

Google Trust Services
Certificate Policy
v3.2

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1. Introduction

1.1. Overview

The Google Public Key Infrastructure (“Google PKI”), has been established by Google Trust Services, LLC (“Google”), to enable reliable and secure identity authentication, and to facilitate the preservation of confidentiality and integrity of data in electronic transactions.

This certificate policy (CP) is the principal statement of policy governing the CAs within the Google PKI. It sets forth the business, legal, and technical requirements for approving, issuing, managing, using, revoking, and renewing, Google Certificates and providing associated trust services for all Participants. These requirements protect the security and integrity of the Google PKI and comprise a single set of rules that apply consistently to all CAs therein, so as to provide assurance of uniform trust throughout it.

This CP conforms to the Certificate Policy and Certification Practices Framework of the Internet Engineering Task Force as defined in (IETF) RFC 3647 and adopts the CA/Browser Forum’s Requirements for the Issuance and Management of Publicly-Trusted Certificates (BR) in their current version.

All CAs subject to this CP SHALL give effect to the BR in their current version and indicate their applicability in their CPS. In the event of any inconsistency between this CP and the BR, the BR takes precedence.

1.2. Document name and identification

Google has reserved the following Object Identifiers (OIDs) for its issuance policies.

Policy Identifier	Google Trust Services Object Identifier (GTS OID)
This Certificate Policy (CP)	1.3.6.1.4.1.11129.2.5.3
signedHTTPExchanges	1.3.6.1.4.1.11129.2.5.3.1
clientAuthentication*	1.3.6.1.4.1.11129.2.5.3.2
documentSigning*	1.3.6.1.4.1.11129.2.5.3.3
S/MIME	1.3.6.1.4.1.11129.2.5.3.4

* These Policy Identifiers are reserved for future issuance and will be described in subsequent versions of this CP.

In addition to the GTS OIDs, all Certificates that comply with the BR shall include one of the following CA/B Forum Policy Identifiers:

- Domain Validation 2.23.140.1.2.1
- Organization Validation 2.23.140.1.2.2

All end entity certificates shall include at least one of the GTS OIDs. They may include any number of OIDs that are specified under the GTS reserved policy OID arc of {iso(1) iso-identified-organization(3) dod(6) internet(1) private(4) enterprise(1) google(11129) 2(2) 5(5) 3(3)}

(1.3.6.1.4.1.11129.2.5.3) or the CA/Browser Forum’s reserved policy OID arc of {joint-iso-itu-t(2) international-organizations(23) ca-browser-forum(140) certificate-policies(1)} (2.23.140.1).

Subject to the restrictions in Section 7.1.6 of this CP, CAs may issue certificates containing the “anyPolicy” identifier (2.5.29.32.0).

This CP applies to all CAs that issue certificates asserting a GTS OID. By including a GTS OID, the CA asserts that the certificate was issued and is managed in accordance with this CP and the relevant CPS.

1.2.1 Revisions

See Appendix.

1.2.2 Relevant Dates

Compliance	Section(s)	Summary Description (See Full Text for Details)
2017-09-01	3.2.2.8	CAs MUST check and process CAA records
2018-03-01	6.3.2	Certificates issued MUST have a Validity Period no greater than 825 days
2018-03-01	4.2.1	re-use of validation information limited to 825 days
2018-05-31	2.2	CP and CPS must follow RFC 3647 format
2018-10-14	4.9.1.	Revocation timelines extended
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	Phone Contact with Domain Contact retired as validation method
2019-08-01	3.2.2.5	CAs shall maintain record of IP validation method used
2019-08-01	3.2.2.5.4	CAs may no longer use “Any Other Method” for certificate validations
2020-06-03	3.2.2.4.6	CAs may not perform certificate validations using method 3.2.2.4.6
2020-07-24	3.2.2.8, 6.3.2, 7.1.2.3	Signed HTTP Exchanges Certificate Profile added
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	OCSF responses MUST conform to the validity period requirements specified.

Compliance	Section(s)	Summary Description (See Full Text for Details)
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

1.3.1. Certification authorities

Google Trust Services LLC is the Certification Authority (CA) authorized to issue public key certificates within the Google PKI.

1.3.2. Registration authorities

With the exception of sections 3.2.2.4 and 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

No stipulation.

1.3.4. Relying parties

A Relying Party is any individual or entity that acts in reliance on a Google Certificate to verify a digital signature and/or decrypt an encrypted document or message.

1.3.5. Other participants

Not applicable.

1.4. Certificate usage

1.4.1. Appropriate certificate uses

The primary goal of this Policy is to enable efficient and secure electronic communication, while addressing Relying Parties' concerns about the trustworthiness of Certificates.

1.4.2. Prohibited certificate uses

No stipulation.

1.5. Policy administration

1.5.1. Organization administering the document

Google Trust Services LLC
1600 Amphitheatre Parkway
Mountain View, CA 94043

1.5.2. Contact person

Google Trust Services LLC
CA Policy Authority
1600 Amphitheatre Parkway
Mountain View, CA 94043
contact@pki.goog

To notify Google of a CA service outage or a security issue including a suspected Private Key compromise, Certificate misuse, or other types of fraud, compromise, misuse, inappropriate conduct, or any other matter related to Certificates, please contact us using the contact form at <https://pki.goog/> or send an email to contact@pki.goog.

If you request a Certificate revocation, please add "Revocation request" and the domain name, IP address or certificate serial number into the subject line of your email.

1.5.3. Person determining CPS suitability for the policy

The Google CA Policy Authority determines the suitability of CPSs published in response to this CP.

1.5.4. CP approval procedures

Approvals of this CP and any amendments thereof are made by the Policy Authority. Amendments SHALL be made by publishing a new version of this CP at <https://pki.goog/repository/>. In the event Google decides to make significant changes to this CP, notification of such changes will be posted at <https://pki.goog/>.

A new version of the CP will become effective fifteen (15) days after such posting, and will supersede all previous versions and will be binding on all Participants in the Google PKI from that point forward.

This CP and associated documents are available from the Repository at <https://pki.goog/repository/>.

1.6. Definitions and acronyms

See Appendix A.

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.

2. PUBLICATION AND REPOSITORY RESPONSIBILITIES

The CA SHALL develop, implement, enforce, and annually update a 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 certification 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 Certification Practice Statement is structured in accordance with RFC 3647 and includes 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 this CP. 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 the CAB/Forum's Baseline Requirements for the Issuance and Management of Publicly Trusted Certificates 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.

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

No stipulation.

3.1.2. Need for names to be meaningful

No stipulation.

3.1.3. Anonymity or pseudonymity of subscribers

No stipulation.

3.1.4. Rules for interpreting various name forms

No stipulation.

3.1.5. Uniqueness of names

No stipulation.

3.1.6. Recognition, authentication, and role of trademarks

No stipulation.

3.2. Initial identity validation

3.2.1. Method to prove possession of private key

No stipulation.

3.2.2. Authentication of organization 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 Jurisdiction of Incorporation or Jurisdiction of Registration;
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/Tradename If the Subject Identity Information is to include a DBA or trade-name, the CA SHALL verify the Applicant's right to use the DBA/tradename using at least one of the following:

1. Documentation provided by, or communication with, a government agency in the jurisdiction of the Applicant's legal creation, existence, or recognition;
2. 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 using at least one of the methods listed below.

CAs may not issue certificates for FQDNs that contain "onion" as the rightmost label.

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 Domain Labels of the validated FQDN. This method is suitable for validating Wildcard Domain Names.

3.2.2.4.3 Phone Contact with 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

3.2.2.4.4 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 CAs MUST NOT perform validation using this method after 2020-06-03. CAs MAY continue to re-use information and validations for domains validated under this method per the applicable certificate data reuse periods.

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 this document).

Note: Once the FQDN has been validated using this method, the CA MAY also issue Certificates for other FQDNs that end with all the Domain 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 Domain 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 Domain 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 reuse 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 Domain 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 Domain 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 Domain 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 Domain 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 Domain 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 Domain 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 Domain 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 the CA/B Forum Baseline 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 “tlsalpn-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 Wildcard Certificate, the CA MUST establish and follow a documented procedure that determines if the FQDN portion of any Wildcard Domain Name in the Certificate is “registry-controlled” or is a “public suffix” (e.g. “*.com”, “*.co.uk”, see RFC 6454 Section 8.2 for further explanation).

If the FQDN portion of any Wildcard Domain Name is “registry-controlled” or is a “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) at <http://publicsuffix.org/>, 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 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 7.1.5, where the lack of CAA checking is an explicit contractual provision in the contract with the Applicant.
- For certificates issued prior to July 1, 2021, 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:.

If the certificate to be issued is a subscriber certificate asserting the 1.3.6.1.4.1.11129.2.5.3.1 policy identifier, the CA MUST check for the existence of the "cansignhttpexchanges" parameter having the value "yes". If a CAA record cannot be found, CAs MUST refuse issuance.

3.2.3 Authentication of individual identity

If an Applicant subject to this Section 3.2.2 is a natural person, then the CA SHALL verify the Applicant's name, Applicant's address, and the authenticity of the certificate request.

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

The CA SHALL verify the Applicant's address using a form of identification that 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

No stipulation.

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

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

3.3 Identification and authentication for re-key requests

3.3.1 Identification and authentication for routine re-key

No stipulation.

3.3.2 Identification and authentication for re-key after revocation

No stipulation.

3.4 Identification and authentication for revocation request

No stipulation.

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 this Policy and/or the CA's 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 397 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 Section 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 (see Section 7.1.4.2.1).

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

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 Sections 6.1.5 and 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 Sections 6.1.5 and 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 any reason 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:

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 7.1.5, 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 related to 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 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 controls

The CA infrastructure SHALL be located and operated from secure Google facilities. Detailed security procedures MUST be in place and followed that prohibit unauthorized access and entry into the areas of the facilities in which CA systems reside.

5.1.1 Site location and construction

No stipulation.

5.1.2 Physical access

The CA SHALL have in place appropriate physical security controls to restrict access to all hardware and software used for providing CA Services. Access to such hardware and software SHALL be limited to those personnel performing in a trusted role and two-person access SHALL be enforced.

5.1.3 Power and air conditioning

No stipulation.

5.1.4 Water exposures

No stipulation.

5.1.5 Fire prevention and protection

No stipulation.

5.1.6 Media storage

No stipulation.

5.1.7 Waste disposal

No stipulation.

5.1.8 Off-site backup

No stipulation.

5.2 Procedural controls

5.2.1 Trusted roles

No stipulation.

5.2.2. Number of persons required per task

The Private Key SHALL be backed up, stored, and recovered only by personnel in trusted roles using, at least, dual control in a physically secured environment.

5.2.3 Identification and authentication for each role

No stipulation.

5.2.4 Roles requiring separation of duties

No stipulation.

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

No stipulation.

5.3.3 Training requirements

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

No stipulation.

5.3.6 Sanctions for unauthorized actions

No stipulation.

5.3.7 Independent contractor requirements

The CA SHALL verify that the Delegated Third Party's personnel involved in the issuance of a Certificate meet the training and skills requirements of Section 5.3.3 and the document retention and event logging requirements of Section 5.4.1.

5.3.8. Documentation supplied to personnel

No stipulation.

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, modification 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 entries MUST include the following elements:

1. Date and time of entry;

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

5.4.2 Frequency of processing log

No stipulation.

5.4.3 Retention period for audit log

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

No stipulation.

5.4.5 Audit log backup procedures

No stipulation.

5.4.6 Audit collection system (internal vs. external)

No stipulation.

5.4.7 Notification to event-causing subject

No stipulation.

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

No stipulation.

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

No stipulation.

5.5.4 Archive backup procedures

No stipulation.

5.5.5 Requirements for time-stamping of records

No stipulation.

5.5.6 Archive collection system (internal or external)

No stipulation.

5.5.7 Procedures to obtain and verify archive information

No stipulation.

5.6 Key changeover

No stipulation.

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 procedure 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;
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

No stipulation.

5.7.3 Recovery procedures after key compromise

No stipulation.

5.7.4 Business continuity capabilities after a disaster

No stipulation.

5.8 CA or RA termination

No stipulation.

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 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 Certification Practice Statement and (if applicable) its Key Generation Script.

6.1.1.2 RA Key Pair generation No stipulation.

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

No stipulation.

6.1.4 CA public key delivery to relying parties

No stipulation.

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 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 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

No stipulation.

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

No stipulation.

6.2.3 Private key escrow

No stipulation.

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 140-2 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 Method of activating private key

No stipulation.

6.2.9 Method of deactivating private key

No stipulation.

6.2.10 Method of destroying private key

No stipulation.

6.2.11 Cryptographic Module Rating

No stipulation.

6.3 Other aspects of Key Pair management

6.3.1 Public key archival

No stipulation.

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.

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

No stipulation.

6.4.2 Activation data protection

No stipulation.

6.4.3 Other aspects of activation data

No stipulation.

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

No stipulation.

6.6 Life cycle technical controls

6.6.1 System development controls

No stipulation.

6.6.2 Security management controls

No stipulation.

6.6.3 Life cycle security controls

No stipulation.

6.7 Network security controls

No stipulation.

6.8 Time-stamping

No stipulation.

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.

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; Application of RFC 5280

This section specifies the additional requirements for Certificate content and extensions for Certificates.

7.1.2.1 Root CA Certificate

a. basicConstraints

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

b. keyUsage

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

c. certificatePolicies

This extension SHOULD NOT be present.

d. extendedKeyUsage

This extension MUST NOT be present.

7.1.2.2 Subordinate CA Certificate

a. certificatePolicies

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

certificatePolicies:policyIdentifier (Required)

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

certificatePolicies:policyQualifiers:policyQualifierId (Optional) id-qt 1 [RFC 5280].

certificatePolicies:policyQualifiers:qualifier:cPSuri (Optional)

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

b. `cRLDistributionPoints`

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

c. `authorityInformationAccess`

This extension **SHOULD** be present. It **MUST NOT** be marked critical.

It **SHOULD** contain the HTTP URL of the Issuing CA's certificate (`accessMethod` = 1.3.6.1.5.5.7.48.2). It **MAY** contain the HTTP URL of the Issuing CA's OCSP responder (`accessMethod` = 1.3.6.1.5.5.7.48.1).

d. `basicConstraints`

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

e. `keyUsage`

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

f. `nameConstraints` (optional)

If present, this extension **SHOULD** be marked critical.

Note: Non-critical Name Constraints are an exception to RFC 5280 (4.2.1.10), however, they **MAY** be used until the Name Constraints extension is supported by Application Software Suppliers whose software is used by a substantial portion of Relying Parties worldwide.

g. `extKeyUsage` (optional/required)

For Cross Certificates that share a Subject Distinguished Name and Subject Public Key with a Root Certificate operated in accordance with these Requirements, this extension **MAY** be present. If present, this extension **SHOULD NOT** be marked critical. This extension **MUST** only contain usages for which the issuing CA has verified the Cross Certificate is authorized to assert. This extension **MAY** contain the `anyExtendedKeyUsage` [RFC5280] usage, if the Root Certificate(s) associated with this Cross Certificate are operated by the same organization as the issuing Root Certificate. For all other Subordinate CA Certificates, including Technically Constrained Subordinate CA Certificates:

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

Note: While 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 subordinate certificates, as implemented by a number of Application Software Suppliers

For Subordinate CA Certificates that will be used to issue TLS certificates, the value `id-kp-serverAuth` [RFC5280] **MUST** be present. The value `id-kp-clientAuth` [RFC5280] **MAY** be present.

The values id-kp-emailProtection [RFC5280], id-kpcodeSigning [RFC5280], id-kp-timeStamping [RFC5280], and anyExtendedKeyUsage [RFC5280] MUST NOT be present. Other values SHOULD NOT be present.

For Subordinate CA Certificates that are not used to issue TLS certificates, then the value id-kp-serverAuth [RFC5280] MUST NOT be present. Other values MAY be present, but SHOULD NOT combine multiple independent key purposes (e.g. including id-kp-timeStamping [RFC5280] with id-kp-codeSigning [RFC5280]).

h. authorityKeyIdentifier (required)

This extension MUST be present and MUST NOT be marked critical. It MUST contain a keyIdentifier field and it MUST NOT contain a authorityCertIssuer or authorityCertSerialNumber field.

** While 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 subordinate certificates, as implemented by a number of Application Software Suppliers.

7.1.2.3 Subscriber Certificate

a. certificatePolicies

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

certificatePolicies:policyIdentifier (Required)

A Policy Identifier, documented by the issuing CA in its Certificate Policy and/or Certification Practice Statement, that indicates a Certificate Policy asserting the issuing CA's adherence to and compliance with these Requirements.

The following extensions MAY be present: certificatePolicies:policyQualifiers:policyQualifierId (Recommended)

id-qt 1 [RFC 5280]. certificatePolicies:policyQualifiers:qualifier:cPSuri (Optional)

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

b. cRLDistributionPoints

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

c. authorityInformationAccess

This extension MUST be present. It MUST NOT be marked critical, and it MUST contain the HTTP URL of the Issuing CA's OCSP responder (accessMethod = 1.3.6.1.5.5.7.48.1).

It SHOULD also contain the HTTP URL of the Issuing CA's certificate (accessMethod = 1.3.6.1.5.5.7.48.2).

d. basicConstraints (optional) The cA field MUST NOT be true.

e. keyUsage (optional)

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

f. extKeyUsage (required)

If the certificate asserts the 1.3.6.1.4.1.11129.2.5.3, 1.3.6.1.4.1.11129.2.5.3.1 or 1.3.6.1.4.1.11129.2.5.3.2 policy identifiers, either the value id-kp-serverAuth [RFC5280] or id-kp-clientAuth [RFC5280] or both values MUST be present. id-kp-emailProtection [RFC5280] MUST NOT be present. Other values SHOULD NOT be present. The value anyExtendedKeyUsage MUST NOT be present.

If the certificate asserts the 1.3.6.1.4.1.11129.2.5.3.4 policy identifier, the value id-kp-emailProtection [RFC5280] MUST be present. id-kp-serverAuth [RFC5280] and id-kp-clientAuth [RFC5280] MUST NOT be present. Other values SHOULD NOT be present. The value anyExtendedKeyUsage MUST NOT be present.

g. authorityKeyIdentifier (required)

This extension MUST be present and MUST NOT be marked critical. It MUST contain a keyIdentifier field and it MUST NOT contain a authorityCertIssuer or authorityCertSerialNumber field.

h. canSignHttpExchanges

If the certificate asserts the 1.3.6.1.4.1.11129.2.5.3.1 policy identifier, this extension MUST be present and MUST be set to the NULL value. In all other cases, this extension MUST NOT be present.

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, extendedKeyUsage value, Certificate extension, or other data not specified in Section 7.1.2.1, Section 7.1.2.2, or Section 7.1.2.3 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 extendedKeyUsage 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 extendedKeyUsage 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 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: 30 0d 06 09 2a 86 48 86 f7 0d 01 01 01 05 00

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, 30 13 06 07 2a 86 48 ce 3d 02 01 06 08 2a 86 48 ce 3d 03 01 07.
- For P-384 keys, 30 10 06 07 2a 86 48 ce 3d 02 01 06 05 2b 81 04 00 22.
- For P-521 keys, 30 10 06 07 2a 86 48 ce 3d 02 01 06 05 2b 81 04 00 23.

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: 30 0d 06 09 2a 86 48 86 f7 0d 01 01 0b 05 00.
- RSASSA-PKCS1-v1_5 with SHA-384: Encoding: 30 0d 06 09 2a 86 48 86 f7 0d 01 01 0c 05 00.

- RSASSA-PKCS1-v1_5 with SHA-512: Encoding: 30 0d 06 09 2a 86 48 86 f7 0d 01 01 0d 05 00.
- RSASSA-PSS with SHA-256, MGF-1 with SHA-256, and a salt length of 32 bytes: Encoding: 30 41 06 09 2a 86 48 86 f7 0d 01 01 0a 30 34 a0 0f 30 0d 06 09 60 86 48 01 65 03 04 02 01 05 00 a1 1c 30 1a 06 09 2a 86 48 86 f7 0d 01 01 08 30 0d 06 09 60 86 48 01 65 03 04 02 01 05 00 a2 03 02 01 20
- RSASSA-PSS with SHA-384, MGF-1 with SHA-384, and a salt length of 48 bytes: Encoding: 30 41 06 09 2a 86 48 86 f7 0d 01 01 0a 30 34 a0 0f 30 0d 06 09 60 86 48 01 65 03 04 02 02 05 00 a1 1c 30 1a 06 09 2a 86 48 86 f7 0d 01 01 08 30 0d 06 09 60 86 48 01 65 03 04 02 02 05 00 a2 03 02 01 30
- RSASSA-PSS with SHA-512, MGF-1 with SHA-512, and a salt length of 64 bytes: Encoding: 30 41 06 09 2a 86 48 86 f7 0d 01 01 0a 30 34 a0 0f 30 0d 06 09 60 86 48 01 65 03 04 02 03 05 00 a1 1c 30 1a 06 09 2a 86 48 86 f7 0d 01 01 08 30 0d 06 09 60 86 48 01 65 03 04 02 03 05 00 a2 03 02 01 40

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-kpserverAuth (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: 30 0d 06 09 2a 86 48 86 f7 0d 01 01 05 05 00

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

7.1.4.1 Issuer Information Prior to 2020-09-30, the content of the Certificate Issuer Distinguished Name field MUST match the Subject DN of the Issuing CA to support Name chaining as specified in RFC 5280, section 4.1.2.4.

Effective 2020-09-30, the following requirements SHOULD be met by all newly-issued Subordinate CA Certificates that are not used to issue TLS certificates, as defined in Section 7.1.2.2, 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 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 Sections 3.2.2.4 or 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.

7.1.4.2.1 Subject Alternative Name Extension Certificate Field: extensions:subjectAltName

Required/Optional: Required

Contents: This extension MUST contain at least one entry. Each entry MUST be one of the following types:

- **dNSName:** The entry MUST contain either a Fully-Qualified Domain Name or Wildcard Domain Name that the CA has validated in accordance with Section 3.2.2.4. Wildcard Domain Names MUST be validated for consistency with Section 3.2.2.6. The entry MUST NOT contain an Internal Name. The Fully-Qualified Domain Name or the FQDN portion of the Wildcard Domain Name contained in the entry MUST be composed entirely of LDH Labels joined together by a U+002E FULL STOP (“.”) character. The zero-length Domain Label representing the root zone of the Internet Domain Name System MUST NOT be included (e.g. “example.com” MUST be encoded as “example.com” and MUST NOT be encoded as “example.com.”).

Effective 2021-10-01, the Fully-Qualified Domain Name or the FQDN portion of the Wildcard Domain Name MUST consist solely of Domain Labels that are P-Labels or Non-Reserved LDH Labels.

- **iPAddress:** The entry MUST contain an IPv4 or IPv6 address that the CA has validated in accordance with Section 3.2.2.5. The entry MUST NOT contain a Reserved IP Address.
- **rfc822Name:** The entry MUST contain an RFC 5322 email address that the CA has validated in accordance with its validation practices.

7.1.4.2.2 Subject Distinguished Name Fields

a) Certificate Field: subject:commonName (OID 2.5.4.3)

Required/Optional: Deprecated (Discouraged, but not prohibited) for TLS Certificates, mandatory for S/MIME Certificates

Contents: If present, this field MUST contain exactly one entry that is one of the values contained in the Certificate’s **subjectAltName** extension (see Section 7.1.4.2.1). The value of the field MUST be encoded as follows:

- If the value is an IPv4 address, then the value MUST be encoded as an IPv4Address as specified in RFC 3986, Section 3.2.2.
- If the value is an IPv6 address, then the value MUST be encoded in the text representation specified in RFC 5952, Section 4.
- If the value is a Fully-Qualified Domain Name or Wildcard Domain Name, then the value MUST be encoded as a character-for-character copy of the **dNSName** entry value from the **subjectAltName** extension. Specifically, all Domain Labels of the Fully-Qualified Domain Name or FQDN portion of the Wildcard Domain Name must be encoded as LDH Labels, and P-Labels MUST NOT be converted to their Unicode representation.
- If the value is an email address, then the value MUST be encoded in the text representation specified in RFC 5322, Section 3.4.

b) Certificate Field: subject:organizationName (OID 2.5.4.10) Optional.

Contents: If present, the subject:organizationName field MUST contain either the Subject's name or DBA as verified under Section 3.2.2.2. 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". Because Subject name attributes for individuals (e.g. givenName (2.5.4.42) and surname (2.5.4.4)) are not broadly supported by application software, the CA MAY use the subject:organizationName field to convey a natural person Subject's name or DBA.

c) Certificate Field: subject:givenName (2.5.4.42) and subject:surname (2.5.4.4)

Optional.

Contents: If present, the subject:givenName field and subject:surname field MUST contain a natural person Subject's name as verified under Section 3.2.3. A Certificate containing a subject:givenName field or subject:surname field MUST contain the (2.23.140.1.2.3) Certificate Policy OID.

d) Certificate Field: Number and street: subject:streetAddress (OID: 2.5.4.9)

subject:surname field are present.

Prohibited if the subject:organizationName field, subject:givenName, and subject:surname field are absent.

Contents: If present, the subject:streetAddress field MUST contain the Subject's street address information as verified under Section 3.2.2.1.

e) Certificate Field: subject:localityName (OID: 2.5.4.7)

Required if the subject:organizationName field, subject:givenName field, or subject:surname field are present and the subject:stateOrProvinceName field is absent.

Optional if the subject:stateOrProvinceName field and the subject:organizationName field, subject:givenName field, or subject:surname field are present.

Prohibited if the subject:organizationName field, subject:givenName, and subject:surname field are absent.

Contents: If present, the subject:localityName field MUST contain the Subject's locality information as verified under Section 3.2.2.1. If the subject:countryName field specifies the ISO 3166-1 user-assigned code of XX in accordance with Section 7.1.4.2.2(g), the localityName field MAY contain the Subject's locality and/or state or province information as verified under Section 3.2.2.1.

f) Certificate Field: subject:stateOrProvinceName (OID: 2.5.4.8)

Required if the subject:organizationName field, subject:givenName field, or subject:surname field are present and subject:localityName field is absent.

Optional if the subject:localityName field and the subject:organizationName field, and subject:givenName field, or subject:surname field are present.

Prohibited if the subject:organizationName field, subject:givenName field , or subject:surname field are absent.

Contents: If present, the subject:stateOrProvinceName field MUST contain the Subject's state or province information as verified under Section 3.2.2.1. If the subject:countryName field specifies the ISO 3166-1 user-assigned code of XX in accordance with Section 7.1.4.2.2(g), the subject:stateOrProvinceName field MAY contain the full name of the Subject's country information as verified under Section 3.2.2.1.

g) Certificate Field: subject:postalCode (OID: 2.5.4.17)

Optional if the subject:organizationName, subject:givenName field, or subject:surname fields are present.

Prohibited if the subject:organizationName field, subject:givenName field, or subject:surname field are absent.

Contents: If present, the subject:postalCode field MUST contain the Subject's zip or postal information as verified under Section 3.2.2.1.

h) Certificate Field: subject:countryName (OID: 2.5.4.6))

Required if the subject:organizationName field, subject:givenName, or subject:surname field are present.

Optional if the subject:organizationName field, subject:givenName field, and subject:surname field are absent.

Contents: If the subject:organizationName field is present, the subject:countryName MUST contain the two-letter ISO 3166-1 country code associated with the location of the Subject verified under Section 3.2.2.1. If the subject:organizationName field is absent, the subject:countryName field MAY contain the two-letter ISO 3166-1 country code associated with the Subject as verified in accordance with Section 3.2.2.3. If a Country is not represented by an official ISO 3166-1 country code, the CA MAY specify the ISO 3166-1 user-assigned code of XX indicating that an official ISO 3166-1 alpha-2 code has not been assigned.

i) Certificate Field: subject:organizationalUnitName (OID: 2.5.4.11) Optional.

The CA SHALL implement a process that prevents an OU attribute from including a name, DBA, tradename, trademark, address, location, or other text that refers to a specific natural person or Legal Entity unless the CA has verified this information in accordance with Section 3.2 and the Certificate also contains subject:organizationName, , subject:givenName, subject:surname, subject:localityName, and subject:countryName attributes, also verified in accordance with Section 3.2.2.1.

j) Other Subject Attributes

Other attributes MAY be present within the subject field. If present, other attributes MUST contain information that has been verified by the CA.

7.1.4.3 Subject Information – Root Certificates and Subordinate CA Certificates By issuing a Subordinate CA 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.

7.1.4.3.1 Subject Distinguished Name Fields

- a. Certificate Field: subject:commonName (OID 2.5.4.3)
Required/Optional: Required
Contents: This field MUST be present and 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.
- b. Certificate Field: subject:organizationName (OID 2.5.4.10)
Required/Optional: Required
Contents: This field MUST be present and the contents MUST contain either the Subject CA's name or DBA as verified under Section 3.2.2.2. 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".
- c. Certificate Field: subject:countryName (OID: 2.5.4.6)
Required/Optional: Required
Contents: This field MUST contain the two-letter ISO 3166-1 country code for the country in which the CA's place of business is located.

7.1.5. Name Constraints

For a Subordinate CA Certificate to be considered Technically Constrained, the certificate MUST include an Extended Key Usage (EKU) extension specifying all extended key usages that the Subordinate CA Certificate is authorized to issue certificates for. The anyExtendedKeyUsage KeyPurposeId MUST NOT appear within this extension.

If the Subordinate CA Certificate includes the id-kp-serverAuth extended key usage, then the Subordinate CA Certificate MUST include the Name Constraints X.509v3 extension with constraints on dNSName, iPAddress and DirectoryName as follows:

- (a) For each dNSName in permittedSubtrees, 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 in line with the verification practices of section 3.2.2.4.
- (b) For each iPAddress range in permittedSubtrees, 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.
- (c) For each DirectoryName in permittedSubtrees, the CA MUST confirm the Applicant's and/or Subsidiary's Organizational name and location such that end entity certificates issued from the subordinate CA Certificate will be in compliance with section 7.1.2.4 and 7.1.2.5

If the Subordinate CA Certificate is not allowed to issue certificates with an iPAddress, then the Subordinate CA Certificate MUST specify the entire IPv4 and IPv6 address ranges in excludedSubtrees. The Subordinate CA Certificate MUST include within excludedSubtrees an iPAddress

GeneralName of 8 zero octets (covering the IPv4 address range of 0.0.0.0/0). The Subordinate CA Certificate MUST also include within excludedSubtrees an IPAddress GeneralName of 32 zero octets (covering the IPv6 address range of ::0/0). Otherwise, the Subordinate CA Certificate MUST include at least one IPAddress in permittedSubtrees.

A decoded example for issuance to the domain and sub domains of example.com by organization: Example LLC, Boston, Massachusetts, US would be:

X509v3 Name Constraints:

Permitted:

DNS:example.com

DirName: C=US, ST=MA, L=Boston, O=Example LLC

Excluded:

IP:0.0.0.0/0.0.0.0

IP:0:0:0:0:0:0:0:0/0:0:0:0:0:0:0:0

If the Subordinate CA is not allowed to issue certificates with dNSNames, then the Subordinate CA Certificate MUST include a zero-length dNSName in excludedSubtrees. Otherwise, the Subordinate CA Certificate MUST include at least one dNSName in permittedSubtrees.

7.1.6 Certificate Policy Object Identifier

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

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)

7.1.6.2 Root CA Certificates A Root CA Certificate SHOULD NOT contain the certificatePolicies extension. If present, the extension MUST conform to the requirements set forth for Certificates issued to Subordinate CAs in Section 7.1.6.3.

7.1.6.3 Subordinate CA Certificates A Certificate issued to a Subordinate CA that is not an Affiliate of the Issuing CA:

1. MUST include one or more explicit policy identifiers that indicate the Subordinate CA's adherence to and compliance with these Requirements (i.e. either the CA/Browser Forum

Reserved Certificate Policy Identifiers or identifiers documented by the Subordinate CA in its Certificate Policy and/or Certification Practice Statement); and

2. MAY contain one or more identifiers documented by the Subordinate CA in its Certificate Policy and/or Certification Practice Statement; and
3. MUST NOT contain the anyPolicy identifier (2.5.29.32.0).

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

1. MAY include one or more explicit policy identifiers that indicate the Subordinate CA's adherence to and compliance with these Requirements (i.e. either the CA/Browser Forum Reserved Certificate Policy Identifiers or identifiers documented by the Subordinate CA in its Certificate Policy and/or Certification Practice Statement) and
2. MAY contain one or more identifiers documented by the Subordinate CA in its Certificate Policy and/or Certification Practice Statement and
3. MAY contain the anyPolicy identifier (2.5.29.32.0) in place of an explicit policy identifier.

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

7.1.6.4 Subscriber Certificates Effective 2020-09-30, a Certificate issued to a Subscriber MUST contain, within the Certificate's certificatePolicies extension, one or more policy identifier(s) that are specified beneath the CA/Browser Forum's reserved policy OID arc of {joint-iso-itu-t(2) international-organizations(23) ca-browser-forum(140) certificatepolicies(1)} (2.23.140.1).

The certificate MAY also contain additional policy identifier(s) defined by the Issuing CA. The issuing CA SHALL document in its Certificate Policy or Certification Practice Statement that the Certificates it issues containing the specified policy identifier(s) are managed in accordance with these requirements.

For certificates issued prior to 2020-09-30, a Certificate issued to a Subscriber MUST contain a certificatePolicies extension. The extension MUST contain one or more policy identifiers that indicate adherence to and compliance with these Requirements. CAs MUST either use a CA/Browser Forum identifier reserved for this purpose or MUST use a policy identifier documented by the CA in its Certificate Policy and/or Certification Practice Statement to indicate the Certificate's compliance with these Requirements.

Prior to including a Reserved Certificate Policy Identifier, the CA MUST ensure the following requirements are met:

- Certificate Policy Identifier: 2.23.140.1.2.1 If the Certificate complies with these requirements and lacks Subject identity information that has been verified in accordance with Section 3.2.2.1 or Section 3.2.3. Such Certificates MUST NOT include organizationName, givenName, surname, streetAddress, localityName, stateOrProvinceName, or postalCode in the Subject field.
- Certificate Policy Identifier: 2.23.140.1.2.2 If the Certificate complies with these Requirements and includes Subject Identity Information that is verified in accordance with Section 3.2.2.1. Such Certificates MUST also include organizationName, localityName (to the extent

such field is required under Section 7.1.4.2.2), stateOrProvinceName (to the extent such field is required under Section 7.1.4.2.2), and countryName in the Subject field.

- Certificate Policy Identifier: 2.23.140.1.2.3 If the Certificate complies with these Requirements and includes Subject Identity Information that is verified in accordance with Section 3.2.3. Such Certificates MUST also include either organizationName or both givenName and surname, localityName (to the extent such field is required under Section 7.1.4.2.2), stateOrProvinceName (to the extent required under Section 7.1.4.2.2), and countryName in the Subject field.
- Certificate Policy Identifier: 2.23.140.1.1 If the Certificate complies with these Requirements and has been issued and operated in accordance with the CA/Browser Forum Guidelines for the Issuance and Management of Extended Validation Certificates (“EV Guidelines”). Such Certificates MUST also include Subject Identity Information as required and verified according to the EV Guidelines.

7.1.7 Usage of Policy Constraints extension

No stipulation.

7.1.8 Policy qualifiers syntax and semantics

No stipulation.

7.1.9 Processing semantics for the critical Certificate Policies extension

No stipulation.

7.2 CRL profile

7.2.1 Version number(s)

No stipulation.

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 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 OCSF profile

If an OCSF response is for a Root CA or Subordinate CA Certificate, including Cross Certificates, and that certificate has been revoked, then the revocationReason field within the RevokedInfo of the CertStatus MUST be present.

The CRLReason indicated MUST contain a value permitted for CRLs, as specified in Section 7.2.2.

7.3.1 Version number(s)

No stipulation.

7.3.2 OCSF extensions

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

8. COMPLIANCE AUDIT AND OTHER ASSESSMENTS

The CA SHALL at all times:

1. Issue Certificates and operate its PKI in accordance with all laws 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 laws of such jurisdiction for the issuance of Certificates.

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 section 7.1.5 and 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 ETSI TS 119 403, or accredited to conduct such audits under an equivalent national scheme, or accredited by a national accreditation body in line with ISO 27006 to carry out ISO 27001 audits;

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.

Qualified Auditors must hold omissions insurance with policy limits of at least one million US dollars in coverage.

8.3 Assessor's relationship to assessed entity

No stipulation.

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

No stipulation.

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 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.

9. OTHER BUSINESS AND LEGAL MATTERS

9.1 Fees

9.1.1 Certificate issuance or renewal fees

No stipulation.

9.1.2 Certificate access fees

No stipulation.

9.1.3 Revocation or status information access fees

No stipulation.

9.1.4 Fees for other services

No stipulation.

9.1.5 Refund policy

No stipulation.

9.2 Financial responsibility

9.2.1 Insurance coverage

No stipulation.

9.2.2 Other assets

No stipulation.

9.2.3 Insurance or warranty coverage for end-entities

No stipulation.

9.3 Confidentiality of business information

9.3.1 Scope of confidential information

No stipulation.

9.3.2 Information not within the scope of confidential information

No stipulation.

9.3.3 Responsibility to protect confidential information

No stipulation.

9.4 Privacy of personal information

9.4.1 Privacy plan

No stipulation.

9.4.2 Information treated as private

No stipulation.

9.4.3 Information not deemed private

No stipulation.

9.4.4 Responsibility to protect private information

No stipulation.

9.4.5 Notice and consent to use private information

No stipulation.

9.4.6 Disclosure pursuant to judicial or administrative process

No stipulation.

9.4.7 Other information disclosure circumstances

No stipulation.

9.5 Intellectual property rights

No stipulation.

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

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

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

1. **Right to Use Domain Name or IP Address:** That, at the time of issuance, the CA (i) implemented a procedure for verifying that the Applicant either had the right to use, or had control of, the Domain Name(s) and IP address(es) listed in the Certificate's subject field and subjectAltName extension (or, only in the case of Domain Names, was delegated such right or control by someone who had such right to use or control); (ii) followed the procedure when issuing the Certificate; and (iii) accurately described the procedure in the CA's Certificate Policy and/or Certification Practice Statement;
2. **Authorization for Certificate:** That, at the time of issuance, the CA (i) implemented a procedure for verifying that the Subject authorized the issuance of the Certificate and that the Applicant Representative is authorized to request the Certificate on behalf of the Subject; (ii) followed the procedure when issuing the Certificate; and (iii) accurately described the procedure in the CA's Certificate Policy and/or Certification Practice Statement;
3. **Accuracy of Information:** That, at the time of issuance, the CA (i) implemented a procedure for verifying the accuracy of all of the information contained in the Certificate (with the exception of the subject:organizationalUnitName attribute); (ii) followed the procedure when issuing the Certificate; and (iii) accurately described the procedure in the CA's Certificate Policy and/or Certification Practice Statement;
4. **No Misleading Information:** That, at the time of issuance, the CA (i) implemented a procedure for reducing the likelihood that the information contained in the Certificate's subject:organizationalUnitName attribute would be misleading; (ii) followed the procedure when issuing the Certificate; and (iii) accurately described the procedure in the CA's Certificate Policy and/or Certification Practice Statement;
5. **Identity of Applicant:** That, if the Certificate contains Subject Identity Information, the CA (i) implemented a procedure to verify the identity of the Applicant in accordance with Sections 3.2 and 11.2; (ii) followed the procedure when issuing the Certificate; and (iii) accurately described the procedure in the CA's Certificate Policy and/or Certification Practice Statement;
6. **Subscriber Agreement:** That, if the CA and Subscriber are not Affiliated, the Subscriber and CA are parties to a legally valid and enforceable Subscriber Agreement that satisfies these Requirements, or, if the CA and Subscriber are Affiliated, the Applicant Representative acknowledged and accepted the Terms of Use;
7. **Status:** That the CA maintains a 24 x 7 publicly-accessible Repository with current information regarding the status (valid or revoked) of all unexpired Certificates; and
8. **Revocation:** That the CA will revoke the Certificate for any of the reasons specified in these Requirements. 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 or Terms of Use Agreement, 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 agreement to the Terms of Use agreement.

The CA SHALL implement a process to ensure that each Subscriber or Terms of Use Agreement is legally enforceable against the Applicant. In either case, the Agreement MUST apply to the Certificate to be issued pursuant to the certificate request. The CA may use an electronic or "click-through" Agreement provided that the CA has determined that such agreements are legally enforceable. A separate Agreement MAY be used for each certificate request, or a single Agreement MAY be used to cover multiple future certificate requests and the resulting Certificates, so long as each Certificate that the CA issues to the Applicant is clearly covered by that Subscriber or Terms of Use Agreement. The Subscriber or Terms of Use Agreement MUST contain provisions imposing on the Applicant itself (or made by the Applicant on behalf of its principal or agent under a subcontractor or hosting service relationship) the following obligations and warranties:

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

9.6.4 Relying party representations and warranties

No stipulation.

9.6.5 Representations and warranties of other participants

No stipulation.

9.7 Disclaimers of warranties

No stipulation.

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 Certification Practice Statement. If the CA has not issued or managed the Certificate in compliance with applicable requirements and its 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 so limit its liability, then the CA SHALL include the limitations on liability in its Certification Practice Statement.

9.9 Indemnities

No stipulation.

9.10 Term and termination

9.10.1 Term

No stipulation.

9.10.2 Termination

No stipulation.

9.10.3 Effect of termination and survival

No stipulation.

9.11 Individual notices and communications with participants

No stipulation.

9.12 Amendments

9.12.1 Procedure for amendment

No stipulation.

9.12.2 Notification mechanism and period

No stipulation.

9.12.3 Circumstances under which OID MUST be changed

No stipulation.

9.13 Dispute resolution provisions

No stipulation.

9.14 Governing law

No stipulation.

9.15 Compliance with applicable law

No stipulation.

9.16 Miscellaneous provisions

9.16.1 Entire agreement

No stipulation.

9.16.2 Assignment

No stipulation.

9.16.3 Severability

No stipulation.

9.16.4 Enforcement (attorneys' fees and waiver of rights)

No stipulation.

9.16.5 Force Majeure

No stipulation.

9.17 Other provisions

No stipulation.

Appendix A: References

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 FQDN used to obtain authorization for a given FQDN to be included in a Certificate. The CA may use the FQDN returned from a DNS CNAME lookup as the FQDN for the purposes of domain validation. If a Wildcard Domain Name is to be included in a Certificate, then the CA MUST remove “*.” from the left-most portion of the Wildcard Domain Name to yield the corresponding FQDN. The CA may prune zero or more Domain Labels of the FQDN from left to right until encountering a Base Domain Name and may use any one of the values that were yielded by pruning (including the Base Domain Name itself) 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.

Baseline Requirements (BR): CA/Browser Forum Baseline Requirements for the Issuance and Management of Publicly Trusted Certificates, available at <https://cabforum.org/baseline-requirements-documents/>

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 of the Baseline Requirements. 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 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, and whose activities are not within the scope of the appropriate CA audits, but is authorized by the CA to assist in the Certificate Management Process by performing or fulfilling one or more of the CA requirements found herein.

DNS CAA Email Contact: The email address defined in section Section A.1.1. Appendix A to the BR.

DNS CAA Phone Contact: The phone number defined in Section A.1.2. Appendix A to the BR.

DNS TXT Record Email Contact: The email address defined in Section A.2.1. Appendix A to the BR.

DNS TXT Record Phone Contact: The phone number defined in section Section A.2.2. Appendix A to the BR.

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 Label: From RFC 8499 (<http://tools.ietf.org/html/rfc8499>): "An ordered list of zero or more octets that makes up a portion of a domain name. Using graph theory, a label identifies one node in a portion of the graph of all possible domain names."

Domain Name: An ordered list of one or more Domain Labels 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 Domain 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 number 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.

LDH Label: From RFC 5890 (<http://tools.ietf.org/html/rfc5890>): "A string consisting of ASCII letters, digits, and the hyphen with the further restriction that the hyphen cannot appear at the beginning or end of the string. Like all DNS labels, its total length must not exceed 63 octets."

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

Non-Reserved LDH Label: From RFC 5890 (<http://tools.ietf.org/html/rfc5890>): "The set of valid LDH labels that do not have '-' in the third and fourth positions."

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.

P-Label: A XN-Label that contains valid output of the Punycode algorithm (as defined in RFC 3492, Section 6.3) from the fifth and subsequent positions.

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.

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 is contained in the address block of any entry in either of the following IANA registries: reserved: <https://www.iana.org/assignments/iana-ipv4-special-registry/iana-ipv4-special-registry.xhtml> <https://www.iana.org/assignments/iana-ipv6-special-registry/iana-ipv6-special-registry.xhtml>

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: A Certificate which is issued under a CA where there are no certificate paths/chains to a root certificate subject to these 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: 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 at least one Wildcard Domain Name in the Subject Alternative Names in the Certificate.

Wildcard Domain Name: A string starting with “*.” (U+002A ASTERISK, U+002E FULL STOP) immediately followed by a Fully-Qualified Domain Name.

XN-Label: From RFC 5890 (<http://tools.ietf.org/html/rfc5890>): “The class of labels that begin with the prefix”xn–” (case independent), but otherwise conform to the rules for LDH labels.”

Acronyms

AICPA, American Institute of Certified Public Accountants

ADN, Authorization Doman Name

BR, CA/Browser Forum Baseline Requirements

CA, Certificate Authority

CAA, Certificate 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

RA, Registration Authority

S/MIME, Secure MIME (Multipurpose Internet Mail Extensions) SSL Secure Sockets Layer

TLD, Top-Level Domain

TLS, Transport Layer Security

VoIP, Voice Over Internet Protocol

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Appendix B: Document History

Version	Date	Change owner	Note
1.0	2016-12-09	CA Policy Authority	Initial publication
1.1	2017-02-15	CA Policy Authority	Updated contact information
1.2	2017-05-29	CA Policy Authority	Updated certificate operational periods
1.3	2017-09-08	CA Policy Authority	Aligned with new version of CA/B Forum Requirements
1.4	2018-03-08	CA Policy Authority	Aligned with new version of CA/B Forum Requirements
1.5	2018-05-08	CA Policy Authority	Applied changes of CA/B Forum Ballot 220
1.6	2018-10-23	CA Policy Authority	Updated validation methods and revocation timelines
1.7	2019-01-07	CA Policy Authority	Added prohibition of underscore characters in dNSName entries
1.8	2019-05-08	CA Policy Authority	Updated section on Subscribers
1.9	2019-05-14	CA Policy Authority	Aligned with BR version 1.6.5
1.10	2020-06-02	CA Policy Authority	Aligned with BR version 1.7.0
1.11	2020-06-05	CA Policy Authority	Clarified OID requirements in Section 1.2
1.12	2020-08-21	CA Policy Authority	Clarified OID requirements in Section 1.2
1.13	2020-11-09	CA Policy Authority	Aligned with BR version 1.7.3
2.0	2021-03-19	CA Policy Authority	Updated various sections following annual CP review
2.1	2021-05-10	CA Policy Authority	Updated various sections following annual CP review
3.0	2021-08-11	CA Policy Authority	Updated various sections following full CP review
3.1	2021-09-09	CA Policy Authority	Updated additional section following full CP review.
3.2	2021-12-02	CA Policy Authority	Updated various sections based on ballot SC48