrees, and as such, this does not apply. See the Excluded Subtrees requirements for more.
Any other value	SHOULD-NOT		-	-

7.1.2.5 TLS Subordinate CA Certificate Profile

Field	Description
tbsCertificate	
version	MUST be v3(2)
serialNumber	MUST be a non-sequential number greater than zero (0) containing at least 64 bits of output from a CSPRNG.
signature	See Section 7.1.3.2
issuer	MUST be byte-for-byte identical to the subject field of the Issuing CA. See Section 7.1.4.1
validity	TBD
subject	See Section 7.1.2.8.1
subjectPublicKeyInfo	See Section 7.1.3.1
issuerUniqueID	MUST NOT be present
subjectUniqueID	MUST NOT be present
extensions	See Section 7.1.2.5.1
signatureAlgorithm	Encoded value MUST be byte-for-byte identical to the tbsCertificate.signature.
signature	

7.1.2.5.1 TLS Subordinate CA Extensions

Extension	Presence	Critical	Description
authorityKeyIdentifier	MUST	N	See Section 7.1.2.9.2
basicConstraints	MUST	Y	See Section 7.1.2.8.3
certificatePolicies	MUST	N	See Section 7.1.2.8.4 (Affiliated CA)
crlDistributionPoints	MUST	N	See Section 7.1.2.9.3
keyUsage	MUST	Y	See Section 7.1.2.8.6
subjectKeyIdentifier	MUST	N	See Section 7.1.2.9.5
extKeyUsage	MUST ⁹	-	See Section 7.1.2.8.6 (TLS CA)
nameConstraints	MUST	* ¹⁰	See Section 7.1.2.8.2
authorityInformationAccess	SHOULD	N	See Section 7.1.2.8.2
Signed Certificate Timestamp List	MAY	N	See Section 7.1.2.9.4
Any other extension	SHOULD NOT	-	TBD

7.1.2.6 Subscriber (Server) Certificate Profile

Field	Description
tbsCertificate	
version	MUST be v3(2)
serialNumber	MUST be a non-sequential number greater than zero (0) containing at least 64 bits of output from a CSPRNG.
signature	See Section 7.1.3.2
issuer	MUST be byte-for-byte identical to the subject field of the Issuing CA. See Section 7.1.4.1
validity	
notBefore	TBD
notAfter	See Section 6.3.2
subject	See Section 7.1.2.6.1
subjectPublicKeyInfo	See Section 7.1.3.1
issuerUniqueID	MUST NOT be present
subjectUniqueID	MUST NOT be present
extensions	See Section 7.1.2.6.1
signatureAlgorithm	Encoded value MUST be byte-for-byte identical to the <code>tbsCertificate.signature</code> .
signature	

7.1.2.6.1 Subscriber Certificate Types

There are four types of Subscriber Certificates that may be issued, which vary based on the amount of Subject Information that is included. Each of these certificate types shares a common

⁹While [RFC 5280, Section 4.2.1.12](#) notes that this extension will generally only appear within end-entity certificates, these Requirements make use of this extension to further protect relying parties by limiting the scope of CA Certificates, as implemented by a number of Application Software Suppliers.

¹⁰See [Section 7.1.2.8.7](#) for further requirements, including regarding criticality of this extension.

profile, with three exceptions: the subject name fields that may occur, how those fields are validated, and the contents of the `certificatePolicies` extension.

Type	Description
Domain Validated (DV)	See Section 7.1.2.6.2
Individual Validated (IV)	See Section 7.1.2.6.3
Organization Validated (OV)	See Section 7.1.2.6.4
Extended Validation (EV)	See Section 7.1.2.6.5

Note: Although each Subscriber Certificate type varies in Subject Information, all Certificates provide the same level of assurance of the device identity (domain name and/or IP address).

7.1.2.6.2 Domain Validated

For a Subscriber Certificate to be Domain Validated, it MUST meet the following profile:

Field	Requirements
subject	See following table.
certificatePolicies	MUST be present and MUST assert the Reserved Certificate Policy Identifier of 2.23.140.1.2.1 as a <code>policyIdentifier</code> .
All other extensions	See Section 7.1.2.6.6

All subject names MUST be encoded as specified in [Section 7.1.4](#).

The following table details the acceptable `AttributeTypes` that may appear within the `type` field of an `AttributeTypeAndValue`, as well as the contents permitted within the `value` field.

Table 23: Domain Validated subject Attributes

Attribute Name	Presence	Value	Verification
countryName	MAY	The two-letter ISO 3166-1 country code for the country associated with the Subject.	Section 3.2.2.3
commonName	SHOULD NOT	If present, MUST contain a single IP address or Fully-Qualified Domain Name that is one of the values contained in the Certificate's <code>subjectAltName</code> extension.	
Any other attribute	MUST NOT	TBD	

7.1.2.6.3 Individual Validated

For a Subscriber Certificate to be Individual Validated, it MUST meet the following profile:

Field	Requirements
subject	See following table.
certificatePolicies	MUST be present and MUST assert the Reserved Certificate Policy Identifier of 2.23.140.1.2.3 as a <code>policyIdentifier</code> .
All other extensions	See Section 7.1.2.6.6

All subject names MUST be encoded as specified in [Section 7.1.4](#).

The following table details the acceptable `AttributeTypes` that may appear within the `type` field of an `AttributeTypeAndValue`, as well as the contents permitted within the `value` field.

Table 25: Individual Validated subject Attributes

Attribute Name	Presence	Value	Verification
countryName	MUST	The two-letter ISO 3166-1 country code for the country associated with the Subject. If a Country is not represented by an official ISO 3166-1 country code, the CA MUST specify the ISO 3166-1 user-assigned code of XX, indicating that an official ISO 3166-1 alpha-2 code has not been assigned.	Section 3.2.3
stateOrProvinceName	MUST / MAY	MUST be present if <code>localityName</code> is absent, MAY be present otherwise. If present, MUST contain the Subject's state or province information.	Section 3.2.3
localityName	MUST / MAY	MUST be present if <code>stateOrProvinceName</code> is absent, MAY be present otherwise. If present, MUST contain the Subject's locality information.	Section 3.2.3
streetAddress	SHOULD NOT	If present, MUST contain the Subject's street address information.	Section 3.2.3
postalCode	SHOULD NOT	If present, MUST contain the Subject's zip or postal information.	Section 3.2.3
organizationName	SHOULD NOT	If present, MUST contain the Subject's name or DBA.	Section 3.2.3
surname	MUST	The Subject's surname.	Section 3.2.3
givenName	MUST	The Subject's given name.	Section 3.2.3
organizationalUnitName	SHOULD NOT	TBD	TBD
commonName	SHOULD NOT	If present, MUST contain a single IP address or Fully-Qualified Domain Name that is one of the values contained in the Certificate's <code>subjectAltName</code> extension.	
Any other attribute	SHOULD NOT	TBD	TBD

7.1.2.6.4 Organization Validated

For a Subscriber Certificate to be Organization Validated, it MUST meet the following profile:

Field	Requirements
subject	See following table.
certificatePolicies	MUST be present and MUST assert the Reserved Certificate Policy Identifier of 2.23.140.1.2.2 as a <code>policyIdentifier</code> .
All other extensions	See Section 7.1.2.6.6

All subject names MUST be encoded as specified in [Section 7.1.4](#).

The following table details the acceptable `AttributeTypes` that may appear within the `type` field of an `AttributeTypeAndValue`, as well as the contents permitted within the `value` field.

Table 27: Individual Validated subject Attributes

Attribute Name	Presence	Value	Verification
countryName	MUST	The two-letter ISO 3166-1 country code for the country associated with the Subject. If a Country is not represented by an official ISO 3166-1 country code, the CA MUST specify the ISO 3166-1 user-assigned code of XX, indicating that an official ISO 3166-1 alpha-2 code has not been assigned.	Section 3.2.2.1
stateOrProvinceName	MUST / MAY	MUST be present if localityName is absent, MAY be present otherwise. If present, MUST contain the Subject's state or province information.	Section 3.2.2.1
localityName	MUST / MAY	MUST be present if stateOrProvinceName is absent, MAY be present otherwise. If present, MUST contain the Subject's locality information.	Section 3.2.2.1
streetAddress	SHOULD NOT	If present, MUST contain the Subject's street address information.	Section 3.2.2.1
postalCode	SHOULD NOT	If present, MUST contain the Subject's zip or postal information.	Section 3.2.2.1
organizationName	MUST	The Subject's name or DBA. The CA MAY include information in this field that differs slightly from the verified name, such as common variations or abbreviations, provided that the CA documents the difference and any abbreviations used are locally accepted abbreviations; e.g. if the official record shows "Company Name Incorporated", the CA MAY use "Company Name Inc." or "Company Name".	Section 3.2.2.2
surname	MUST NOT		
givenName	MUST NOT		
organizationalUnitName	SHOULD NOT	TBD	TBD
commonName	SHOULD NOT	If present, MUST contain a single IP address or Fully-Qualified Domain Name that is one of the values contained in the Certificate's subjectAltName extension.	
Any other attribute	SHOULD NOT	TBD	TBD

7.1.2.6.5 Extended Validation

For a Subscriber Certificate to be Extended Validation, it MUST comply with the Certificate Profile specified in the then-current version of the Guidelines for the Issuance and Management of Extended Validation Certificates. In addition, it MUST meet the following profile:

Field	Requirements
subject	See Guidelines for the Issuance and Management of Extended Validation Certificates, Section 9.2.
certificatePolicies	MUST be present and MUST assert the Reserved Certificate Policy Identifier of 2.23.140.1.1 as a policyIdentifier.
All other extensions	See Section 7.1.2.6.6 and the Guidelines for the Issuance and Management of Extended Validation Certificates.

7.1.2.6.6 Subscriber Certificate Extensions

Extension	Presence	Critical	Description
authorityInformationAccess	MUST	N	See Section 7.1.2.6.7
authorityKeyIdentifier	MUST	N	See Section 7.1.2.9.2
basicConstraints	MUST	Y	See Section 7.1.2.6.8
certificatePolicies	MUST	N	See Section 7.1.2.6.9
extKeyUsage	MUST	-	See Section 7.1.2.6.10
subjectAltName	MUST	-	See Section 7.1.2.6.12
nameConstraints	MUST NOT	-	-
crlDistributionPoints	MAY	N	See Section 7.1.2.9.3
keyUsage	MAY	Y	See Section 7.1.2.6.11
CA/Browser Forum Onion Extension	MAY	N	TODO
Signed Certificate Timestamp List	MAY	N	See Section 7.1.2.9.4
subjectKeyIdentifier	SHOULD NOT	N	See Section 7.1.2.9.5
Any other extension	SHOULD NOT	-	TBD

7.1.2.6.7 Authority Information Access

The AuthorityInformationAccessSyntax MUST contain one or more AccessDescriptions. Each AccessDescription MUST only contain a permitted accessMethod, as detailed below, and each AuthorityInformationAccessSyntax MUST contain all required AccessDescriptions.

Access Method	OID	Presence	Access Location	Description
id-ad-ocsp	1.3.6.1.5.5.7.48.1	MUST	uniformResourceIdentifier	An HTTP URL of the Issuing CA's OCSP responder.
id-ad-caIssuers	1.3.6.1.5.5.7.48.2	SHOULD	uniformResourceIdentifier	An HTTP URL of the Issuing CA's certificate.
Any other value	-	MUST NOT	-	-

7.1.2.6.8 Basic Constraints

Field	Description
ca	MUST be FALSE
pathLenConstraint	MUST NOT be present

Note: CAs MUST observe DER encoding rules, such as not explicitly encoding DEFAULT values within OPTIONAL fields.

7.1.2.6.9 Certificate Policies

Field	Presence	Description
certificatePolicies		

Field	Presence	Description
1	MUST	The first PolicyInformation present in the certificatePolicies.
policyIdentifier		The Reserved Certificate Policy Identifier (see Section 7.1.6.1) associated with the given Subscriber Certificate type (see Section 7.1.2.6.1).
policyQualifiers	SHOULD NOT	See below for restrictions on policyQualifiers
2	MAY	The Issuing CA MAY include additional PolicyInformation values that meet the following profile:
policyIdentifier	MUST	An identifier documented by the Issuing CA in its Certificate Policy and/or Certification Practice Statement.
policyQualifiers	SHOULD NOT	See below for restrictions on policyQualifiers
3	MUST NOT	The Issuing CA MUST NOT include any additional PolicyInformation values that do not meet the above profile.

If the policyQualifiers is permitted and present within a PolicyInformation field, it MUST be formatted as follows:

Qualifier ID	Presence	Field Type	Contents
id-qt-cps (OID: 1.3.6.1.5.5.7.2.1)	MAY	IA5String	The HTTP URL for the Issuing CA's Certificate Policies, Certification Practice Statement, Relying Party Agreement, or other pointer to online policy information provided by the Issuing CA.
Any other qualifier	MUST NOT	-	-

7.1.2.6.10 Extended Key Usage

Key Purpose	OID	Presence
id-kp-serverAuth	1.3.6.1.5.5.7.3.1	MUST
id-kp-clientAuth	1.3.6.1.5.5.7.3.2	MAY
id-kp-codeSigning	1.3.6.1.5.5.7.3.3	MUST NOT
id-kp-emailProtection	1.3.6.1.5.5.7.3.4	MUST NOT
id-kp-timeStamping	1.3.6.1.5.5.7.3.8	MUST NOT
id-kp-OCSPSigning	1.3.6.1.5.5.7.3.9	MUST NOT
anyExtendedKeyUsage	2.5.29.37.0	MUST NOT
Any other value	-	SHOULD NOT

7.1.2.6.11 Key Usage

The acceptable Key Usage values vary based on whether the Certificate's subjectPublicKeyInfo identifies an RSA public key or an ECC public key. CAs MUST ensure the Key Usage is appropriate for the Certificate Public Key.

Table 35: Key Usage for RSA Public Keys

Key Usage	Permitted	Required
digitalSignature	Y	SHOULD
nonRepudiation	N	-
keyEncipherment	N	-
dataEncipherment	N	-
keyAgreement	Y	MAY
keyCertSign	N	-
cRLSign	N	-
encipherOnly	N	-
decipherOnly	N	-

Note: At least one Key Usage MUST be set for RSA Public Keys. The digitalSignature bit is REQUIRED for use with modern protocols, such as TLS 1.3, and secure ciphersuites, while the keyAgreement bit MAY be asserted to support older protocols, such as TLS 1.2, when using insecure ciphersuites. Subscribers MAY wish to ensure key separation to limit the risk from such legacy protocols, and thus a CA MAY issue a Subscriber certificate that only asserts the keyAgreement bit. For most Subscribers, the digitalSignature bit is sufficient, while Subscribers that want to mix insecure and secure ciphersuites with the same algorithm MAY choose to assert both digitalSignature and keyAgreement within the same certificate, although this SHOULD NOT be done by default.

Table 36: Key Usage for ECC Public Keys

Key Usage	Permitted	Required
digitalSignature	Y	MUST
nonRepudiation	N	-
keyEncipherment	N	-
dataEncipherment	N	-
keyAgreement	N	-
keyCertSign	N	-
cRLSign	N	-
encipherOnly	N	-
decipherOnly	N	-

7.1.2.6.12 Subject Alternative Name

For Subscriber Certificates, the Subject Alternative Name MUST be present and MUST contain at least one dNSName or iPAddress GeneralName. See below for further requirements about the permitted fields and their validation requirements.

Table 37: GeneralName within a subjectAltName extension

Name Type	Permitted	Validation
otherName	N	-
rfc822Name	N	-

Name Type	Permitted	Validation
dNSName	Y	MUST contain the Fully-Qualified Domain Name. The Issuing CA MUST confirm that the Applicant controls or has been granted the right to use the Domain Name through a method specified in Section 3.2.2.4 . As an exception to the requirement of RFC 5280 requirements, Wildcard FQDNs are permitted. All other domain labels MUST be in the “preferred name syntax” and thus MUST NOT contain underscore characters (“_”). MUST NOT contain an Internal Name.
x400Address	N	-
directoryName	N	-
ediPartyName	N	-
uniformResourceIdentifier	N	-
iPAddress	Y	MUST contain the IPv4 or IPv6 address that the CA has confirmed the Applicant controls or has been granted the right to use through a method specified in Section 3.2.2.5 . MUST NOT contain a Reserved IP Address.
registeredID	N	-

Note: If the subject field of the certificate is an empty SEQUENCE, this extension MUST be marked critical, as specified in [RFC 5280, Section 4.2.1.6](#).

7.1.2.7 OCSP Responder Certificate Profile

If the Issuing CA does not directly sign OCSP responses, it MAY make use of an OCSP Authorized Responder. The Issuing CA of the Responder MUST be the same as the Issuing CA for the Certificates it provides responses for.

Field	Description
tbsCertificate	
version	MUST be v3(2)
serialNumber	MUST be a non-sequential number greater than zero (0) containing at least 64 bits of output from a CSPRNG.
signature	See Section 7.1.3.2
issuer	MUST be byte-for-byte identical to the subject field of the Issuing CA. See Section 7.1.4.1
validity	TBD
subject	See Section 7.1.2.8.1
subjectPublicKeyInfo	See Section 7.1.3.1
issuerUniqueID	MUST NOT be present
subjectUniqueID	MUST NOT be present
extensions	See Section 7.1.2.5.1
signatureAlgorithm	Encoded value MUST be byte-for-byte identical to the tbsCertificate.signature.
signature	

7.1.2.7.1 OCSP Responder Extensions

Extension	Presence	Critical	Description
authorityKeyIdentifier	MUST	N	See Section 7.1.2.9.2
basicConstraints	MUST	Y	See Section 7.1.2.7.3
extKeyUsage	MUST	-	See Section 7.1.2.7.4
id-pkix-ocsp-nocheck	MUST	N	See Section 7.1.2.7.5
keyUsage	MUST	Y	See Section 7.1.2.7.6
certificatePolicies	MUST NOT	N	-
nameConstraints	MUST NOT	-	-
subjectAltName	MUST NOT	-	-
subjectKeyIdentifier	SHOULD	N	See Section 7.1.2.9.5
authorityInformationAccess	SHOULD NOT	N	See Section 7.1.2.7.2
crlDistributionPoints	SHOULD NOT	N	See Section 7.1.2.9.3
Signed Certificate Timestamp List	MAY	N	See Section 7.1.2.9.4
Any other extension	SHOULD NOT	-	TBD

7.1.2.7.2 Authority Information Access

For OCSP Responder certificates, this extension SHOULD NOT be present, as the Relying Party should already possess the necessary information. In order to validate the given Responder certificate, the Relying Party must have access to the Issuing CA's certificate, eliminating the need to provide id-ad-caIssuers. Similarly, because of the requirement for an OCSP Responder certificate to include the id-pkix-ocsp-nocheck extension, it is not necessary to provide id-ad-ocsp, as such responses will not be checked by Relying Parties.

If present, the AuthorityInformationAccessSyntax MUST contain one or more AccessDescriptions. Each AccessDescription MUST only contain a permitted accessMethod, as detailed below, and each AuthorityInformationAccessSyntax MUST contain all required AccessDescriptions.

Access Method	OID	Presence	Access Location	Description
id-ad-caIssuers	1.3.6.1.5.5.7.48.2	SHOULD NOT	uniformResourceIdentifier	An HTTP URL of the Issuing CA's certificate.
id-ad-ocsp	1.3.6.1.5.5.7.48.1	MUST NOT	uniformResourceIdentifier	An HTTP URL of the Issuing CA's OCSP responder.
Any other value	-	MUST NOT	-	-

7.1.2.7.3 Basic Constraints

Field	Description
cA	MUST be FALSE
pathLenConstraint	MUST NOT be present

Note: CAs MUST observe DER encoding rules, such as not explicitly encoding DEFAULT values within OPTIONAL fields.

7.1.2.7.4 Extended Key Usage

Key Purpose	OID	Presence
id-kp-OCSPSigning	1.3.6.1.5.5.7.3.9	MUST
id-kp-serverAuth	1.3.6.1.5.5.7.3.1	MUST NOT
id-kp-clientAuth	1.3.6.1.5.5.7.3.2	MUST NOT
id-kp-codeSigning	1.3.6.1.5.5.7.3.3	MUST NOT
id-kp-emailProtection	1.3.6.1.5.5.7.3.4	MUST NOT
id-kp-timeStamping	1.3.6.1.5.5.7.3.8	MUST NOT
anyExtendedKeyUsage	2.5.29.37.0	MUST NOT
Any other value	-	MUST NOT

7.1.2.7.5 id-pkix-ocsp-nocheck

The CA MUST include the `id-pkix-ocsp-nocheck` extension (OID: 1.3.6.1.5.5.7.48.1.5).

This extension MUST be encoded as a single ASN.1 NULL, as specified in [RFC 6960, Section 4.2.2.2.1](#).

7.1.2.7.6 Key Usage

Key Usage	Permitted	Required
digitalSignature	Y	Y
nonRepudiation	N	-
keyEncipherment	N	-
dataEncipherment	N	-
keyAgreement	N	-
keyCertSign	N	-
cRLSign	N	-
encipherOnly	N	-
decipherOnly	N	-

7.1.2.8 Common CA Fields

This section contains several fields that are common among multiple CA Certificate profiles. However, these fields may not be common among all CA Certificate profiles. Before issuing a certificate, the CA MUST ensure the certificate contents, including the contents of each field, complies in whole with all of the requirements of at least one Certificate Profile documented in [Section 7.1.2](#).

7.1.2.8.1 CA Certificate Naming

All subject names MUST be encoded as specified in [Section 7.1.4](#).

The following table details the acceptable `AttributeTypes` that may appear within the type field of an `AttributeTypeAndValue`, as well as the contents permitted within the `value` field.

Attribute Name	Presence	Value	Verification
countryName	MUST	The two-letter ISO 3166-1 country code for the country in which the CA's place of business is located.	Section 3.2.2.3

Attribute Name	Presence	Value	Verification
stateOrProvinceName	MAY	If present, the CA's state or province information.	Section 3.2.2.1
localityName	MAY	If present, the CA's locality.	Section 3.2.2.1
streetAddress	MAY	If present, the CA's street address. Multiple instances MAY be present.	Section 3.2.2.1
postalCode	MAY	If present, the CA's zip or postal information.	Section 3.2.2.1
organizationName	MUST	The CA's name or DBA. The CA MAY include information in this field that differs slightly from the verified name, such as common variations or abbreviations, provided that the CA documents the difference and any abbreviations used are locally accepted abbreviations; e.g. if the official record shows "Company Name Incorporated", the CA MAY use "Company Name Inc." or "Company Name".	Section 3.2.2.2
organizationalUnitName	SHOULD NOT	TBD	
commonName	MUST	The contents SHOULD be an identifier for the certificate such that the certificate's Name is unique across all certificates issued by the issuing certificate.	
Any other attribute	SHOULD NOT	TBD	

7.1.2.8.2 Authority Information Access

If present, the AuthorityInformationAccessSyntax MUST contain one or more AccessDescriptions. Each AccessDescription MUST only contain a permitted accessMethod, as detailed below, and each AuthorityInformationAccessSyntax MUST contain all required AccessDescriptions.

Access Method	OID	Presence	Access Location	Description
id-ad-caIssuers	1.3.6.1.5.5.7.48.2	SHOULD	uniformResourceIdentifier	An HTTP URL of the Issuing CA's certificate.
id-ad-ocsp	1.3.6.1.5.5.7.48.1	MAY	uniformResourceIdentifier	An HTTP URL of the Issuing CA's OCSP responder.
Any other value	-	MUST NOT	-	-

7.1.2.8.3 Basic Constraints

Field	Description
ca	MUST be set TRUE
pathLenConstraint	MAY be present

7.1.2.8.4 Certificate Policies - Affiliated CA

The following requirements apply to the Certificate Policies extension within CA certificates that are issued to and operated by an organization that is the same as the organization operating the Issuing CA or that is an Affiliate of the organization operating the Issuing CA.

If present, the Certificate Policies extension MUST be one of the following two formats:

Table 47: No Policy Restrictions

Field	Presence	Description
certificatePolicies		
1		The first PolicyInformation present in the certificatePolicies.
policyIdentifier	MUST	The anyPolicy (OID: 2.5.29.32.0) identifier.
policyQualifiers	MUST NOT	
2	MUST NOT	When the anyPolicy policy is present, the CA MUST NOT include any further PolicyInformation values.

Table 48: Policy Restricted

Field	Presence	Description
certificatePolicies		
1	MUST	The first PolicyInformation present in the certificatePolicies.
policyIdentifier		A Reserved Certificate Policy Identifier (see Section 7.1.6.1).
policyQualifiers	MUST NOT	
2	SHOULD	The CA SHOULD include additional Reserved Certificate Policy Identifiers for each type of Subscriber certificate that may be issued beneath it.
policyIdentifier	MUST	A Reserved Certificate Policy Identifier (see Section 7.1.6.1).
policyQualifiers	MUST NOT	
3	MAY	The CA MAY include additional PolicyInformation values that meet the following profile:
policyIdentifier	MUST	An identifier documented by the CA in its Certificate Policy and/or Certification Practice Statement.
policyQualifiers	MUST NOT	
4	MUST NOT	The CA MUST NOT include any additional PolicyInformation values that do not meet the above profile.

7.1.2.8.5 Certificate Policies - Non-Affiliated CA

The following requirements apply to the Certificate Policies extension within CA certificates that are issued to and operated by a CA that is not an Affiliate of the Issuing CA.

If present, the Certificate Policies extension MUST be formatted as follows:

Field	Presence	Description
certificatePolicies		
1	MUST	The first PolicyInformation present in the certificatePolicies.
policyIdentifier		A Reserved Certificate Policy Identifier (see Section 7.1.6.1).
policyQualifiers	SHOULD NOT	See below for restrictions on policyQualifiers

Field	Presence	Description
2	SHOULD	The CA SHOULD include additional Reserved Certificate Policy Identifiers for each type of Subscriber certificate that may be issued beneath it.
policyIdentifier	MUST	A Reserved Certificate Policy Identifier (see Section 7.1.6.1).
policyQualifiers	SHOULD NOT	See below for restrictions on policyQualifiers
3	MAY	The CA MAY include additional PolicyInformation values that meet the following profile:
policyIdentifier	MUST	An identifier documented by the CA in its Certificate Policy and/or Certification Practice Statement.
policyQualifiers	SHOULD NOT	See below for restrictions on policyQualifiers
4	MUST NOT	The CA MUST NOT include any additional PolicyInformation values that do not meet the above profile.

If the policyQualifiers is permitted and present within a PolicyInformation field, it MUST be formatted as follows:

Qualifier ID	Presence	Field Type	Contents
id-qt-cps (OID: 1.3.6.1.5.5.7.2.1)	MAY	IA5String	The HTTP URL for the Issuing CA's Certificate Policies, Certification Practice Statement, Relying Party Agreement, or other pointer to online policy information provided by the Issuing CA.
Any other qualifier	MUST NOT	-	-

7.1.2.8.6 Extended Key Usage - Non-TLS CA

The Issuing CA MUST verify that the Subordinate CA Certificate is authorized to issue certificates for each included extended key usage purpose. Multiple, independent key purposes (e.g. id-kp-timeStamping and id-kp-codeSigning) SHOULD NOT be present.

Key Purpose	OID	Presence
id-kp-serverAuth	1.3.6.1.5.5.7.3.1	MUST NOT
id-kp-clientAuth	1.3.6.1.5.5.7.3.2	MAY
id-kp-codeSigning	1.3.6.1.5.5.7.3.3	MAY
id-kp-emailProtection	1.3.6.1.5.5.7.3.4	MAY
id-kp-timeStamping	1.3.6.1.5.5.7.3.8	MAY
id-kp-OCSPSigning	1.3.6.1.5.5.7.3.9	MAY
anyExtendedKeyUsage	2.5.29.37.0	MUST NOT
Any other value	-	SHOULD NOT

7.1.2.8.6 Extended Key Usage - TLS CA

Key Purpose	OID	Presence
id-kp-serverAuth	1.3.6.1.5.5.7.3.1	MUST

Key Purpose	OID	Presence
id-kp-clientAuth	1.3.6.1.5.5.7.3.2	MAY
id-kp-codeSigning	1.3.6.1.5.5.7.3.3	MUST NOT
id-kp-emailProtection	1.3.6.1.5.5.7.3.4	MUST NOT
id-kp-timeStamping	1.3.6.1.5.5.7.3.8	MUST NOT
id-kp-OCSPSigning	1.3.6.1.5.5.7.3.9	MUST NOT
anyExtendedKeyUsage	2.5.29.37.0	MUST NOT
Any other value	-	SHOULD NOT

7.1.2.8.6 Key Usage

Key Usage	Permitted	Required
digitalSignature	Y	N ¹¹
nonRepudiation	N	-
keyEncipherment	N	-
dataEncipherment	N	-
keyAgreement	N	-
keyCertSign	Y	Y
cRLSign	Y	Y
encipherOnly	N	-
decipherOnly	N	-

7.1.2.8.7 Name Constraints

If present, the Name Constraints extension **MUST** be encoded as follows. As an explicit exception from RFC 5280, this extension **SHOULD** be marked critical, but **MAY** be marked non-critical if compatibility with certain legacy applications that do not support Name Constraints is necessary.

Table 54: nameConstraints requirements

Field	Description
permittedSubtrees	
GeneralSubtree	The requirements for a GeneralSubtree that appears within a permittedSubtrees.
base	See following table.
minimum	MUST NOT be present.
maximum	MUST NOT be present.
excludedSubtrees	
GeneralSubtree	The requirements for a GeneralSubtree that appears within a permittedSubtrees.
base	See following table.
minimum	MUST NOT be present.
maximum	MUST NOT be present.

¹¹If a CA Certificate does not assert the digitalSignature bit, the CA Private Key **MUST NOT** be used to sign an OCSP Response. See [Section 7.3](#) for more information.

The following table contains the requirements for the GeneralName that appears within the base of a GeneralSubtree in either the permittedSubtrees or excludedSubtrees.

Table 55: GeneralName requirements for the base field

Name Type	Presence	Permitted Subtrees	Excluded Subtrees
dnsName	MUST	The CA MUST confirm that the Applicant has registered the dnsName or has been authorized by the domain registrant to act on the registrant's behalf. See Section 3.2.2.4 .	If at least one dnsName instance is present in the permittedSubtrees, the CA MAY indicate one or more subordinate domains to be excluded.
iPAddress	MUST	The CA MUST confirm that the Applicant has been assigned the iPAddress range or has been authorized by the assigner to act on the assignee's behalf. See Section 3.2.2.5 .	If at least one iPAddress instance is present in the permittedSubtrees, the CA MAY indicate one or more subdivisions of those ranges to be excluded.
directoryName	MUST	The CA MUST confirm the Applicant's and/or Subsidiary's name attributes such that all certificates issued will comply with the relevant Certificate Profile (see Section 7.1.2), including Name Forms (See Section 7.1.4).	The CA SHOULD NOT include values within excludedSubtrees.
Any other value	SHOULD NOT	-	-

7.1.2.9 Common Certificate Fields

This section contains several fields that are common among multiple certificate profiles. However, these fields may not be common among all certificate profiles. Before issuing a certificate, the CA MUST ensure the certificate contents, including the contents of each field, complies in whole with all of the requirements of at least one Certificate Profile documented in [Section 7.1.2](#).

7.1.2.9.2 Authority Key Identifier

Field	Description
keyIdentifier	MUST be present. MUST be identical to the subjectKeyIdentifier field of the Issuing CA.
authorityCertIssuer	MUST NOT be present
authorityCertSerialNumber	MUST NOT be present

7.1.2.9.3 CRL Distribution Points

If present, the CRL Distribution Points extension MUST be formatted as follows:

Table 57: CRLDistributionPoints profile

Field	Presence	Description
CRLDistributionPoints		
1	MUST	The first DistributionPoint present in the CRLDistributionPoints
distributionPoint	MUST	The DistributionPointName MUST be a fullName formatted as described below.

Field	Presence	Description
reasons	MUST NOT	
cRLIssuer	MUST NOT	
2	MAY	Additional DistributionPoints that meet the following profile MAY be present.
distributionPoint	MUST	The DistributionPointName MUST be a fullName formatted as described below.
reasons	MUST NOT	
cRLIssuer	MUST NOT	
3	MUST NOT	DistributionPoints that do not conform to the above requirements MUST NOT be present.

Table 58: fullName profile

Field	Presence	Description
fullName		
1	MUST	The first GeneralName present in fullName MUST be of type uniformResourceIdentifier
uniformResourceIdentifier	MUST	The HTTP URL of the Issuing CA's CRL service for this certificate.
2	SHOULD NOT	Additional GeneralNames SHOULD NOT be present. TBD: MUST NOT

7.1.2.9.4 Signed Certificate Timestamp List

If present, the Signed Certificate Timestamp List extension contents MUST be an OCTET STRING containing the encoded SignedCertificateTimestampList, as specified in [RFC 6962, Section 3.3](#).

Each SignedCertificateTimestamp included within the SignedCertificateTimestampList MUST be for a PreCert LogEntryType that corresponds to the current certificate.

7.1.2.9.5 Subject Key Identifier

If present, the subjectKeyIdentifier MUST be set as defined within [RFC 5280, Section 4.2.1.2](#). CAs MUST generate a unique subjectKeyIdentifier for each unique public key (the subjectPublicKeyInfo field of the tbsCertificate). For example, CAs MAY generate the subject key identifier using an algorithm derived from the public key, or MAY generate a unique number, such by using a CSPRNG.

7.1.2.4 All Certificates

All other fields and extensions MUST be set in accordance with RFC 5280. The CA SHALL NOT issue a Certificate that contains a keyUsage flag, extKeyUsage value, Certificate extension, or other data not specified in [Section 7.1.2](#) unless the CA is aware of a reason for including the data in the Certificate.

CAs SHALL NOT issue a Certificate with:

- a. Extensions that do not apply in the context of the public Internet (such as an extKeyUsage value for a service that is only valid in the context of a privately managed network), unless:

- i. such value falls within an OID arc for which the Applicant demonstrates ownership, or
 - ii. the Applicant can otherwise demonstrate the right to assert the data in a public context;
or
- b. semantics that, if included, will mislead a Relying Party about the certificate information verified by the CA (such as including an `extKeyUsage` value for a smart card, where the CA is not able to verify that the corresponding Private Key is confined to such hardware due to remote issuance).

7.1.2.5 Application of RFC 5280

Except where explicitly noted, all certificates MUST conform to the certificate profile of RFC 5280. The following requirements are noted in addition to any normative requirements placed within RFC 5280.

For purposes of clarification, a Precertificate, as described in [RFC 6962 - Certificate Transparency](#), shall not be considered to be a “certificate” subject to the requirements of [RFC 5280 - Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List \(CRL\) Profile](#) under these Baseline Requirements.

7.1.3 Algorithm object identifiers

7.1.3.1 SubjectPublicKeyInfo

The following requirements apply to the `subjectPublicKeyInfo` field within a Certificate or Precertificate. No other encodings are permitted.

7.1.3.1.1 RSA

The CA SHALL indicate an RSA key using the `rsaEncryption` (OID: 1.2.840.113549.1.1.1) algorithm identifier. The parameters MUST be present, and MUST be an explicit NULL. The CA SHALL NOT use a different algorithm, such as the `id-RSASSA-PSS` (OID: 1.2.840.113549.1.1.10) algorithm identifier, to indicate an RSA key.

When encoded, the `AlgorithmIdentifier` for RSA keys MUST be byte-for-byte identical with the following hex-encoded bytes: 300d06092a864886f70d0101010500

7.1.3.1.2 ECDSA

The CA SHALL indicate an ECDSA key using the `id-ecPublicKey` (OID: 1.2.840.10045.2.1) algorithm identifier. The parameters MUST use the `namedCurve` encoding.

- For P-256 keys, the `namedCurve` MUST be `secp256r1` (OID: 1.2.840.10045.3.1.7).
- For P-384 keys, the `namedCurve` MUST be `secp384r1` (OID: 1.3.132.0.34).
- For P-521 keys, the `namedCurve` MUST be `secp521r1` (OID: 1.3.132.0.35).

When encoded, the `AlgorithmIdentifier` for ECDSA keys MUST be byte-for-byte identical with the following hex-encoded bytes:

- For P-256 keys, 301306072a8648ce3d020106082a8648ce3d030107.
- For P-384 keys, 301006072a8648ce3d020106052b81040022.
- For P-521 keys, 301006072a8648ce3d020106052b81040023.

7.1.3.2 Signature AlgorithmIdentifier

All objects signed by a CA Private Key MUST conform to these requirements on the use of the `AlgorithmIdentifier` or `AlgorithmIdentifier-derived` type in the context of signatures.

In particular, it applies to all of the following objects and fields:

- The `signatureAlgorithm` field of a Certificate or Precertificate.

- The signature field of a TBSCertificate (for example, as used by either a Certificate or Precertificate).
- The signatureAlgorithm field of a CertificateList
- The signature field of a TBSCertList
- The signatureAlgorithm field of a BasicOCSPResponse.

No other encodings are permitted for these fields.

7.1.3.2.1 RSA

The CA SHALL use one of the following signature algorithms and encodings. When encoded, the AlgorithmIdentifier MUST be byte-for-byte identical with the specified hex-encoded bytes.

- RSASSA-PKCS1-v1_5 with SHA-256:
Encoding: 300d06092a864886f70d01010b0500.
- RSASSA-PKCS1-v1_5 with SHA-384:
Encoding: 300d06092a864886f70d01010c0500.
- RSASSA-PKCS1-v1_5 with SHA-512:
Encoding: 300d06092a864886f70d01010d0500.
- RSASSA-PSS with SHA-256, MGF-1 with SHA-256, and a salt length of 32 bytes:
Encoding:
304106092a864886f70d01010a3034a00f300d0609608648016503040201
0500a11c301a06092a864886f70d010108300d0609608648016503040201
0500a203020120
- RSASSA-PSS with SHA-384, MGF-1 with SHA-384, and a salt length of 48 bytes:
Encoding:
304106092a864886f70d01010a3034a00f300d0609608648016503040202
0500a11c301a06092a864886f70d010108300d0609608648016503040202
0500a203020130
- RSASSA-PSS with SHA-512, MGF-1 with SHA-512, and a salt length of 64 bytes:
Encoding:
304106092a864886f70d01010a3034a00f300d0609608648016503040203
0500a11c301a06092a864886f70d010108300d0609608648016503040203
0500a203020140

In addition, the CA MAY use the following signature algorithm and encoding if all of the following conditions are met:

- If used within a Certificate, such as the signatureAlgorithm field of a Certificate or the signature field of a TBSCertificate:
 - The new Certificate is a Root CA Certificate or Subordinate CA Certificate that is a Cross-Certificate; and,
 - There is an existing Certificate, issued by the same issuing CA Certificate, using the following encoding for the signature algorithm; and,
 - The existing Certificate has a serialNumber that is at least 64-bits long; and,
 - The only differences between the new Certificate and existing Certificate are one of the following:

- A new `subjectPublicKey` within the `subjectPublicKeyInfo`, using the same algorithm and key size; and/or,
 - A new `serialNumber`, of the same encoded length as the existing Certificate; and/or
 - The new Certificate's `extKeyUsage` extension is present, has at least one key purpose specified, and none of the key purposes specified are the `id-kp-serverAuth` (OID: 1.3.6.1.5.5.7.3.1) or the `anyExtendedKeyUsage` (OID: 2.5.2937.0) key purposes; and/or
 - The new Certificate's `basicConstraints` extension has a `pathLenConstraint` that is zero.
- If used within an OCSP response, such as the `signatureAlgorithm` of a `BasicOCSPResponse`:
 - All unexpired, un-revoked Certificates that contain the Public Key of the CA Key Pair and that have the same Subject Name MUST also contain an `extKeyUsage` extension with the only key usage present being the `id-kp-ocspSigning` (OID: 1.3.6.1.5.5.7.3.9) key usage.
 - If used within a CRL, such as the `signatureAlgorithm` field of a `CertificateList` or the `signature` field of a `TBSCertList`:
 - The CRL is referenced by one or more Root CA or Subordinate CA Certificates; and,
 - The Root CA or Subordinate CA Certificate has issued one or more Certificates using the following encoding for the signature algorithm.

Note: The above requirements do not permit a CA to sign a Precertificate with this encoding.

- RSASSA-PKCS1-v1_5 with SHA-1:

Encoding: 300d06092a864886f70d0101050500

7.1.3.2.2 ECDSA

The CA SHALL use the appropriate signature algorithm and encoding based upon the signing key used.

If the signing key is P-256, the signature MUST use ECDSA with SHA-256. When encoded, the `AlgorithmIdentifier` MUST be byte-for-byte identical with the following hex-encoded bytes: 300a06082a8648ce3d040302.

If the signing key is P-384, the signature MUST use ECDSA with SHA-384. When encoded, the `AlgorithmIdentifier` MUST be byte-for-byte identical with the following hex-encoded bytes: 300a06082a8648ce3d040303.

If the signing key is P-521, the signature MUST use ECDSA with SHA-512. When encoded, the `AlgorithmIdentifier` MUST be byte-for-byte identical with the following hex-encoded bytes: 300a06082a8648ce3d040304.

7.1.4 Name Forms

This section details encoding rules that apply to all Certificates issued by a CA. Further restrictions may be specified within [Section 7.1.2](#), but these restrictions do not supersede these requirements.

In addition, the following requirements apply to all Subject Attributes (i.e. those attributes within the `subject` field of a `tbsCertificate`): * Subject Attributes MUST NOT contain only metadata such as `'`, `'`, and `'` (i.e. space) characters, and/or any other indication that the value is absent, incomplete, or not applicable. * Subject Attributes MUST NOT include a Domain Name or IP Address, except as specified in [Section 3.2.2.4](#) or [Section 3.2.2.5](#)

7.1.4.1 Name Encoding

When encoding a Name, the CA SHALL ensure that: * Each Name MUST contain an `RDNSSequence`.

* Each RelativeDistinguishedName MUST contain exactly one AttributeTypeAndValue. * Each RelativeDistinguishedName, if present, is encoded within the RDNSequence in the order that it appears in [Section 7.1.4.2](#). * For example, a RelativeDistinguishedName that contains a countryName AttributeTypeAndValue pair MUST be encoded within the RDNSequence before a RelativeDistinguishedName that contains a stateOrProvinceName AttributeTypeAndValue. * Except where explicitly specified, each Name MUST NOT contain more than one instance of a given AttributeTypeAndValue across all RelativeDistinguishedNames.

In addition to the above, the following requirements SHOULD be met by all newly-issued Technically Constrained Non-TLS Subordinate CA Certificates, as defined in [Section 7.1.2.c](#), and MUST be met for all other Certificates, regardless of whether the Certificate is a CA Certificate or a Subscriber Certificate.

For every valid Certification Path (as defined by [RFC 5280, Section 6](#)):

- For each Certificate in the Certification Path, the encoded content of the Issuer Distinguished Name field of a Certificate SHALL be byte-for-byte identical with the encoded form of the Subject Distinguished Name field of the Issuing CA certificate.
- For each CA Certificate in the Certification Path, the encoded content of the Subject Distinguished Name field of a Certificate SHALL be byte-for-byte identical among all Certificates whose Subject Distinguished Names can be compared as equal according to RFC 5280, Section 7.1, and including expired and revoked Certificates.

7.1.4.2 Subject Attribute Encoding

This document defines requirements for the content and validation of a number of attributes that may appear within the subject field of a tbsCertificate. CAs SHALL NOT include these attributes unless their content has been validated as specified by, and only if permitted by, the relevant certificate profile specified within [Section 7.1.2](#).

Table 59: Attribute Encoding and Order Requirements

Attribute	OID	Specification	Encoding Requirements	Max Length ¹²
countryName	2.5.4.6	RFC 5280		2
stateOrProvinceName	2.5.4.8	RFC 5280	MUST use UTF8String	128
localityName	2.5.4.7	RFC 5280	MUST use UTF8String	128
streetAddress	2.5.4.9	X.520	MUST use UTF8String	128
postalCode	2.5.4.17	X.520	MUST use UTF8String	40
organizationName	2.5.4.10	RFC 5280	MUST use UTF8String	64
surname	2.5.4.4	X.520	MUST use UTF8String	-
givenName	2.5.4.42	X.520	MUST use UTF8String	-
organizationalUnitName	2.5.4.11	RFC 5280	MUST use UTF8String	32
commonName	2.5.4.3	RFC 5280	MUST use UTF8String	64

7.1.4.3 Other Subject Attributes

When explicitly stated as permitted by the relevant certificate profile specified within [Section 7.1.2](#), CAs MAY include additional attributes within the AttributeTypeAndValue beyond those specified in [Section 7.1.4.2](#).

Before including such an attribute, the CA SHALL: * Document the attributes within Section 7.1.4 of their CP/CPS, along with the applicable validation practices. * Ensure that the contents contain

information that has been verified by the CA, independent of the Applicant.

7.1.4.2 Subject Information - Subscriber Certificates

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. CAs SHALL NOT include a Domain Name or IP Address in a Subject attribute except as specified in [Section 3.2.2.4](#) or [Section 3.2.2.5](#).

Subject attributes MUST NOT contain only metadata such as ' ', '-', and ' ' (i.e. space) characters, and/or any other indication that the value is absent, incomplete, or not applicable.

7.1.6 Certificate policy object identifier

7.1.6.1 Reserved Certificate Policy Identifiers

The following Certificate Policy identifiers are reserved for use by CAs as an optional means of asserting that a Certificate complies with these Requirements.

```
{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)
```

```
{joint-iso-itu-t(2) international-organizations(23) ca-browser-forum(140)
certificate-policies(1) baseline-requirements(2)
organization-validated(2)} (2.23.140.1.2.2)
```

```
{joint-iso-itu-t(2) international-organizations(23) ca-browser-forum(140)
certificate-policies(1) baseline-requirements(2) individual-validated(3)}
(2.23.140.1.2.3)
```

```
{joint-iso-itu-t(2) international-organizations(23) ca-browser-forum(140)
certificate-policies(1) ev-guidelines(1)} (2.23.140.1.1)
```

7.1.7 Usage of Policy Constraints extension

7.1.8 Policy qualifiers syntax and semantics

7.1.9 Processing semantics for the critical Certificate Policies extension

7.2 CRL profile

7.2.1 Version number(s)

7.2.2 CRL and CRL entry extensions

1. reasonCode (OID 2.5.29.21)

Effective 2020-09-30, all of the following requirements MUST be met:

If present, this extension MUST NOT be marked critical.

If a CRL entry is for a Root CA or Subordinate CA Certificate, including Cross-Certified Subordinate CA Certificates, this CRL entry extension MUST be present. If a CRL entry is for a Certificate not technically capable of causing issuance, this CRL entry extension SHOULD be present, but MAY be omitted, subject to the following requirements.

The CRLReason indicated MUST NOT be unspecified (0). If the reason for revocation is unspecified, CAs MUST omit reasonCode entry extension, if allowed by the previous requirements. If a CRL entry is for a Certificate not subject to these Requirements and was either issued on-or-after 2020-09-30 or has a notBefore on-or-after 2020-09-30, the

CRLReason MUST NOT be certificateHold (6). If a CRL entry is for a Certificate subject to these Requirements, the CRLReason MUST NOT be certificateHold (6).

If a reasonCode CRL entry extension is present, the CRLReason MUST indicate the most appropriate reason for revocation of the certificate, as defined by the CA within its CP/CPS.

7.3 OCSP profile

Effective 2020-09-30, if an OCSP response is for a Root CA or Subordinate CA Certificate, including Cross-Certified Subordinate CA Certificates, and that certificate has been revoked, then the revocationReason field within the RevokedInfo of the CertStatus MUST be present.

Effective 2020-09-30, the CRLReason indicated MUST contain a value permitted for CRLs, as specified in [Section 7.2.2](#).

7.3.1 Version number(s)

7.3.2 OCSP extensions

The singleExtensions of an OCSP response MUST NOT contain the reasonCode (OID 2.5.29.21) CRL entry extension.

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8. COMPLIANCE AUDIT AND OTHER ASSESSMENTS

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 this section; 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.

Implementers' Note: Version 1.1.6 of the SSL Baseline Requirements was published on July 29, 2013. Version 2.0 of WebTrust's Principles and Criteria for Certification Authorities - SSL Baseline with Network Security and ETSI's Electronic Signatures and Infrastructures (ESI) 102 042 incorporate version 1.1.6 of these Baseline Requirements and version 1.0 of the Network and Certificate System Security Requirements. The CA/Browser Forum continues to improve the Baseline Requirements while WebTrust and ETSI also continue to update their audit criteria. We encourage all CAs to conform to each revision herein on the date specified without awaiting a corresponding update to an applicable audit criterion. In the event of a conflict between an existing audit criterion and a guideline revision, we will communicate with the audit community and attempt to resolve any uncertainty, and we will respond to implementation questions directed to questions@cabforum.org. Our coordination with compliance auditors will continue as we develop guideline revision cycles that harmonize with the revision cycles for audit criteria, the compliance auditing periods and cycles of CAs, and the CA/Browser Forum's guideline implementation dates.

8.1 Frequency or circumstances of assessment

Certificates that are capable of being used to issue new certificates MUST either be Technically Constrained in line with either [Section 7.1.2.3](#) or [Section 7.1.2.4](#), as well as audited in line with [Section 8.7](#) only, or Unconstrained and fully audited in line with all remaining requirements from this section. A Certificate is deemed as capable of being used to issue new certificates if it contains an X.509v3 basicConstraints extension, with the cA boolean set to true and is therefore by definition a Root CA Certificate or a Subordinate CA Certificate.

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.

If the CA has a currently valid Audit Report indicating compliance with an audit scheme listed in [Section 8.4](#), 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 8.4](#), 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 8.4](#). 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.

8.2 Identity/qualifications of assessor

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 (see [Section 8.4](#));

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. (For audits conducted in accordance with any one of the ETSI standards) accredited in accordance with ISO 17065 applying the requirements specified in ETSI EN 319 403;
5. (For audits conducted in accordance with the WebTrust standard) licensed by WebTrust;
6. Bound by law, government regulation, or professional code of ethics; and
7. 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

8.3 Assessor's relationship to assessed entity

8.4 Topics covered by assessment

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

1. "WebTrust for CAs v2.1 or newer" AND "WebTrust for CAs SSL Baseline with Network Security v2.3 or newer"; or
2. ETSI EN 319 411-1 v1.2.2, which includes normative references to ETSI EN 319 401 (the latest version of the referenced ETSI documents should be applied); or
3. If a Government CA is required by its Certificate Policy to use a different internal audit scheme, it MAY use such scheme provided that the audit either
 - a. encompasses all requirements of one of the above schemes or
 - b. consists of comparable criteria that are available for public review.

Whichever scheme is chosen, it MUST incorporate periodic monitoring and/or accountability procedures to ensure that its audits continue to be conducted in accordance with the requirements of the scheme.

The audit MUST be conducted by a Qualified Auditor, as specified in [Section 8.2](#).

For Delegated Third Parties which are not Enterprise RAs, then the CA SHALL obtain an audit report, issued under the auditing standards that underlie the accepted audit schemes found in [Section 8.4](#), 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.

8.5 Actions taken as a result of deficiency

8.6 Communication of results

The Audit Report SHALL state explicitly that it covers the relevant systems and processes used in the issuance of all Certificates that assert one or more of the policy identifiers listed in [Section 7.1.6.1](#). The CA SHALL make the Audit Report publicly available.

The CA MUST 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, the CA SHALL provide an explanatory letter signed by the Qualified Auditor.

For Audit Reports in which the Audit Period includes a date later than 2020-08-01, then the requirements set forth in the remainder of this [Section 8.6](#) SHALL be met. Audit Reports for Audit Periods that conclude prior to 2020-08-01 SHOULD meet these requirements.

The Audit Report MUST contain at least the following clearly-labelled information:

1. name of the organization being audited;
2. name and address of the organization performing the audit;
3. the SHA-256 fingerprint of all Roots and Subordinate CA Certificates, including Cross-Certified Subordinate CA Certificates, that were in-scope of the audit;
4. audit criteria, with version number(s), that were used to audit each of the certificates (and associated keys);
5. a list of the CA policy documents, with version numbers, referenced during the audit;
6. whether the audit assessed a period of time or a point in time;
7. the start date and end date of the Audit Period, for those that cover a period of time;
8. the point in time date, for those that are for a point in time;
9. the date the report was issued, which will necessarily be after the end date or point in time date; and
10. (for audits conducted in accordance with any of the ETSI standards) a statement to indicate if the audit was a full audit or a surveillance audit, and which portions of the criteria were applied and evaluated, e.g. DVCP, OVCP, NCP, NCP+, LCP, EVCP, EVCP+, QCP-w, Part 1 (General Requirements), and/or Part 2 (Requirements for Trust Service Providers).
11. (for audits conducted in accordance with any of the ETSI standards) a statement to indicate that the auditor referenced the applicable CA/Browser Forum criteria, such as this document, and the version used.

An authoritative English language version of the publicly available audit information MUST be provided by the Qualified Auditor and the CA SHALL ensure it is publicly available.

The Audit Report MUST be available as a PDF, and SHALL be text searchable for all information required. Each SHA-256 fingerprint within the Audit Report MUST be uppercase letters and MUST NOT contain colons, spaces, or line feeds.

8.7 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 8.4](#), 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.

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

During the period in which a Technically Constrained Subordinate CA issues Certificates, the CA

which signed the Subordinate CA SHALL monitor adherence to the CA's Certificate Policy and the Subordinate CA's Certification Practice Statement. 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 the Subordinate CA, during the period commencing immediately after the previous audit sample was taken, the CA shall ensure all applicable CP are met.

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9. OTHER BUSINESS AND LEGAL MATTERS

9.1 Fees

9.1.1 Certificate issuance or renewal fees

9.1.2 Certificate access fees

9.1.3 Revocation or status information access fees

9.1.4 Fees for other services

9.1.5 Refund policy

9.2 Financial responsibility

9.2.1 Insurance coverage

9.2.2 Other assets

9.2.3 Insurance or warranty coverage for end-entities

9.3 Confidentiality of business information

9.3.1 Scope of confidential information

9.3.2 Information not within the scope of confidential information

9.3.3 Responsibility to protect confidential information

9.4 Privacy of personal information

9.4.1 Privacy plan

9.4.2 Information treated as private

9.4.3 Information not deemed private

9.4.4 Responsibility to protect private information

9.4.5 Notice and consent to use private information

9.4.6 Disclosure pursuant to judicial or administrative process

9.4.7 Other information disclosure circumstances

9.5 Intellectual property rights

9.6 Representations and warranties

9.6.1 CA representations and warranties

By issuing a Certificate, the CA makes the certificate warranties listed herein to the following Certificate Beneficiaries:

1. The Subscriber that is a party to the Subscriber Agreement or Terms of Use 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. 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 [Section 3.2](#) and [Section 7.1.2](#);
 - 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 the same entity or are Affiliated, the Applicant Representative acknowledged 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.

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

9.6.2 RA representations and warranties

No stipulation.

9.6.3 Subscriber representations and warranties

The CA SHALL require, as part of the Subscriber Agreement or Terms of Use, that the Applicant make the commitments and warranties in this section for the benefit of the CA and the Certificate Beneficiaries.

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 acknowledgement of the Terms of Use.

The CA SHALL implement a process to ensure that each Subscriber Agreement or Terms of Use 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 Agreement or Terms of Use.

The Subscriber Agreement or Terms of Use 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 assure 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 Agreement or Terms of Use;
5. **Reporting and Revocation:** An obligation and warranty to:
 - a. promptly request revocation of the Certificate, and cease using it and its associated Private Key, if there is any actual or suspected misuse or compromise of the Subscriber's Private Key associated with the Public Key included in the Certificate, and
 - b. promptly request revocation of the Certificate, and cease using it, if any information in the Certificate is or becomes incorrect or inaccurate;
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 Agreement or Terms of Use or if revocation is required by the CA's CP, CPS, or these Baseline Requirements.

9.6.4 Relying party representations and warranties

9.6.5 Representations and warranties of other participants

9.7 Disclaimers of warranties

9.8 Limitations 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.

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.

9.9 Indemnities

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).

9.10 Term and termination

9.10.1 Term

9.10.2 Termination

9.10.3 Effect of termination and survival

9.11 Individual notices and communications with participants

9.12 Amendments

9.12.1 Procedure for amendment

9.12.2 Notification mechanism and period

9.12.3 Circumstances under which OID must be changed

9.13 Dispute resolution provisions

9.14 Governing law

9.15 Compliance with applicable law

9.16 Miscellaneous provisions

9.16.1 Entire agreement

9.16.2 Assignment

9.16.3 Severability

In the event of a conflict between these Requirements and a law, regulation or government order (hereinafter 'Law') of any jurisdiction in which a CA operates or issues certificates, a CA MAY modify any conflicting requirement to the minimum extent necessary to make the requirement valid and legal in the jurisdiction. This applies only to operations or certificate issuances that are subject to that Law. In such event, the CA SHALL immediately (and prior to issuing a certificate under the modified requirement) include in Section 9.16.3 of the CA's CPS a detailed reference to the Law requiring a modification of these Requirements under this section, and the specific modification to these Requirements implemented by the CA.

The CA MUST also (prior to issuing a certificate under the modified requirement) notify the CA/Browser Forum of the relevant information newly added to its CPS by sending a message to questions@cabforum.org and receiving confirmation that it has been posted to the Public Mailing List and is indexed in the Public Mail Archives available at <https://cabforum.org/pipermail/public/> (or such other email addresses and links as the Forum may designate), so that the CA/Browser Forum may consider possible revisions to these Requirements accordingly.

Any modification to CA practice enabled under this section MUST be discontinued if and when the Law no longer applies, or these Requirements are modified to make it possible to comply with both them and the Law simultaneously. An appropriate change in practice, modification to the CA's CPS and a notice to the CA/Browser Forum, as outlined above, MUST be made within 90 days.

9.16.4 Enforcement (attorneys' fees and waiver of rights)

9.16.5 Force Majeure

9.17 Other provisions

APPENDIX A – CAA Contact Tag

These methods allow domain owners to publish contact information in DNS for the purpose of validating domain control.

A.1. CAA Methods

A.1.1. CAA contactemail Property

SYNTAX: `contactemail <rfc6532emailaddress>`

The CAA contactemail property takes an email address as its parameter. The entire parameter value MUST be a valid email address as defined in RFC 6532, Section 3.2, with no additional padding or structure, or it cannot be used.

The following is an example where the holder of the domain specified the contact property using an email address.

```
DNS Zone $ORIGIN example.com.           CAA 0 contactemail
"domainowner@example.com"
```

The contactemail property MAY be critical, if the domain owner does not want CAs who do not understand it to issue certificates for the domain.

A.1.2. CAA contactphone Property

SYNTAX: `contactphone <rfc3966 Global Number>`

The CAA contactphone property takes a phone number as its parameter. The entire parameter value MUST be a valid Global Number as defined in RFC 3966, Section 5.1.4, or it cannot be used. Global Numbers MUST have a preceding + and a country code and MAY contain visual separators.

The following is an example where the holder of the domain specified the contact property using a phone number.

```
DNS Zone $ORIGIN example.com.           CAA 0 contactphone "+1 (555)
123-4567"
```

The contactphone property MAY be critical if the domain owner does not want CAs who do not understand it to issue certificates for the domain.

A.2. DNS TXT Methods

A.2.1. DNS TXT Record Email Contact

The DNS TXT record MUST be placed on the “_validation-contactemail” subdomain of the domain being validated. The entire RDATA value of this TXT record MUST be a valid email address as defined in RFC 6532, Section 3.2, with no additional padding or structure, or it cannot be used.

A.2.2. DNS TXT Record Phone Contact

The DNS TXT record MUST be placed on the “_validation-contactphone” subdomain of the domain being validated. The entire RDATA value of this TXT record MUST be a valid Global Number as defined in RFC 3966, Section 5.1.4, or it cannot be used.

APPENDIX B – Issuance of Certificates for .onion Domain Names

This appendix defines permissible verification procedures for including one or more RFC 7686 “.onion” special-use Domain Names in a Certificate.

1. The Domain Name MUST contain at least two labels, where the right-most label is “onion”, and the label immediately preceding the right-most “onion” label is a valid Version 3 Onion Address, as defined in Section 6 of the Tor Rendezvous Specification - Version 3 located at <https://spec.torproject.org/rend-spec-v3>.
2. The CA MUST verify the Applicant’s control over the .onion Domain Name using at least one of the methods listed below:
 - a. The CA MAY verify the Applicant’s control over the .onion service by using method in [Section 3.2.2.4.6 - Agreed-Upon Change to Website](#). If this method is replaced by a newer version(s) of Agreed-Upon Change to Website, the timelines for use of new and existing version of this method that are defined in [Section 3.2.2.4](#) SHALL apply.
 - b. The CA MAY verify the Applicant’s control over the .onion service by having the Applicant provide a Certificate Request signed using the .onion public key if the Attributes section of the certificationRequestInfo contains:
 - i. A caSigningNonce attribute that contains a Random Value that is generated by the CA; and
 - ii. An applicantSigningNonce attribute that contains a single value with at least 64-bits of entropy that is generated by the Applicant.

The signing nonce attributes have the following format:

```
caSigningNonce ATTRIBUTE ::= {  
    WITH SYNTAX                OCTET STRING  
    EQUALITY MATCHING RULE     octetStringMatch  
    SINGLE VALUE                TRUE  
    ID                          { cabf-caSigningNonce }  
}
```

```
cabf-caSigningNonce OBJECT IDENTIFIER ::= { cabf 41 }
```

```
applicantSigningNonce ATTRIBUTE ::= {  
    WITH SYNTAX                OCTET STRING  
    EQUALITY MATCHING RULE     octetStringMatch  
    SINGLE VALUE                TRUE  
    ID                          { cabf-applicantSigningNonce }  
}
```

```
cabf-applicantSigningNonce OBJECT IDENTIFIER ::= { cabf 42 }
```

The Random Value SHALL remain valid for use in a confirming response for no more than 30 days from its creation. The CPS MAY specify a shorter validity period for Random Values.

The CA MAY include a wildcard character in the Subject Alternative Name Extension and Subject Common Name Field as the left-most character in the .onion Domain Name provided inclusion of the wildcard character complies with [Section 3.2.2.6](#) of these Requirements.

3. When a Certificate includes an FQDN where “onion” is in the right-most label of the Domain Name, the Domain Name shall not be considered an Internal Name provided that the

Certificate was issued in compliance with this [Appendix B](#).

DRAFT