

Interoperability Guidelines for Digital Signature Certificates issued under Information Technology Act

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Foreword

The office of Controller of Certifying Authorities (CCA) was set up under the Information Technology (IT) in the year 2000. One of the primary objectives was to promote the use of Digital Signatures for authentication in e-commerce & e-governance. Towards facilitating this, the CCA licensed eight Certifying Authorities (CAs) to issue Digital Signature Certificates (DSC) under the IT Act 2000. The standards and practices to be followed were defined in the Rules and Regulations under the Act and the Guidelines that are issued by CCA from time to time.

The Root Certifying Authority of India (RCAI) was set up by the CCA to serve as the root of trust in the hierarchical Public Key Infrastructure (PKI) model that has been set up in the country. The RCAI with its self-signed Root Certificate issues Public Key Certificates to the licensed CAs, while these licensed CAs in turn issue DSCs to end-users.

To gauge the extent of usage of Digital Signatures and the challenges that are being faced in further proliferating growth, a survey was carried out in the year 2007. One of the key findings of the survey was the lack of interoperability between DSCs issued by different CAs resulting in users having to obtain multiple number of DSCs for use across different applications.

This Guideline is the result of the effort made by the office of CCA to achieve interoperability across DSCs issued by different CAs. The first draft DSC profile was circulated widely to the Department of Information Technology, Central Government Departments, IT Secretaries of all States, CAs & major application developers and also published on CCAs website for comments from the public at large. Based on the feedback received, the draft was revised and sent for comments to an international expert in this area. The observations and specific recommendations received in this regard have now been incorporated and the profile that has been prepared is in line with international standards and best practices. These Guidelines also include profiles of other special purpose certificates including Time stamping, OCSP responder, SSL Server, SSL Client, Encryption and Code signing.

We thank all those who have contributed in the framing of these Guidelines and look forward to their continued interest and implementation.

Introduction

As part of the interoperability initiative of the CCA, a comparative analysis of the certificates in use in India was carried out. Also the certificates were compared with the CCA rules and regulations for certificate formats. The comparative analysis of the certificates has highlighted that the majority of the interoperability problems in certificates are due to inconsistency in the 'Issuer' and 'Subject' fields of the certificates. Additionally, many fields were interpreted differently by the CAs. Some key observations from the comparative analysis revealed:

1. The 'Issuer' field in the digital certificates has been interpreted and /or used in 20 different ways especially its sub-fields. The variations ranged from name of the application for which the certificate is meant to company / organization names operating applications.
2. The 'Subject' field shows variety of usage for its sub fields. We observed non-standard implementation of the organization parameters. The Organization Unit sub field interpretation varies across the Certifying Authorities and contains information such as certificate class, subject designations, application specific information etc.
3. There is variation in usage and interpretation of almost all fields in the certificate including fields such as Authority Key Identifier, Key Usage, CRL distribution points etc.

Another major problem of interoperability arose from issuance of various different classes of certificates by each of the Certifying Authorities. There is currently no standard mechanism either for applications or by human inspection of certificate fields to determine the class of the certificate. Although various certifying authorities have attempted to include classes of certificates in various certificate fields or extensions, these are largely non-standard and create uncertainty for end users and applications on interpretation of the fields or extensions.

Many certifying authorities were found to be using sub-CAs for issuing digital certificates. The issue of sub-CA and its place in the overall PKI hierarchy created interoperability issues especially in path development and path validation for applications.

The analysis of the certificate and the applications highlighted the need to create a detailed guideline which addressed the above interoperability issues. This report and guidelines has been issued as part of the CCA interoperability project for digital certificates in India. The guidelines herein are mandated to the licensed certifying authorities in India. Additionally these guidelines are to help applications interpret and process the certificate fields in a uniform manner thus increasing the interoperability of the certificates across applications and ensuring secure usage of the certificates.

Scope and applicability

These guidelines are applicable to all licensed certifying authorities and are to be implemented for all certificates issued by them and their sub-CAs. The guidelines are in continuation and complimentary to the existing rules and regulations issued by the Controller of Certifying Authorities under the powers conferred upon it by the IT Act 2000. These guidelines shall be interpreted along with the existing rules and regulations. In case of any contradictions with any rules and regulations issued prior to these guidelines being issued, these guidelines will be considered as final, unless a clarification stating otherwise has been issued by the CCA.

Revisions

CCA may review and issue updated versions of this document. The revised document will be available on the CCA website.

The interoperability model

The interoperability challenges facing the Indian PKI are two fold - first being standardization of certificate fields and second being the scalability of accommodating business requirements of various classes of certificates and sub-CAs. The interoperability model that has been defined by the CA recommends two major initiatives – organizational guidelines and certificate profile guidelines.

Organizational Guidelines: Under this initiative, the CCA has recommended changes in the way Certifying Authorities are structured and issue certificates. This includes flexibility in operating sub-CAs for business purposes.

Certificate Profile Guidelines: Under Certificate Profile guidelines, CCA has issued detailed guidelines pertaining to certificate fields and extensions. This includes guidance on mandated or recommended values, interpretation and usage for certificate fields / extensions.

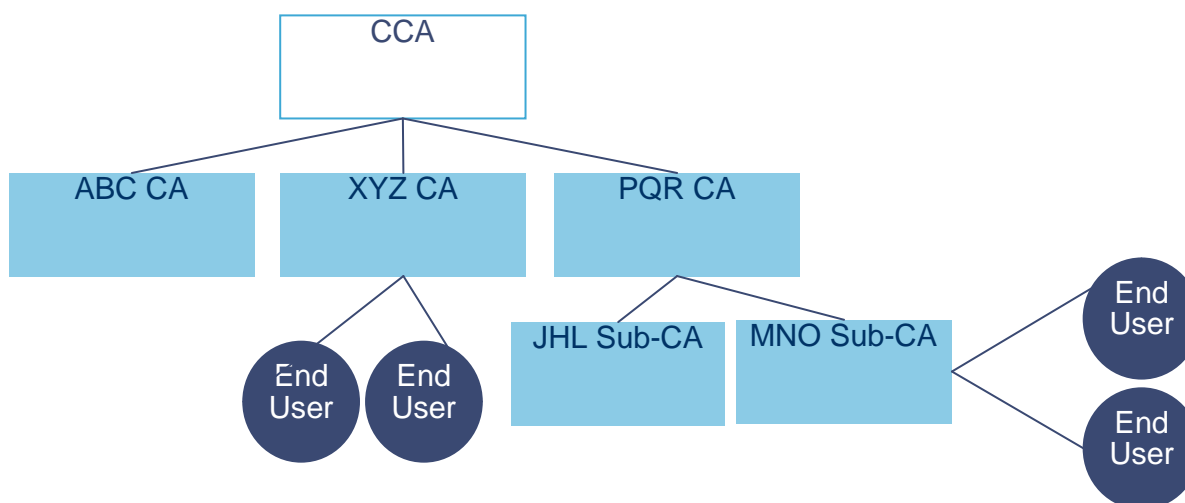
Organizational Guidelines

The current India PKI organization structure consists of the Controller of Certifying Authority as the apex body and the Root Certifying Authority of India (RCAI). The RCAI is responsible for issuing digital certificates to Licensed Certifying Authorities (henceforth referred to Certifying Authorities or CA) as per the IT Act 2000. The CAs are responsible for issuing further digital certificates to the end users.

Recommended Organization Hierarchy

In order to facilitate greater flexibility to Certifying Authorities, the CCA allowed the creation of sub-CAs. As per this model, a Certifying Authority can create a sub-CA to meet his business branding requirement. However the sub-CA will be part of the same legal entity as the CA.

- The sub-CA model will be based on the following principles:
 - The CAs MUST NOT have more than ONE level of sub-CA
 - The sub-CA MUST use a sub-CA certificate issued by the CA for issuing end entity certificates
 - The sub-CA must necessarily use the CAs infrastructure for issuing certificate
 - The sub-CAs operations shall be subject to same audit procedures as the CA
 - The certificate policies of the sub-CA must be same as or sub-set of the CA's certificate policies
 - A CA with sub-CA must necessarily issue end entity certificates only through its sub-CA.
 - The only exception will be for OCSP Responder Certificates, which may directly be issued by the CA.
 - A CA should have separate offline certificate issuance system for issuance of SSL and Code signing certificates under special purpose trust chain. A separate CA must be used for issuance of SSL and Code Signing certificates. A single issuing CA must not be used to issue both server authentication and code signing certificates.



PKI Hierarchy with sub-CAs

Certificate Profile Guidelines

One of the most important aspects of interoperability is the uniform interpretation of Digital Certificate fields and extensions. The Certificate Profile Guidelines specifies the format of the digital certificate and classifies each of the fields / extensions as following:

Mandatory – These fields or extensions are mandated by the CCA and **MUST** be present in the certificates issued by the Certifying Authorities. Additionally the content of the fields **MUST** be as per the guidance provided in this document.

Optional – The CA may use this field at its discretion. However, in case the field is being used, the applicable guidance or the compliance standards specified **MUST** be adhered to.

Special Purpose – These fields may be used only in certain circumstances. In all such cases, additional guidance will be provided by the CCA

Customizable – Customizable fields are non standard extensions notified by CCA which may have interpretations depending upon usage / application / industry.

Prohibited – These fields or extensions are **NOT** to be included or used in Digital Certificates unless notified by CCA regarding the usage and format.

Reserved for Future Use – These extensions are reserved by CCA for use in the future and additional guidance is expected from CCA before these can be utilized in the Digital Certificates. Until such time CA **MUST NOT** use these fields / extensions.

The following specification also provides guidance on other important aspects of the field including the length, data type and mandated values. The certifying authorities must issue certificates in accordance with the guidance provided in this documents.

Applications Using Digital Certificates

Applications are to process digital certificates as mentioned in the application developer guidance mentioned in annexure III.

Field Definitions

1. Field Name: **Version**

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>

Field description	Describes the version of certificate format adopted
Interpretation & usage	This field describes the version of the encoded certificate. Version field is used by the ASN.1 decoding software to parse the certificate.
Compliance Standards	RFC 5280
Type	Positive Integer
Length	1 Integer
Mandated Value	The mandated value is 2. (i.e. The certificate must be in the version 3 format)

2. Field Name: Serial Number

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>

Field description	Number allocated to a certificate by the issuer CA, unique for a given issuer CA
Interpretation & usage	The serial number field along with the Issuer DN is unique identifier for certificate
Compliance Standards	RFC 5280
Type	Positive Integer
Length	Max 20 Octets (bytes)
Mandated Value	Positive number unique to each certificate issued by a CA.

3. Field Name: Signature

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>

Field description	Issuer signature algorithm identifier
Interpretation & usage	The signature field identifies the algorithm used by the CA to sign the certificate. This field is used to invoke the appropriate hashing and signature verification algorithm.
Compliance Standards	RFC 5280, RFC 3279, RFC 4055, and RFC 4491
Type	Algorithm OID and Algorithm dependent parameters
Mandated Value	OID for SHA256 with RSA Encryption (null parameters) {iso(1) member-body(2) us(840) rsadsi(113549) pkcs(1) pkcs-1(1) 11} or OID for ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)

4. Field Name: Issuer

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>

Field description	Uniquely Identifies the Certifying Authority issuing the certificate
Interpretation & usage	The issuer field identifies the entity that has issued and signed the certificate
Compliance Standards	RFC 5280, X.520
Type	SEQUENCE OF Relative Distinguished Names (RDNs) in printable string format
Mandated Value	Refer Annexure I

6. Field Name: Validity

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>

Field description	Time interval during which the CA warrants that it will maintain information about the status of the certificate (hence certificate is valid)
Interpretation & usage	<p>The Validity fields are used to assess if the certificate issued is valid.</p> <p>The validity is represented as Sequence of two dates during which the certificate is valid inclusive.</p>
Compliance Standards	RFC 5280
Type	UTC Time / Generalized time
Mandated Value	<ul style="list-style-type: none"> ▪ Validity expressed in UTC Time for certificates valid through 2049 ▪ Validity expressed in Generalized Time for certificates valid through 2050 and beyond ▪ Certificate MUST contain a well defined expiration date. ▪ Sub-CA certificate validity must not exceed CA certificate validity.

6. Field Name: Subject

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>

Field description	The subject field associates an entity (named in the field) with the public key in the certificate.
Interpretation & usage	The Distinguished Name mentioned in the Subject identifies the owner of the certificate – or the entity to whom the certificate has been issued.
Compliance Standards	RFC 5280, X.520
Type	SEQUENCE OF Relative Distinguished Names (RDNs) in printable string format (except for variations mentioned in Annexure I)
Mandated Value	Refer Annexure I

7. Field Name: Subject Public Key Info

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>

Field description	Contains the public key algorithm for the subject public key being certified. Also contains the subject public key and the parameters.
Interpretation & usage	Algorithm identifier identifies the algorithm with which the key is used.
Compliance Standards	RFC 5280, RFC 3279, RFC 4055, RFC 4491
Type	OID, OID dependent parameters and Key in bitstring format
Mandated Value	<p>For CA & sub-CA: rsaEncryption, 2048 RSA Key modulus, Public Exponent = $2^{16}+1$</p> <p>For end user: rsaEncryption, 2048 RSA Key modulus, Public Exponent = $2^{16}+1$</p> <p>For Sub-CA and end user: ecPublicKey { 1.2.840.10045.2.1}, namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)</p>

8. Field Name: Unique Identifiers

Mandatory	<input type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input checked="" type="checkbox"/>

Field description	Unique identifier for a subject and issuer names (Subject Unique Identifier, Issuer Unique Identifier)
Interpretation & usage	©
Compliance Standards	RFC 5280
Type	Bit string
Mandated Value	Field not to be used

9. Field Name: signatureAlgorithm

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>

Field description	Issuer signature algorithm identifier
Interpretation & usage	The signature field identifies the algorithm used by the CA to sign the certificate. This field is used to invoke the appropriate hashing and signature verification algorithm
Compliance Standards	RFC 5280, RFC 3279, RFC 4055, and RFC 4491
Type	Algorithm OID and Algorithm dependent parameters
Mandated Value	<p>OID for SHA256 with RSA Encryption (null parameters) {iso(1) member-body(2) us(840) rsadsi(113549) pkcs(1) pkcs-1(1) 11}</p> <p>If parameters are present, in this field, they shall be ignored.</p> <p>or</p> <p>OID for ECDSA with SHA256 {1 2 840 10045 4 3 2 }</p>

10. Field Name: SignatureValue

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>

Field description	This field contains the signature on the certificate
Interpretation & usage	The value in this field is used for signature verification. For example, for RSA, this field is decrypted using the public key, then unpadded, and then matched against the hash of the certificate.
Compliance Standards	RFC 5280
Type	Bit string
Mandated Value	Must contain the signature in accordance with the algorithm. For RSA, this is the value generated by hashing the certificate, then padding, and then performing the RSA private key operation.

Standard Extensions Definition

1. Std. Extension : Authority Key Identifier

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Field description	The authority key identifier extension provides means of identifying the public key corresponding to signing key used (by CA) to sign the certificate.
Interpretation & usage	The authority key identifier is used to facilitate certificate path construction.
Compliance Standards	RFC 5280
Type	Octet string
Critical / Non Critical	Non Critical

<p>Mandated Value</p>	<p>This field may be absent in the RCAI certificate.</p> <p>All CAs MUST have Authoritykeyidentifier value same as SubjectkeyIdentifier Value of RCAI*</p> <p>CA Authoritykeyidentifier = Root Certifying Authority of India (RCAI)* SubjectkeyIdentifier</p> <p>Authoritykeyidentifier value for a certificate shall be the same as the SubjectkeyIdentifier for the Issuer. In other words, certificates issued by a CA shall contain the Authoritykeyidentifier value as the same as the SubjectkeyIdentifier in the CA's own certificate.</p>
<p>Calculation Method</p>	<p>Calculation method has been specified in the SubjectkeyIdentifier section.</p>

* With respect to creation of separate distinct chain for special operations, RCAI will refer to Root Certifying Authority of India Certificate for the respective special operation

2. Std. Extension : Subject Key Identifier

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input checked="" type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Note: This field is mandatory for all CA / sub-CA / end entity certificates

Field description	The subject key identifier extension provides means of identifying certificates that contain a particular key when the subject has multiple certificates with multiple keys.
Interpretation & usage	The subject key identifier is used to facilitate certificate path construction.
Compliance Standards	RFC 5280
Type	Octet string
Critical / Non Critical	Non Critical
Mandated Value	A CA shall always honour the subject key identifier value requested in a certificate request (e.g., PKCS-10 request). Honouring requested value is critical to interoperability when RCAF issues a CA certificate or a CA issues a sub-CA certificate.

<p>Recommended Value</p>	<p>Subject key identifier can be calculated as per any of the method mentioned below. Any other method which provides a statistically unique value associated with the Public key is also acceptable.</p>
<p>Calculation Method</p>	<p>SubjectKeyIdentifier should be composed of the 160-bit SHA-1 hash of value of the BIT STRING subjectPublicKey in the certificate (excluding the tag, length, and number of unused bits).</p> <p>OR</p> <p>The SubjectKeyIdentifier should be composed of a four-bit type field with value 0100 followed by the least significant 60 bits of SHA-1 hash of the value of the BIT STRING subjectPublicKey (excluding the tag, length, and number of unused bits).</p>

3. Std. Extension : Key Usage

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Field description	Key Usage field defines the cryptographic purpose of the key contained in the certificate.
Interpretation & usage	The applications implementing cryptography must interpret this field and restrict the usage of the key accordingly.
Compliance Standards	RFC 5280
Type	Bit string
Critical / Non Critical	Critical
Mandated Value	<p>For CA Certificates, the following key usage MUST be asserted</p> <ul style="list-style-type: none"> ▪ cRLSign ▪ keyCertsign <p>For end entity signature Certificates, following key usage MUST be asserted</p> <ul style="list-style-type: none"> ▪ digitalSignature ▪ nonRepudiation(Optional)

The following key usage MUST NOT be set / asserted for end entity certificates

- cRLSign
- keyCertSign

4. Std. Extension : Certificate Policies

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Field description	Contains policy information terms in the form of OIDs and qualifiers.
Interpretation & usage	CCA certificate policy the certificate is valid for; and all the lower level CCA certificate policies.
Compliance Standards	RFC 5280
Type	OID, IA5 string
Critical / Non Critical	Non Critical
Mandated Value	<p>The value must contain the OID representing the RCAI certificate policy the certificate is valid for; and all the lower level certificate policies.</p> <p>The end entity certificate should contain User Notice qualifier 'explicit text' encoded as Visible string. The string should state the highest Certificate Policy for which the certificate is valid for - as defined by the CCA.</p> <p>The maximum length of the 'explicit Text' field is 200 characters</p> <p>explicit Text- Values for short validity (30 Min) DSC may be any one of the following:- 'Aadhaar online eKYC Biometric- Single factor', 'Aadhaar online eKYC OTP-Single Factor', 'Aadhaar Offline eKYC OTP and PIN -Multi Factor', 'Organisational KYC OTP and PIN -Multi Factor', 'Banking eKYC OTP and PIN -Multi Factor', 'PAN KYC OTP and PIN -Multi Factor', CA KYC OTP and PIN -Multi Factor'</p>

	Values for long validity DSC may be any one of the following:- 'Class III Certificate', :- 'Class II certificate – Remote'
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5. Std. Extension : Policy Mappings

Mandatory	<input type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input checked="" type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Field description	Lists pairs of OIDs for issuerDomainPolicy and subject DomainPolicy
Interpretation & usage	The use of this Extension is prohibited by the CCA.
Compliance Standards	RFC 5280
Type	SEQUENCE of pairs of OID, each pair itself is a SEQUENCE
Critical / Non Critical	Non Critical
Mandated Value	Field is to not be used

6. Std. Extension : Subject Alternative Name

Mandatory	<input type="checkbox"/>
Optional	<input checked="" type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Field description	Provides additional field to bind the certificate / public key to an identity
Interpretation & usage	Depending upon the type of certificate, the Subject Alternative name must be set to be email ID, IP address or domain name.
Compliance Standards	RFC 5280
Type	Email ID / IP Address / URL / DNS Name
Critical / Non Critical	Non Critical
Mandated Value	Not Applicable
Recommended Value	<p>The following are the recommended formats</p> <ul style="list-style-type: none"> ▪ For end-entity certificates, email address for RFC822 Name may be included ONLY after verification. It shall be encoded as IA5String ▪ For machine certificates IP Address as mentioned in RFC791 may be

	included in the form of Octet string in network byte order.
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7. Std. Extension : Issuer Alternative Name

- | | |
|-------------------------|-------------------------------------|
| Mandatory | <input type="checkbox"/> |
| Optional | <input type="checkbox"/> |
| Special Purpose | <input type="checkbox"/> |
| Customisable | <input type="checkbox"/> |
| Prohibited | <input checked="" type="checkbox"/> |
| Reserved for future use | <input type="checkbox"/> |

Field description	This extension is used for binding internet style identities to the issuer.
Interpretation & usage	The use of this field is Prohibited by the CCA.
Compliance Standards	RFC 5280
Type	Email ID / IP Address / URL / DNS Name
Critical / Non Critical	Non Critical
Mandated Value	Extension not to be used

8. Std. Extension : Subject Directory Attributes

Mandatory	<input type="checkbox"/>
Optional	<input checked="" type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Field description	This extension is used to convey subject authorisations.
Interpretation & usage	Field used to convey identification attributes of the subject.
Compliance Standards	RFC 5280
Type	Sequence of attributes
Critical / Non Critical	Non Critical
Mandated Value	Not applicable.
Recommended Value	CCA will provide guidance on this as needs arise.

9. Std. Extension : Basic Constraints

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose*	<input checked="" type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Note: Mandatory in RCAI, CA, Sub-CA certificates and end entity certificates.

Field description	The basic constraints extension identifies whether the subject of the certificate is a CA and the maximum number of CAs may follow in the certification path
Interpretation & usage	The use of this field is used to validate if the public key contained can be used to verify Certificate and CRL signatures and the length of certificate path.
Compliance Standards	RFC 5280
Type	Boolean, Numeric
Critical / Non Critical	Critical
Mandated Value	For a certifying Authority & sub-CA, Basic Constraints field for CA Boolean must be asserted. RCAI self-signed CA certificate shall not contain pathLengthConstraint. CA certificate shall contain pathLengthConstraint = 0 if there are no sub-CA

for that licensed CA.

CA certificate shall contain pathLengthConstraint = 1 if there are sub-CAs for that licensed CA.

Sub-CA certificate shall contain pathLengthConstraint = 0.

For end user certificate, the field MUST have value CA= False

10. Std. Extension : Name Constraints

- Mandatory
- Optional
- Special Purpose
- Customisable
- Prohibited
- Reserved for future use

Field description	Defines the namespace which can and/or can not be used in subject and subject alternative fields of the certificates issued by the subject CA
Interpretation & usage	Use of this field is prohibited by the CCA
Compliance Standards	RFC 5280
Type	Domain name / IP address /directoryName
Critical / Non Critical	Critical
Mandated Value	Field is not to be used

11. Std. Extension : Policy Constraints

Mandatory	<input type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input checked="" type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Field description	Limits the policy mapping or mandates an acceptable policy in certificate path.
Interpretation & usage	Use of this field is prohibited by the CCA
Compliance Standards	RFC 5280
Type	OIDs
Critical / Non Critical	Critical
Mandated Value	Field is not to be used

12. Std. Extension : Extended Key Usage

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input checked="" type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Field description	Further limits the use of a certificate based on cryptographic application.
Interpretation & usage	This field is mandatory to be in all certificates. For special purpose certificates, refer Annexure II
Compliance Standards	RFC 5280
Type	OID
Critical / Non Critical	Critical / Non Critical as listed below
Mandated Value	None
Recommended Value	CAs MAY configure the following extended key usage as per guidance provided in Annexure II only <ul style="list-style-type: none"> ▪ id-kp-serverAuth {1 3 6 1 5 5 7 3 1} (for SSL- certificates) – Non Critical

- | | |
|--|--|
| | <ul style="list-style-type: none">▪ id-kp-clientAuth {1 3 6 1 5 5 7 3 2} (for end user and system-certificates) – Non Critical▪ id-kp-codeSigning {1 3 6 1 5 5 7 3 3} (for signing software) -- Critical▪ id-kp-emailProtection {1 3 6 1 5 5 7 3 4} (email clients) – Non Critical▪ id-kp-OCSPSigning {1 3 6 1 5 5 7 3 9} (for OCSP Responder Certificate) - - Critical▪ id-kp-timestamping {1 3 6 1 5 5 7 3 8} (for time stamp authority) -- Critical▪ Smart Card Logon {1.3.6.1.4.1.311.20.2.2} (for end user certificates) – Non Critical▪ MSFT Document Signing: {1.3.6.1.4.1.311.10.3.12} – Non Critical▪ Adobe Certified Document Signing {1.2.840.113583.1.1.5} – Non Critical |
|--|--|

13. Std. Extension : CRL Distribution Point

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Field description	The CRL distribution points extension identifies the location and method by which CRL information can be obtained.
Interpretation & usage	The field is interpreted as a Distribution Point URI.
Compliance Standards	RFC 5280
Type	URI, IA5String
Critical / Non Critical	Non Critical
Mandated Value	DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer reasons and cRLIssuer fields shall be absent.

14. Std. Extension : Inhibit Any Policy

Mandatory	<input type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input checked="" type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Field description	When set, this field inhibits an explicit match with special anyPolicy OID { 2 5 29 32 0 }
Interpretation & usage	This field is prohibited to be used by CCA
Compliance Standards	RFC 5280
Type	OID
Critical / Non Critical	Critical
Mandated Value	This field must not be used.

15. Std. Extension : Freshest CRL

- | | |
|-------------------------|-------------------------------------|
| Mandatory | <input type="checkbox"/> |
| Optional | <input type="checkbox"/> |
| Special Purpose | <input type="checkbox"/> |
| Customisable | <input type="checkbox"/> |
| Prohibited | <input checked="" type="checkbox"/> |
| Reserved for future use | <input type="checkbox"/> |

Field description	The freshest CRL extension identifies how delta CRL information is obtained.
Interpretation & usage	The use of this field is prohibited by the CCA
Compliance Standards	RFC 5280
Type	URI
Critical / Non Critical	Non Critical
Mandated Value	This field must not be used.

16. Std. Extension : SignedCertificateTimestampList

Mandatory	<input type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input checked="" type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Field description	Signed Certificate Timestamp (SCT) returned by Log operators when a valid certificate is submitted to a log
Interpretation & usage	To be included only in the SSL certificates
Compliance Standards	RFC 5280 , 6962
Type	OCTET STRING
Critical / Non Critical	Non Critical
Mandated Value	If present , at least one SCT MUST be included.

Private Extensions

1. Pvt. Internet Extension : Authority Information Access

Mandatory	<input checked="" type="checkbox"/>
Optional	<input type="checkbox"/>
Special Purpose	<input type="checkbox"/>
Customisable	<input type="checkbox"/>
Prohibited	<input type="checkbox"/>
Reserved for future use	<input type="checkbox"/>

Field description	The extension provides information for accessing information and services of the issuer.
Interpretation & usage	The field is used to access information regarding the issuer (such as issuer certificate) and the OCSP service
Compliance Standards	RFC 5280
Type	URI
Critical / Non Critical	Non Critical
Mandated Value	The id-ad-calssuers MUST point to certificates issued to the CA issuing the certificate containing this field. This should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852].

<p>The id-ad-ocsp accesslocation must specify the location of the OCSP responder as an HTTP URL encoded as IA5String using the syntax defined in [RFC5280] for CAs using OCSP. If OCSP is not used, id-ad-ocsp accesslocation accessMethod must not be present.</p>

2. Pvt. Internet Extension : Subject Information Access

- | | |
|-------------------------|-------------------------------------|
| Mandatory | <input type="checkbox"/> |
| Optional | <input type="checkbox"/> |
| Special Purpose | <input type="checkbox"/> |
| Customisable | <input type="checkbox"/> |
| Prohibited | <input checked="" type="checkbox"/> |
| Reserved for future use | <input type="checkbox"/> |

Field description	The extension provides information for accessing information and services regarding the subject
Interpretation & usage	The use of this field is prohibited by the CCA
Compliance Standards	RFC 5280
Type	URI
Critical / Non Critical	Non Critical
Mandated Value	This field must not be used.

Annexure I – Issuer and Subject field specification

Background

The issuer field identifies the entity that has signed and issued the certificate. It is required that the Issuer field **MUST** contain a non-empty distinguished name (DN). The issuer field is defined as the X.501 type Name [X.501].

Subject field associates the public key in the certificate with an entity. The subject field **MUST** be populated for all certificates issued by a CA. The Subject field **MUST** contain a X.500 distinguished name (DN). Again, the Subject field too must follow X.501 distinguished name format.

A distinguished name consist of a hierarchical structure composed of attributes such as Common name, organization, organization unit, common name etc. and the corresponding vales for these attributes. The standard set of attributes is defined in the X.520 specification.

As explained in the first section of this report, the India PKI hierarchy is depicted in the figure below.

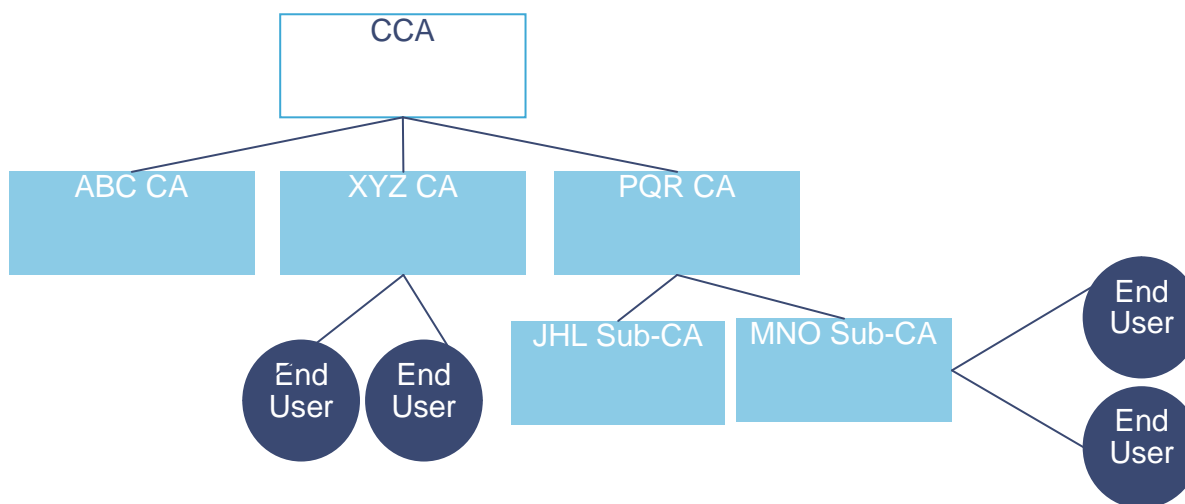


Figure 2: PKI Hierarchy

Naming Conventions

In order to standardize the naming for the CAs and sub-CAs, the following guideline is to be adopted for determining the 'Common Name' (CN) for CAs and Sub-CAs.

Entity	Naming (Common Name)	Example
Certifying Authority	"Certifying Authority Name" CA {Generation Qualifier} (issuance number)	XYZ CA 2009 XYZ CA 2009-1
Sub-CA	"Certifying Authority Name" sub-CA for "Branding Name" {Generation qualifier} (Issuance number)	XYZ Sub CA for Income Tax 2009 XYZ Sub CA for Income Tax 2009-1

Note: The generation qualifier will be the generation qualifier of Root CA. . The generation qualifier necessarily is to be in the form of 4 digit year (yyyy). In case multiple certificates have been issued the year indicator is to be followed by hyphen and digit indicating the sequence number of issuance of certificate. E.g. When a root certificate is issued in 2009, the CA name will be XYZ CA 2009. When the next CA certificate is reissued , the CA name will be indicate as 2009 –1.

Each Relative Distinguished Name (RDN) shall contain a single attribute type and associated value.

Attribute values shall be encoded as specified below:

Sr. No	Attribute Type	Attribute Value Encoding
1	Country	Printable String
2	Organisation	Printable String
3	Organisation Unit	Printable String
4	Post Code	Printable String
5	State / Province	Printable String
6	Street Address	Printable String
7	House Identifier	Printable String
8	Common Name	Printable String
9	Serial Number	Printable String
10	pseudonym	Printable String
11	Telephone Number	Printable String
12	Title	Printable String

Specifications for Issuer and Subject DN

The summary of issuer and subject fields are presented in the table below. Note that the attributes are presented in a reverse order than that of a directory structure.

Sr. No.	Certificate Type	Issuer	Subject
1	RCAI*	Self	Same as issuer
2	Licensed CA	Same as Subject in CCA Certificate	Refer licensed CA Subject Specifications
3	Sub CA	Same as subject in licensed CA Certificate	Refer sub CA Subject Specifications
4	End User (certificate issued by sub-CA)	Same as subject for issuing CA (or sub-CA) Certificate	Refer End user subject specifications

CCA Certificate – SUBJECT and ISSUER specifications

The CCA certificate must comply with following distinguished name specifications for both subject and issuers (for a self signed certificate)

Sr. No.	Attribute	Value
1	Common Name (CN)	CCA India {Generation Qualifier} (Issuance number)
2	Organisation (O)	India PKI*
3	Country (C)	India (IN)

CA Certificate –Issuer specifications

Sr. No.	Attribute	Value
1	Common Name (CN)	CCA India {Generation Qualifier} (Issuance number)
2	Organisation (O)	India PKI*
3	Country (C)	India (IN)

* With respect to creation of separate distinct chain for special operation "O=India PKI" will be substituted with "O=India PKI (XXXXXXXXXXXX operations)"

CA Certificate – SUBJECT specifications

Sr. No.	Attribute	Value
1	Common Name (CN)	<p>Max Length: 64 characters</p> <ul style="list-style-type: none"> Licensed (subject) CA Name (name by which it will be commonly known) (Refer Naming Conventions section in organisational recommendations section)
2	House Identifier	<p>Max Length: 60 Characters</p> <p>This attribute MUST contain the</p> <ul style="list-style-type: none"> Flat number, Apartment name and Plot no. <p>OR</p> <ul style="list-style-type: none"> House Name / Number and Plot Number of the CA's head office or registered office address
3	Street Address	<p>Max Length: 60 Characters</p> <p>This attribute value MUST contain following parameters of the CA's head office or registered office address</p> <ul style="list-style-type: none"> Locality / colony name (nearest) Street Name Town / Suburb / Village City name (if applicable) District
4	State / Province	<p>Max Length: 60 Characters</p> <ul style="list-style-type: none"> State / province where the Certifying Authority has its head office or registered office
5.	Postal Code	Pin Code of the CA's head office or registered office address
6	Organisational Unit (OU)	"Certifying Authority"
7	Organisation (O)	<p>Max Length: 64 Characters</p> <p>Legal Name of the Organisation operating the CA*</p>
8	Country (C)	<p>Max Length: 2 Characters</p> <p>Country code as per the verified residential / office address</p>

* With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

Sub-CA Certificate – Issuer specifications

Issuer Field for Sub-CA MUST be same as the Subject Field for the CA have been again provided here for easy reference

Sr. No.	Attribute	Value
1	Common Name (CN)	Same as SUBJECT field in Issuer CA certificate
2	House Identifier	Same as SUBJECT field in Issuer CA certificate
3	Street Address	Same as SUBJECT field in Issuer CA certificate
4	State / Province	Same as SUBJECT field in Issuer CA certificate
5.	Postal Code	Same as SUBJECT field in Issuer CA certificate
6	Organisational Unit (OU)	Same as SUBJECT field in Issuer CA certificate
7	Organisation (O)	Same as SUBJECT field in Issuer CA certificate
8	Country (C)	Same as SUBJECT field in Issuer CA certificate

Sub-CA Certificate – Subject specifications

Sr. No.	Attribute	Value
1	Common Name (CN)	Sub-CA Common Name (refer CA naming conventions)
2	Organisational Unit (OU)	Sub-CA
3	Organisation (O)	Legal Name of the Organisation operating the Sub-CA (same as the O in Issuer field of Issuer CA certificate)
4	Country (C)	Max Length: 2 Characters Country code as per the verified residential / office address

End User Certificate (Issued by a Sub-CA) – Issuer specifications

Issuer Field for Sub-CA MUST be same as the Subject Field for the Sub-CA have been again provided here for easy reference

Sr. No.	Attribute	Value
1	Common Name (CN)	Same as SUBJECT field in issuing sub-CA
2	Organisational Unit (OU)	Same as SUBJECT field in issuing sub-CA
3	Organisation (O)	Same as SUBJECT field in issuing sub-CA
4	Country (C)	Same as SUBJECT field in issuing sub-CA

End User Certificate –Subject Specifications

Sn.	Attribute	Definition
1.	Common Name	Max Length: 64 Characters The Common name should be the name of the person as in records
2.	Serial Number	This attribute should be populated with the SHA 256 hash of the PAN number of the end user. The hash must be calculated for the PAN number after deleting all leading and trailing blanks. In case PAN has not been provided, this field must be omitted.
3	State or Province Name	Max Length: 60 Characters This attribute value MUST be populated with the name of the State / Province of Subject's residential or office address.
4	Postal Code	PIN Code for the for Subject's residential or office address.
5	Telephone Number	"This attribute shall be used for SHA 256 hash of Mobile Number for individuals" (optional) (2.5.4.20 - id-at-telephoneNumber)
6	Pseudonym	Response code in the case of eKyc Service(optional) (2.5.4.65 - id-at-pseudonym)
7	Title	(Optional) 2.5.4.12 - id-at-title. Last four digit of Aadhaar Number in the case of Aadhaar eKYC for personal certificate. In other cases this field must be omitted.

Sn.	Attribute	Definition
8	Organisation Unit	<p>Max Length: 64 Characters</p> <p>This attribute MUST either contain the name of the department or sub-division of the organisation the person belongs to if the certificate is being issued for official purposes OR must not be used. In case meaningful OU has not been provided, this field must be omitted.</p> <p>The Organisational unit must not be present when the organisation has been marked as “personal”</p>
9	Organisation	<p>Max Length: 64 Characters</p> <p>This attribute MUST contain either</p> <ul style="list-style-type: none"> ▪ Name of the organisation the person belongs to – if such information has been verified by the CA <p>OR</p> <ul style="list-style-type: none"> ▪ Contain string “Personal”
10	Country	<p>Max Length: 2 Characters</p> <p>Country code as per the verified residential / office address</p>

Certificate Subject & Issuer Examples

The subject and issuer profiles starting CA certificate onwards are illustrated below.

1. (n)Code Solutions

CA Certificate

Issuer DN

Attribute	Value
Common Name (CN)	CCA India 2007
Organization (O)	India PKI*
Country (C)	India (IN)

Subject DN

Attribute	Value
Common Name (CN)	(n)Code Solutions CA {Generation Qualifier} (Issuance number)
House Identifier	301, GNFC Infotower
Street Address	Bodakdev, S G Road, Ahmedabad
State / Province	Gujarat
Postal Code	380054
Organizational Unit (OU)	Certifying Authority
Organization (O)	Gujarat Narmada Valley Fertilizers Company Ltd.**
Country (C)	IN

* With respect to creation of separate distinct chain for special operation "O=India PKI" will be substituted with "O=India PKI (XXXXXXXXXXXX operations)"

** With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

Sub-CA Certificate

Issuer DN

Attribute	Value
Common Name (CN)	(n)Code Solutions CA {Generation Qualifier} {Issuance number }
House Identifier	301, GNFC Infotower
Street Address	Bodakdev, S G Road, Ahmedabad
State / Province	Gujarat
Postal Code	380054
Organizational Unit (OU)	Certifying Authority
Organization (O)	Gujarat Narmada Valley Fertilizers Company Ltd.**
Country (C)	IN

Subject DN

Attribute	Value
Common Name (CN)	(n)Code Solutions sub-CA for Income Tax {Generation Qualifier} {Issuance number }
Organizational Unit (OU)	Sub-CA
Organization (O)	Gujarat Narmada Valley Fertilizers Company Ltd.**
Country (C)	IN

End User Certificate Profile (issued by CA)

Issuer DN

Attribute	Value
Common Name (CN)	(n)Code Solutions CA {Generation Qualifier} {Issuance number }
House Identifier	301, GNFC Infotower
Street Address	Bodakdev, S G Road, Ahmedabad
State / Province	Gujarat
Postal Code	380054
Organizational Unit (OU)	Certifying Authority
Organization (O)	Gujarat Narmada Valley Fertilizers Company Ltd.**
Country (C)	IN

Subject DN

** With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

Attribute	Value
Common Name (CN)	Joshi Amrut Manohar
Serial Number	794dbed34bedd3659726f53e44b482b5fc30c76f44baa328522047551c1a4fa4
State or Province Name	Uttar Pradesh
Postal Code	226020
Organizational Unit (OU)	Marketing
Organization (O)	OM Constructions Pvt. Ltd.
Country (C)	IN

End User Certificate Profile (issued by sub-CA)

Issuer DN

Attribute	Value
Common Name (CN)	(n)Code Solutions sub-CA for Income Tax {Generation Qualifier} {Issuance number }
Organizational Unit (OU)	Sub-CA
Organization (O)	Gujarat Narmada Valley Fertilizers Company Ltd.**
Country (C)	IN

Subject DN

Attribute	Value
Common Name (CN)	Joshi Amrut Manohar
Serial Number	794DBED34BEDD3659726F53E44B482B5FC30C76F44BAA328522047551C1A4FA4
State or Province Name	Uttar Pradesh
Postal Code	226020
Organizational Unit (OU)	Marketing
Organization (O)	OM Constructions Pvt. Ltd.
Country (C)	IN

** With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

2. IDRBT CA

CA Certificate

Issuer DN

DN Attribute	Value
Common Name (CN)	CCA India 2007
Organization (O)	India PKI*
Country (C)	India (IN)

Subject DN

Attribute	Value
Common Name (CN)	IDRBT CA {Generation Qualifier} {Issuance number }
House Identifier	Castle Hills
Street Address	Road No. 1, Masab Tank, Hyderabad
State / Province	Andhra Pradesh
Postal Code	500 057
Organizational Unit (OU)	Certifying Authority
Organization (O)	Institute for Development & Research in Banking Technology**
Country (C)	IN

* With respect to creation of separate distinct chain for special operation "O=India PKI" will be substituted with "O=India PKI (XXXXXXXXXXXX operations)"

** With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

Sub-CA Certificate

Issuer DN

Attribute	Value
Common Name (CN)	IDRBT CA {Generation Qualifier} {Issuance number }
House Identifier	Castle Hills
Street Address	Road No. 1, Masab Tank, Hyderabad
State / Province	Andhra Pradesh
Postal Code	500 057
Organizational Unit (OU)	Certifying Authority
Organization (O)	Institute for Development & Research in Banking Technology**
Country (C)	IN

Subject DN

Attribute	Value
Common Name (CN)	IDRBT sub-CA for Income Tax {Generation Qualifier} { Issuance number }
Organizational Unit (OU)	Sub-CA
Organization (O)	Institute for Development & Research in Banking Technology**
Country (C)	IN

End User Certificate Profile (issued by CA)

Issuer DN

Attribute	Value
Common Name (CN)	IDRBT CA {Generation Qualifier} {Issuance number }
House Identifier	Castle Hills
Street Address	Road No. 1, Masab Tank, Hyderabad
State / Province	Andhra Pradesh
Postal Code	500 057
Organizational Unit (OU)	Certifying Authority
Organization (O)	Institute for Development & Research in Banking Technology**
Country (C)	IN

Subject DN

** With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

Attribute	Value
Common Name (CN)	Joshi Amrut Manohar
Serial Number	794DBED34BEDD3659726F53E44B482B5FC30C76F44BAA328522047551C1A4FA4
State or Province Name	Uttar Pradesh
Postal Code	226020
Organizational Unit (OU)	Marketing
Organization (O)	OM Constructions Pvt. Ltd.
Country (C)	IN

End User Certificate Profile (issued by sub-CA)

Issuer DN

Attribute	Value
Common Name (CN)	IDRBT sub-CA for Income Tax {Generation Qualifier} { Issuance number }
Organizational Unit (OU)	Sub-CA
Organization (O)	Institute for Development & Research in Banking Technology**
Country (C)	IN

Subject DN

Attribute	Value
Common Name (CN)	Joshi Amrut Manohar
Serial Number	794DBED34BEDD3659726F53E44B482B5FC30C76F44BAA328522047551C1A4FA4
State or Province Name	Uttar Pradesh
Postal Code	226020
Organizational Unit (OU)	Marketing
Organization (O)	OM Constructions Pvt. Ltd.
Country (C)	IN

** With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

3. Safescrypt CA

CA Certificate

Issuer DN

Attribute	Value
Common Name (CN)	CCA India 2007
Organization (O)	India PKI [*]
Country (C)	India (IN)

Subject DN

Attribute	Value
Common Name (CN)	Safescrypt CA {Generation Qualifier} {Issuance number}
House Identifier	II Floor, Tidel Park,
Street Address	4 Canal Bank Road, Taramani, Chennai,
State / Province	Tamil Nadu
Postal Code	600 113
Organizational Unit (OU)	Certifying Authority
Organization (O)	Safescrypt Ltd. ^{**}
Country (C)	IN

^{*} With respect to creation of separate distinct chain for special operation "O=India PKI" will be substituted with "O=India PKI (XXXXXXXXXXXX operations)"

^{**} With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

Sub-CA Certificate

Issuer DN

Attribute	Value
Common Name (CN)	Safescrypt CA {Generation Qualifier} {Issuance number}
House Identifier	II Floor, Tidel Park,
Street Address	4 Canal Bank Road, Taramani, Chennai,
State / Province	Tamil Nadu
Postal Code	600 113
Organizational Unit (OU)	Certifying Authority
Organization (O)	Safescrypt Ltd.**
Country (C)	IN

Subject DN

Attribute	Value
Common Name (CN)	Safescrypt sub-CA for Income Tax {Generation Qualifier} { Issuance number }
Organizational Unit (OU)	Sub-CA
Organization (O)	Safescrypt Ltd.**
Country (C)	IN

End User Certificate Profile (issued by CA)

Issuer DN

Attribute	Value
Common Name (CN)	Safescrypt CA {Generation Qualifier} {Issuance number}
House Identifier	II Floor, Tidel Park,
Street Address	4 Canal Bank Road, Taramani, Chennai,
State / Province	Tamil Nadu
Postal Code	600 113
Organizational Unit (OU)	Certifying Authority
Organization (O)	Safescrypt Ltd.**
Country (C)	IN

Subject DN

** With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

Attribute	Value
Common Name (CN)	Joshi Amrut Manohar
Serial Number	794DBED34BEDD3659726F53E44B482B5FC30C76F44BAA328522047551C1A4FA4
State or Province Name	Uttar Pradesh
Postal Code	226020
Organizational Unit (OU)	Marketing
Organization (O)	OM Constructions Pvt. Ltd.
Country (C)	IN

End User Certificate Profile (issued by sub-CA)

Issuer DN

Attribute	Value
Common Name (CN)	Safescrypt sub-CA for Income Tax {Generation Qualifier} { Issuance number }
Organizational Unit (OU)	Sub-CA
Organization (O)	Safescrypt Ltd.**
Country (C)	IN

Subject DN

Attribute	Value
Common Name (CN)	Joshi Amrut Manohar
Serial Number	794DBED34BEDD3659726F53E44B482B5FC30C76F44BAA328522047551C1A4FA4
State or Province Name	Uttar Pradesh
Postal Code	226020
Organizational Unit (OU)	Marketing
Organization (O)	OM Constructions Pvt. Ltd.
Country (C)	IN

** With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

4. e-Mudhra CA

CA Certificate

Issuer DN

Attribute	Value
Common Name (CN)	CCA India 2007
Organization (O)	India PKI*
Country (C)	India (IN)

Subject DN

Attribute	Value
Common Name (CN)	e-Mudhra CA {Generation Qualifier} {Issuance number }
House Identifier	TOWER No 5,3-6 Floor, International Info Park,
Street Address	Vashi, Navi Mumbai
State / Province	Maharashtra
Postal Code	400 703
Organizational Unit (OU)	Certifying Authority
Organization (O)	3i Infotech Consumer Services Ltd**
Country (C)	IN

* With respect to creation of separate distinct chain for special operation "O=India PKI" will be substituted with "O=India PKI (XXXXXXXXXXXX operations)"

** With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

Sub-CA Certificate

Issuer DN

Attribute	Value
Common Name (CN)	e-Mudhra CA {Generation Qualifier} {Issuance number }
House Identifier	TOWER No 5,3-6 Floor, International Info Park,
Street Address	Vashi, Navi Mumbai
State / Province	Maharashtra
Postal Code	400 703
Organizational Unit (OU)	Certifying Authority
Organization (O)	3i Infotech Consumer Services Ltd**
Country (C)	IN

Subject DN

Attribute	Value
Common Name (CN)	e-Mudhra sub-CA for Income Tax {Generation Qualifier} { Issuance number }
Organizational Unit (OU)	Sub-CA
Organization (O)	3i Infotech Consumer Services Ltd**
Country (C)	IN

End User Certificate Profile (issued by CA)

Issuer DN

Attribute	Value
Common Name (CN)	e-Mudhra CA {Generation Qualifier} {Issuance number }
House Identifier	TOWER No 5,3-6 Floor, International Info Park,
Street Address	Vashi, Navi Mumbai
State / Province	Maharashtra
Postal Code	400 703
Organizational Unit (OU)	Certifying Authority
Organization (O)	3i Infotech Consumer Services Ltd**
Country (C)	IN

** With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

Subject DN

Attribute	Value
Common Name (CN)	Joshi Amrut Manohar
Serial Number	794DBED34BEDD3659726F53E44B482B5FC30C76F44BAA328522047551C1A4FA4
State or Province Name	Uttar Pradesh
Postal Code	226020
Organizational Unit (OU)	Marketing
Organization (O)	OM Constructions Pvt. Ltd.
Country (C)	IN

End User Certificate Profile (issued by sub-CA)

Issuer DN

Attribute	Value
Common Name (CN)	e-Mudhra sub-CA for Income Tax {Generation Qualifier} { Issuance number }
Organizational Unit (OU)	Sub-CA
Organization (O)	3i Infotech Consumer Services Ltd**
Country (C)	IN

Subject DN

Attribute	Value
Common Name (CN)	Joshi Amrut Manohar
Serial Number	794DBED34BEDD3659726F53E44B482B5FC30C76F44BAA328522047551C1A4FA4
State or Province Name	Uttar Pradesh
Postal Code	226020
Organizational Unit (OU)	Marketing
Organization (O)	OM Constructions Pvt. Ltd.
Country (C)	IN

** With respect to creation of separate distinct chain for special operation "O= Legal Name of the Organization operating CA " will be substituted with "O= Legal Name of the Organization operating CA (XXXXXXXXXXXX operations)"

Annexure II - Special Purpose Certificates

Generally digital certificates are issued to persons for the purpose of digital signature. However some special uses of digital certificate exists for which the certificate fields and extensions vary. These certificates are termed by CCA as special purpose certificates. The special purpose certificates issues by a licensed CA will be compliant with the specifications mentioned in this document. Additionally, licensed CA may not issue any type of special certificates other than those mentioned herein unless explicit approval from CCA has been obtained for the same. The special purpose certificates approved by CCA are as follows.

1. SSL Certificate

The SSL or secure sockets layer certificate is a certificate assigned to web server. The variation in the certificate fields and extensions as compared to general specification is as follows

Sn.	Field / Extension	Variation
1.	• Subject Name	<p>Common Name (CN) Fully Qualified Domain Name(FQDN)</p> <p>Note : CommonName is optional. If present, this field MUST contain a Fully-Qualified Domain Name that is one of the values contained in the Certificate's subjectAltName extension. Wildcard FQDNs are permitted. A CA may issue an SSL Certificate with wildcard in the right-most label of the Domain Name provided that issuance complies with the requirements as mentioned in the Guidelines for issuance of SSL Certificates.</p> <p>Optional Attributes</p> <ul style="list-style-type: none"> ▪ State / Province State / province for verified Office address ▪ Organisation Unit(OU) Department / Division to which the individual belongs within his Organisation ▪ Organisation (O) Legal Name of the organisation the person belongs to ▪ Country (C) Country code as per the verified Office address
2.	• Key Usage	The key usage field MUST have ONLY the following parameters set Digital Signature, Key Encipherment

3.	<ul style="list-style-type: none"> Extended Key usage 	<p>Extended key usage MUST include at least one of the following</p> <p>Server authentication id-kp-serverAuth {1 3 6 1 5 5 7 3 1}</p> <p>Client Authentication id-kp-clientAuth {1 3 6 1 5 5 7 3 2}</p>
4.	<ul style="list-style-type: none"> Subject Alternative Name 	<p>Subject Alternative Name:</p> <p>Fully Qualified Domain Name(FQDN)</p> <p>Note: Subject Alternative Name extension MUST contain at least one entry. Each entry MUST be either a dNSName containing the Fully-Qualified Domain Name. Wildcard FQDNs are permitted. A CA may issue an SSL Certificate with wildcard in the right-most label of the Domain Name provided that issuance complies with the requirements as mentioned in the SSL Guidelines</p> <p>dnsName(s) for the server(s) as an IA5 string</p>

2. System Certificates

Where certificates need to be issued to computer systems for the purpose of machine to machine authentication, it is of paramount importance that the certificate contains a unique identification relating to the systems. At the same time, it is essential that the applications making use of such certificates are designed to verify the system with the digital certificate being used. The certificate field requirements for system certificates include

Sn.	Field / Extension	Variation
1.	Subject Name	<p>The CN in the Subject Name MUST contain either</p> <ul style="list-style-type: none"> IP Address of the system as a printable string in "network byte order", as specified in [RFC791] MAC Address of primary network interface as a printable string Serial number (CPU or any electronically verifiable serial number) as a printable string Unique ID (such as CPU identifier) as a printable string
2.	Key Usage	Key Encipherment, Digital Signature
3.	Subject Alternative Name	<p>Subject Alternative Name may contain</p> <ul style="list-style-type: none"> IP Address of the system as a octet string in "network byte order", as specified in [RFC791]

4	Extended Key Usage	id-kp-clientAuth {1 3 6 1 5 5 7 3 2}
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Applications wishing to utilise these certificates must be developed to independently verify the CN vis-à-vis the actual at the time of each transaction. For applications processing sensitive or high value transactions, it is recommended that the private key be stored in a Hardware Security Module (HSM).

3. Time stamping authority certificate

Licensed CAs in India may issue certificates for the purpose of time stamping. It is recommended by the CCA that a time stamping certificate should be exclusively used for the purpose. The only variation for time stamping certificate will be the Extended Key Usage extension. The extension should be set as

Sn.	Field / Extension	Variation
1.	• Subject	Should follow same naming conventions as a CA with “CA” and “Certifying Authority” replaced with “TSA” and “Time Stamping Authority” respectively
2.	• Key Usage	Digital Signature
3.	• Extended Key Usage	Time stamping id-kp-timestamping {1 3 6 1 5 5 7 3 8} -- Critical

These certificates are to be issued to persons or agencies acting as time stamping authorities.

4. Code Signing

Signing of software code is gaining importance. End users and corporations may wish to sign the software code to indicate genuineness of the software. Certificates may be issued by licensed CAs for code signing purposes. The certificate key usage field MUST be set as follows

Sn.	Field / Extension	Variation
1.	Key Usage	Digital Signature
2.	Extended Key Usage	Code Signing id-kp-codeSigning {1 3 6 1 5 5 7 3 3} -- Critical

5. Encryption Certificate

Certificates for encryption of information must be separate from normal end-user / subscriber digital signature certificate. The certificate may be used for data encryption / decryption or email protection. The variations would exist in the key usage and extended key usage fields as below

Sn.	Field / Extension	Variation
1.	• Key Usage	• Key encipherment
2.	• Extended Key Usage	• Encrypting File System EKU=1.3.6.1.4.1.311.10.3.4 -- Critical

6. OCSP Responder Certificate

The OCSP responder certificates will have the following variation in the fields.

Sn.	Field / Extension	Variation
1.	Validity Period	Validity expressed in UTC Time for certificates valid through 2049
2.	Subject Distinguished Name	Common Name (CN) <OCSP Responder Name> Organisational Unit (OU) OCSP Responder Organisation (O) Legal Name of the OCSP Organization Country (C) Country code as per the verified office address
3.	Key Usage	DigitalSignature
4.	Certificate Policies	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices.
5.	Extended Key Usage	id-kp-OCSPSigning {1 3 6 1 5 5 7 3 9}

7. Organisational Document Signer Certificate

The Document Signer Certificates are issued to organisational software applications for operating automatically to authenticate documents/information attributed to the organisation by using Digital Signature applied on the document documents/Information. The certificate field requirements for Document Signer Certificates include.

Sn.	Field / Extension	Variation
1.	Subject Name	<p>Common Name (CN)</p> <p>DS Legal Name of the Organisation (number)</p> <ul style="list-style-type: none"> • DS represent Documents/Information Signer. • (number) should be appended to differentiate the certificate(s) issued to same organisation <p>Other Attributes</p> <ul style="list-style-type: none"> ▪ Serial Number This attribute should be populated with the SHA 256 hash of the PAN number of organisation. The hash must be calculated for the PAN number after deleting all leading and trailing blanks. In case PAN has not been provided, this field must be omitted. ▪ State / Province State / province for verified Organisation address ▪ Organisation Unit(OU) Department / Division to which the individual belongs within his Organisation. In case meaningful OU has not been provided, this field must be omitted ▪ Organisation (O) Legal Name of the organisation the person belongs to ▪ Country (C) Country code as per the verified Office address
2.	Key Usage	Digital Signature, nonRepudiation(O)

4	Extended Key Usage	<p>Secure E-Mail {1.3.6.1.5.5.7.3.4} (Optional)</p> <p>MSFT Document Signing {1.3.6.1.4.1.311.10.3.12} Mandatory</p> <p>Adobe Document Signing {1.2.840.113583.1.1.5} (Optional)</p>
5	Certificate Policies	<p>1. The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices.</p> <p>2. The value must contain the policy ID, (2.16.356.100.10.1) to limits the usage of this certificate only in the context of automated signing and also to reflect organisational accountability. Relying party application should validate accordingly. This certificate is not meant for individual signing purpose.</p>

Annexure III - Reference Certificate Profiles

This section provides reference certificate profiles for use of Certifying Authority for creation and issuance of Digital Certificate .

Legend

M: Mandatory

O: Optional

C: Critical

NC: Non Critical

CA Certificate Profile

Sn.	Field	M/O	C/NC	Value
1.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
2.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
3.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters)
4.	Issuer Distinguished Name	M	NA	Common Name (CN) CCA India {Generation Qualifier} { Issuance number }* Organisation (O) India PKI* Country (C) India (IN)
5.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
6.	Subject Distinguished Name	M	NA	Common Name (CN) "Certifying Authority Name" CA {Generation Qualifier} (Issuance number) House Identifier This attribute MUST contain the Flat number, Apartment name and Plot no. OR House Name / Number and Plot Number Of the CA;s head office / registered office address Street Address This attribute value MUST contain following parameters of the CA's head office / registered office address Locality / colony name (nearest) Street Name

* With respect to Mauritius Operations, "O=India PKI" will be substituted with "O=India PKI for Mauritius Operations"

				<p>Town / Suburb / Village City name (if applicable) District</p> <p>State / Province State / province where the Certifying Authority has its head office or registered office</p> <p>Postal Code Pin Code</p> <p>Organisational Unit (OU) “Certifying Authority”</p> <p>Organisation (O) Legal Name of the CA</p> <p>Country (C) Country code as per the verified CAs head office or registered office address</p>
7.	Subject Public Key Information	M	NA	rsaEncryption {1 2 840 113549 1 1 1}, 2048 RSA Key modulus, public exponent
8.	Issuer’s Signature Algorithm	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters)
9.	Signature Value	M	NA	Issuer CA’s signature
Extensions				
1.	Authority Key Identifier	M	NC	Root Certifying Authority of India (RCAI) SubjectkeyIndetifier
2.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
3.	Key Usage	M	C	keyCertSign, cRLSign
4.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices.
5.	Basic Constraints	M	C	CA Boolean = True, pathLenConstraints 0 or 1 depending on sub-CA
6.	CRL Distribution Points	M	NC	DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer reasons and cRLIssuer fields shall be absent.
7.	Authority Information Access	M	NC	The id-ad-caIssuers OID shall be absent. The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] if RCAI uses OCSP. If RCAI does not use OCSP AIA extension shall be absent.
8.	Extended Key Usage	O	NC	extended key usage shall include(only for the CA issuing SSL certificates) <ul style="list-style-type: none"> ▪ id-kp-serverAuth {1 3 6 1 5 5 7 3 1} ▪ id-kp-clientAuth {1 3 6 1 5 5 7 3 2} ▪ id-kp-emailProtection {1 3 6 1 5.5 7 3 4}

Sub-CA Certificate Profile

Sn.	Field	M/O	C/NC	Value
1.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
2.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
3.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2}
4.	Issuer Distinguished Name	M	NA	Must be same as Subject DN of the Issuing CA
5.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
6.	Subject Distinguished Name	M	NA	<p>Common Name (CN) “Certifying Authority Name” sub-CA for “Branding Name” {Generation qualifier} (Issuance number }</p> <p>Organisational Unit (OU) Sub-CA</p> <p>Organisation (O) Legal Name of the Sub-CA (same as CA legal name)</p> <p>Country (C) Country code as per the verified office address</p>
7.	Subject Public Key Information	M	NA	rsaEncryption {1 2 840 113549 1 1 1}, 2048 RSA Key modulus, public exponent or ecPublicKey { 1.2.840.10045.2.1}, namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)
8.	Issuer’s Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)
9.	Signature Value	M	NA	Issuer CA’s signature
Extensions				
1.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
2.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
3.	Key Usage	M	C	keyCertSign, cRLSign
4.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices.
5.	Basic Constraints	M	C	CA Boolean = True, pathLenConstraints = 0
6.	CRL Distribution Points	M	NC	DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all

				reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer reasons and cRLIssuer fields shall be absent.
7.	Authority Information Access	M	NC	The id-ad-calssuers OID MUST point to the certificate issued to the Licensed CA by RCAI. The OID should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852]. The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] for CAs using OCSP. If OCSP is not used, the OID must not be present.
8.	Extended Key Usage	O	NC	If present, extended key usage shall include(only for the CA issuing SSL certificates) <ul style="list-style-type: none"> ▪ id-kp-serverAuth {1 3 6 1 5 5 7 3 1} ▪ id-kp-clientAuth {1 3 6 1 5 5 7 3 2} ▪ id-kp-emailProtection {1 3 6 1 5.5 7 3 4}

End User Certificate Profile (issued for personal use)

Sn.	Field	M/O	C/NC	Value
1.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
2.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
3.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2}
4.	Issuer Distinguished Name	M	NA	Must be same as Subject DN of the issuing CA
5.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
6.	Subject Distinguished Name	M	NA	<p>Common Name (CN) Name string of maximum 64 characters The Common name should be the name of the person as in records</p> <p>Serial Number This attribute should be populated with the SHA 256 hash of the PAN number of the end user. The hash must be calculated for the PAN number after deleting all leading and trailing blanks. In case PAN has not been provided, this field must be omitted.</p> <p>State / Province State / province for verified residential</p>

				<p>address</p> <p>Postal Code PIN Code for the for Subject's residential address.</p> <p>Telephone Number "This attribute shall be used for SHA 256 hash of Mobile Number for individuals" (optional) (2.5.4.20 - id-at-telephoneNumber)</p> <p>Pseudonym Response code in the case of eKyc Service(optional) (2.5.4.65 - id-at-pseudonym)</p> <p>Title Last four digit of Aadhaar Number in the case of Aadhaar eKYC for personal certificate. In other cases this field must be omitted.</p> <p>Organisation (O) Personal</p> <p>Country (C) Country code as per the verified residential address</p>
7.	Subject Public Key Information	M	NA	rsaEncryption, 2048 RSA Key modulus, public exponent or ecPublicKey { 1.2.840.10045.2.1}, namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)
8.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)
9.	Signature Value	M	NA	Issuer CA's signature
Extensions				
1.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
2.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
3.	Key Usage	M	C	DigitalSignature, nonRepudiation(optional)
4.	Certificate Policies	M	NC	<p>The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices.</p> <p>explicit Text- Values for short validity (30 Min) DSC may be any one of the following:- 'Aadhaar online eKYC Biometric-Single factor', 'Aadhaar online eKYC OTP-Single Factor', 'Aadhaar Offline eKYC OTP and PIN -Multi Factor', 'Organisational KYC OTP and PIN -Multi Factor', 'Banking eKYC OTP and PIN -Multi Factor', 'PAN KYC OTP and PIN -Multi Factor', CA KYC OTP and PIN -Multi Factor'</p> <p>Values for long validity DSC may be any one of the following:- 'Class III Certificate', :- 'Class II certificate – Remote'</p>
5.	Basic Constraints	M	C	CA Boolean = False

6.	Subject Alternative Name	O	NC	Email Address
7.	CRL Distribution Points	M	NC	DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer reasons and cRLIssuer fields shall be absent.
8.	Authority Information Access	M	NC	The id-ad-calssuers OID MUST point to certificates issued to the CA issuing the certificate containing this field. The OID should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852]. The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] for CAs using OCSP. If OCSP is not used, the OID must not be present.
9.	Extended Key Usage	M	NC	Extended key usage shall include at least one of the following <ul style="list-style-type: none"> ▪ id-kp-emailProtection {1 3 6 1 5.5 7 3 4} ▪ MSFT Document Signing: {1.3.6.1.4.1.311.10.3.12} The optional EKUs are given below <ul style="list-style-type: none"> ▪ Smart Card Logon {1.3.6.1.4.1.311.20.2.2} ▪ Adobe Certified Document Signing {1.2.840.113583.1.1.5 }

End User Certificate Profile (issued for organization use)

Sn.	Field	M/O	C/NC	Value
1.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
2.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
3.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2}
4.	Issuer Distinguished Name	M	NA	Must be same as Subject DN of the issuing CA
5.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
6.	Subject Distinguished Name	M	NA	Common Name (CN) Name string of maximum 64 characters The Common name should be the name of the person as in records

				<p>Serial Number This attribute should be populated with the SHA 256 hash of the PAN number of the end user. The hash must be calculated for the PAN number after deleting all leading and trailing blanks. In case PAN has not been provided, this field must be omitted.</p> <p>State / Province State / province for verified Office address</p> <p>Postal Code PIN Code for the for Subject's Office address.</p> <p>Telephone Number "This attribute shall be used for SHA 256 hash of Mobile Number for individuals" (optional) (2.5.4.20 - id-at-telephoneNumber)</p> <p>Organisation Unit Department / Division to which the individual belongs within his organisation In case meaningful OU has not been provided, this field must be omitted.</p> <p>Organisation (O) Legal Name of the organisation the person belongs to</p> <p>Country (C) Country code as per the verified Office address</p>
7.	Subject Public Key Information	M	NA	rsaEncryption, 2048 RSA Key modulus, public exponent or ecPublicKey { 1.2.840.10045.2.1}, namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)
8.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)
9.	Signature Value	M	NA	Issuer CA's signature
Extensions				
1.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
2.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
3.	Key Usage	M	C	DigitalSignature, nonRepudiation(optional)
4.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices. explicit Text- Values for short validity (30 Min) DSC may be any one of the following:- 'Aadhaar online eKYC Biometric-Single factor', 'Aadhaar online eKYC OTP-Single Factor', 'Aadhaar Offline eKYC OTP and PIN -Multi Factor', 'Organisational KYC OTP and PIN -Multi Factor', 'Banking

				eKYC OTP and PIN -Multi Factor', 'PAN KYC OTP and PIN -Multi Factor', CA KYC OTP and PIN -Multi Factor' Values for long validity DSC may be any one of the following:- 'Class III Certificate', :- 'Class II certificate – Remote'
5.	Basic Constraints	M	C	CA Boolean = False
6.	Subject Alternative Name	O	NC	Email Address
7.	CRL Distribution Points	M	NC	DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer reasons and cRLIssuer fields shall be absent.
8.	Authority Information Access	M	NC	The id-ad-caIssuers OID MUST point to certificates issued to the CA issuing the certificate containing this field. The OID should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852]. The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] for CAs using OCSP. If OCSP is not used, the OID must not be present.
9.	Extended Key Usage	M	NC	Extended key usage shall include at least one of the following <ul style="list-style-type: none"> ▪ id-kp-emailProtection {1 3 6 1 5.5 7 3 4} ▪ MSFT Document Signing: {1.3.6.1.4.1.311.10.3.12} The following are optional <ul style="list-style-type: none"> ▪ Adobe Certified Document Signing {1.2.840.113583.1.1.5} ▪ Smart Card Logon {1.3.6.1.4.1.311.20.2.2}

SSL Certificate Profile

Sn.	Field	M/O	C/NC	Value
1.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
2.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
3.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)
4.	Issuer Distinguished	M	NA	Must be same as Subject DN of the issuing CA

	Name			
5.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
6.	Subject Distinguished Name	M	NA	<p>Common Name (CN) Fully Qualified Domain Name</p> <p>Note : CommonName is optional. If present, this field MUST contain a Fully-Qualified Domain Name that is one of the values contained in the Certificate's subjectAltName extension. Wildcard FQDNs are permitted. A CA may issue an SSL Certificate with wildcard in the right-most label of the Domain Name provided that issuance complies with the requirements as mentioned in the SSL Guidelines.</p> <p>Optional Attributes</p> <p>State / Province State / province for verified Office address</p> <p>Organisation Unit(OU). Department / Division to which the individual belongs within his organisation. In case meaningful OU has not been provided, this field must be omitted.</p> <p>Organisation (O) Legal Name of the organisation the person belongs to</p> <p>Country (C) Country code as per the verified Office address</p>
7.	Subject Public Key Information	M	NA	rsaEncryption, 2048 RSA Key modulus, public exponent or ecPublicKey { 1.2.840.10045.2.1}, namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)
8.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)
9.	Signature Value	M	NA	Issuer CA's signature
Extensions				
1.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
2.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
3.	Key Usage	M	C	Key Encipherment and Digital Signature
4.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices.
5.	Basic Constraints	M	C	CA Boolean = False
6.	Subject Alternative Name	M	NC	<p>Subject Alternative Name: Fully Qualified Domain Name(FQDN)</p> <p>Note: Subject Alternative Name extension MUST contain at least one entry. Each entry MUST be either a dNSName containing the Fully-Qualified Domain Name. Wildcard FQDNs are permitted. A CA may issue an SSL Certificate with wildcard in the right-most label of the Domain Name provided that issuance complies with the requirements as mentioned in the Guidelines for issuance of SSL Certificates</p> <ul style="list-style-type: none"> ▪ dnsName(s) for the server(s) as an IA5 string
7.	Extended Key Usage	M	NC	Extended key usage shall include at least one of the following

				<ul style="list-style-type: none"> ▪ id-kp-serverAuth {1 3 6 1 5 5 7 3 1} ▪ id-kp-clientAuth {1 3 6 1 5 5 7 3 2}
8.	CRL Distribution Points	M	NC	<p>DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer</p> <p>reasons and cRLIssuer fields shall be absent.</p>
9.	Authority Information Access	M	NC	<p>The id-ad-caIssuers OID MUST point to certificates issued to the CA issuing the certificate containing this field. The OID should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852].</p> <p>The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] for CAs using OCSP. If OCSP is not used, the OID must not be present.</p>
10.	SignedCertificateTimestampList	O	NC	<p>OID: 1.3.6.1.4.1.11129.2.4.2- The SCT data corresponding to the end-entity certificate from at least one log operator.</p> <p>If SCT obtained from more than one log, SCTs can be directly embedded in the certificate, by encoding the SignedCertificateTimestampList structure as an ASN.1 OCTET STRING and inserting the resulting data in the TBSCertificate as an X.509v3 certificate extension (OID 1.3.6.1.4.1.11129.2.4.2).</p>

System Certificate Profile

Sn.	Field	M/O	C/NC	Value
1.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
2.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
3.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2}
4.	Issuer Distinguished Name	M	NA	Must be same as Subject DN of the issuing CA
5.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
6.	Subject Distinguished Name	M	NA	<p>The CN in the Subject Name MUST contain either</p> <ul style="list-style-type: none"> ▪ IP Address of the system as a printable string in "network byte order", as specified in [RFC791] ▪ MAC Address of primary network interface as a printable string ▪ Serial number (CPU or any electronically verifiable serial number) as a printable string ▪ Unique ID as a printable string
7.	Subject Public Key	M	NA	rsaEncryption, 2048 RSA Key modulus, public exponent

	Information			or ecPublicKey { 1.2.840.10045.2.1}, namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)
8.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)
9.	Signature Value	M	NA	Issuer CA's signature
Extensions				
1.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
2.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
3.	Key Usage	M	C	Key Encipherment and Digital Signature
4.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices.
5.	Basic Constraints	M	C	CA Boolean = False
6.	Subject Alternative Name	M	NC	The CN in the Subject Name MUST contain either <ul style="list-style-type: none"> IP Address of the system as a octet string in "network byte order", as specified in [RFC791]
7.	Extended Key Usage	M	NC	Extended key usage shall include <ul style="list-style-type: none"> id-kp-clientAuth {1 3 6 1 5 5 7 3 2}
8.	CRL Distribution Points	M	NC	DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer reasons and cRLIssuer fields shall be absent.

Time Stamping Authority Certificate Profile

Sn.	Field	M/O	C/NC	Value
1.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
2.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
3.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2}
4.	Issuer Distinguished Name	M	NA	Must be same as Subject DN of the Issuing CA
5.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
6.	Subject Distinguished Name	M	NA	Common Name (CN) <Time Stamping Authority Name> {Generation qualifier} (Issuance number }

				<p>Organisational Unit (OU) Time Stamping Authority</p> <p>Organisation (O) Legal Name of the TSA Organization</p> <p>Country (C) Country code as per the verified office address</p>
7.	Subject Public Key Information	M	NA	rsaEncryption, 2048 RSA Key modulus, public exponent or ecPublicKey { 1.2.840.10045.2.1}, namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)
8.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)
9.	Signature Value	M	NA	Issuer CA's signature
Extensions				
1.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
2.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
3.	Key Usage	M	C	DigitalSignature
4.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices.
5.	Basic Constraints	M	C	CA Boolean = False
6.	Extended Key Usage	M	C	id-kp-timestamping {1 3 6 1 5 5 7 3 8}
7.	CRL Distribution Points	M	NC	<p>DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer</p> <p>reasons and cRLIssuer fields shall be absent.</p>
8.	Authority Information Access	M	NC	<p>The id-ad-calssuers OID MUST point to certificates issued to the CA issuing the certificate containing this field. The OID should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852].</p> <p>The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] for CAs using OCSP. If OCSP is not used, the OID must not be present.</p>

Code Signing Certificate Profile

Sn.	Field	M/O	C/NC	Value
1.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
2.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
3.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2}
4.	Issuer Distinguished Name	M	NA	Must be same as Subject DN of the issuing CA
5.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
6.	Subject Distinguished Name	M	NA	<p>Common Name (CN) Name string of maximum 64 characters constructed in the following manner Common name should be the name of the person as in records Or Legal Name of the Organisation</p> <p>House Identifier This attribute MUST contain the • Flat number, Apartment name and Plot no. OR • House Name / Number and Plot Number Of the individuals verified office address</p> <p>Street Address This attribute value MUST contain following parameters of the Subject's OFFICE address • Locality / colony name • (nearest) Street Name • Town / Suburb / Village • City name (if applicable) • District</p> <p>State / Province • State / province for verified Office address</p> <p>Postal Code • PIN Code for the for Subject's Office address.</p> <p>Organisation (O) Legal Name of the organisation</p> <p>Country (C) Country code as per the verified Office address</p>
7.	Subject Public Key	M	NA	rsaEncryption, 2048 RSA Key modulus, public exponent

	Information			or ecPublicKey { 1.2.840.10045.2.1}, namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)
8.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)
9.	Signature Value	M	NA	Issuer CA's signature
Extensions				
1.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
2.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
3.	Key Usage	M	C	DigitalSignature
4.	Extended Key Usage	M	C	id-kp-codeSigning {1 3 6 1 5 5 7 3 3}
5.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices.
6.	Basic Constraints	M	C	CA Boolean = False
7.	CRL Distribution Points	M	NC	DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer reasons and cRLIssuer fields shall be absent.
8.	Authority Information Access	M	NC	The id-ad-calssuers OID MUST point to certificates issued to the CA issuing the certificate containing this field. The OID should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852]. The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] for CAs using OCSP. If OCSP is not used, the OID must not be present.

OCSP Responder Certificate Profile

Sn.	Field	M/O	C/NC	Value
1.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
2.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
3.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters) or

				ECDSA with SHA256 {1 2 840 10045 4 3 2}
4.	Issuer Distinguished Name	M	NA	Must be same as Subject DN of the Issuing CA
5.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
6.	Subject Distinguished Name	M	NA	<p>Common Name (CN) <OCSP Responder Name></p> <p>Organisational Unit (OU) OCSP Responder</p> <p>Organisation (O) Legal Name of the OCSP Organization</p> <p>Country (C) Country code as per the verified office address</p>
7.	Subject Public Key Information	M	NA	rsaEncryption, 2048 RSA Key modulus, public exponent or ecPublicKey { 1.2.840.10045.2.1}, namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)
8.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)
9.	Signature Value	M	NA	Issuer CA's signature
1.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
2.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
3.	Key Usage	M	C	DigitalSignature
4.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices.
5.	Basic Constraints	M	C	CA Boolean = False
6.	Extended Key Usage	M	C	id-kp-OCSPSigning {1 3 6 1 5 5 7 3 9}
7.	OCSP No revocation checking	M	NC	id-pkix-ocsp-nocheck=NULL{ 1.3.6.1.5.5.7.48.1.5}
8.	Authority Information Access	M	NC	The id-ad-calssuers OID MUST point to certificates issued to the CA issuing the certificate containing this field. The OID should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852].

Encryption Certificate profile (issued for personal use)

Sn.	Field	M/O	C/NC	Value
1.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
2.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
3.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2}
4.	Issuer Distinguished Name	M	NA	Must be same as Subject DN of the issuing CA
5.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
6.	Subject Distinguished Name	M	NA	<p>Common Name (CN) Name string of maximum 64 characters constructed in the following manner The Common name should be the name of the person as in records</p> <p>Serial Number This attribute should be populated with the SHA 256 hash of the PAN number of the end user. The hash must be calculated for the PAN number after deleting all leading and trailing blanks. In case PAN has not been provided, this field must be omitted.</p> <p>State / Province State / province for verified residential address</p> <p>Postal Code PIN Code for the for Subject's residential address.</p> <p>Organisation (O) Personal</p> <p>Country (C) Country code as per the verified residential address</p>
7.	Subject Public Key Information	M	NA	rsaEncryption, 2048 RSA Key modulus, public exponent or ecPublicKey { 1.2.840.10045.2.1}, namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)
8.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)
9.	Signature Value	M	NA	Issuer CA's signature
Extensions				
1.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
2.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key

3.	Key Usage	M	C	Key encipherment
4.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate policies.
5.	Basic Constraints	M	C	CA Boolean = False
6.	Subject Alternative Name	O	NC	Email Address
7.	Extended Key Usage	M	C	Encrypting File System EKU=1.3.6.1.4.1.311.10.3.4
8.	CRL Distribution Points	M	NC	DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer reasons and cRLIssuer fields shall be absent.
9.	Authority Information Access	M	NC	The id-ad-calssuers OID MUST point to certificates issued to the CA issuing the certificate containing this field. The OID should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852]. The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] for CAs using OCSP. If OCSP is not used, the OID must not be present.

Encryption Certificate profile (issued for organisation use)

Sn.	Field	M/O	C/NC	Value
1.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
2.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
3.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2}
4.	Issuer Distinguished Name	M	NA	Must be same as Subject DN of the issuing CA
5.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
6.	Subject Distinguished Name	M	NA	Common Name (CN) Name string of maximum 64 characters constructed in the following manner The Common name should be the name of the person as in records.

				<p>Serial Number This attribute should be populated with the <u>SHA 256 hash</u> of the PAN number of the end user. The hash must be calculated for the PAN number after deleting all leading and trailing blanks. In case PAN has not been provided, this field must be omitted.</p> <p>State / Province State / province for verified Office address</p> <p>Postal Code PIN Code for the for Subject's Office address.</p> <p>Organisation Unit(OU) Department / Division to which the individual belongs within his organisation. In case meaningful OU has not been provided, this field must be omitted.</p> <p>Organisation (O) Legal Name of the organisation the person belongs to</p> <p>Country (C) Country code as per the verified residential address</p>
7.	Subject Public Key Information	M	NA	rsaEncryption, 2048 RSA Key modulus, public exponent or ecPublicKey { 1.2.840.10045.2.1}, namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)
8.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)
9.	Signature Value	M	NA	Issuer CA's signature
Extensions				
1.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
2.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
3.	Key Usage	M	C	Key encipherment
4.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices.
5.	Basic Constraints	M	C	CA Boolean = False
6.	Subject Alternative Name	O	NC	Email Address
7.	Extended Key Usage	M	C	Encrypting File System EKU=1.3.6.1.4.1.311.10.3.4
8.	CRL Distribution Points	M	NC	DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer

				reasons and cRLIssuer fields shall be absent.
9.	Authority Information Access	M	NC	<p>The id-ad-calssuers OID MUST point to certificates issued to the CA issuing the certificate containing this field. The OID should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852].</p> <p>The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] for CAs using OCSP. If OCSP is not used, the OID must not be present.</p>

Organisational Document Signer Certificate Profile

Sn.	Field	M/O	C/NC	Value
1.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
2.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
3.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2}
4.	Issuer Distinguished Name	M	NA	Must be same as Subject DN of the issuing CA
5.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
6.	Subject Distinguished Name	M	NA	<p>Common Name (CN)</p> <ul style="list-style-type: none"> • DS Legal Name of the Organisation (number) <ul style="list-style-type: none"> • DS represent Documents/Information Signer. • (number) should be appended to differentiate the certificate(s) issued to same organisation <p>Serial Number</p> <p>This attribute should be populated with the <u>SHA 256 hash</u> of the PAN number of the organisation. The hash must be calculated for the organisational PAN number after deleting all leading and trailing blanks. In case organisational PAN has not been provided, this field must be omitted.</p>

				<p>House Identifier Of the Subject's verified Office address</p> <p>Street Address This attribute value MUST contain following parameters of the Subject's organisation address</p> <ul style="list-style-type: none"> • Locality / colony name (nearest) Street Name • Town / Suburb / Village • City name (if applicable) • District <p>State / Province • State / province for verified Office address</p> <p>Postal Code • PIN Code for the for Subject's Office address.</p> <p>Organisation Unit(OU) Department / Division to which the Subject belongs within his organisation. In case meaningful OU has not been provided, this field must be omitted.</p> <p>Organisation (O) Legal Name of the organisation</p> <p>Country (C) Country code as per the verified Office address</p>
7.	Subject Public Key Information	M	NA	rsaEncryption, 2048 RSA Key modulus, public exponent or ecPublicKey { 1.2.840.10045.2.1}, namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)
8.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters) or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)
9.	Signature Value	M	NA	Issuer CA's signature
Extensions				
1.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
2.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
3.	Key Usage	M	C	DigitalSignature, nonRepudiation(O)
4.	Subject Alternative Name	O	NC	Email Address
5.	Extended Key Usage	M	NC	At least one of the following is mandatory Secure E-Mail {1.3.6.1.5.5.7.3.4} MSFT Document Signing {1.3.6.1.4.1.311.10.3.12} The optional EKU is given below Adobe Document Signing {1.2.840.113583.1.1.5}
6.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate

				<p>polices.</p> <p>The value must contain the policy ID, 2.16.356.100.10.1 also</p>
7.	Basic Constraints	M	C	CA Boolean = False
8.	CRL Distribution Points	M	NC	<p>DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer</p> <p>reasons and cRLIssuer fields shall be absent.</p>
9.	Authority Information Access	M	NC	<p>The id-ad-caIssuers OID MUST point to certificates issued to the CA issuing the certificate containing this field. The OID should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852].</p> <p>The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] for CAs using OCSP. If OCSP is not used, the OID must not be present.</p>

CRL Profile

Sn.	Field	M/O	C/NC	Value
1.	Version	M		Should be Version 2 (Field value 1)
2.	Issuer Signature Algorithm	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} or ECDSA with SHA256 {1 2 840 10045 4 3 2}
3.	Issuer Distinguished Name	M	NA	Unique X.500 Issuing CA DN Single value shall be encoded in each RDN. Furthermore, each value shall be encoded as a printable string.
4.	thisUpdate	M	NA	Expressed in UTCTime until 2049
5.	nextUpdate	M	NA	Expressed in UTCTime until 2049 (\geq thisUpdate + CRL issuance frequency)
6.	Revoked certificates list	M	NA	0 or more 2-tuple of certificate serial number and revocation date (in Generalized Time)
7.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} or ECDSA with SHA256 {1 2 840 10045 4 3 2} (encoding MUST omit the parameters Field)

Extensions

1.	CRL Number	O	NC	Monotonically increasing integer (never repeated)
2.	Authority Key Identifier	M	NC	Octet String (must be the same as in Authority Key Identifier field in certificates issued by the CA)
CRL Entry Extensions				
1.	Reason Code	O	NC	Must be included when reason code = key compromise or CA compromise

Annexure IV – Application Developer Guidelines

Application developers are to develop applications in compliance with RFC5280 certificate profile. A number of commercial and open source PKI toolkits are available which can be used to develop a standard validation process. Some of the tool kits available include

- Microsoft CAPI for Windows environments
- Microsoft CNG for Vista and Server 2008 environments
- NSS for Linux and Unix environments
- Sun Java toolkit
- Open Source PKIF for Windows, Unix, Linux, .NET, and Java environments.
- Toolkits from PKI vendors

The following guidelines provide the minimum validations and certificate processing which needs to be carried out by applications to establish trust in the certificate presented to them by the user.

Pre-requisites

1. As a prerequisite, the applications need to establish a trust anchor. The trust anchor for the Indian PKI would be the CCA Root Certifying Authority of India (RCAI) Certificate. The certificate needs to be downloaded and installed in the application in a secure manner after verification of the certificate thumbprint.
2. The system should know the Certificate Policy OID(s) acceptable to it. For example an application may accept only Class III certificate or both Class II and Class III – depending upon the level of assurance required.
3. Applications should be able to determine the prospective certification path. Since the Indian PKI has limited number of CAs and Sub-CA with no cross certification, the CA certificates and sub-CA certificates are easily obtainable manually. Applications also may download the issuers certificate from the URI specified in Authority Information Access (AIA) field
4. The applications should have the capability to check the validity of the certificate with CRLs (and OCSP in the future)

Simplified Certificate Validation Steps

Application developers should carry out certification path validation in accordance to specifications in RFC 5280. The following steps are minimum validations to be performed by an application as an interim measure until it implements the complete path validation algorithm as mentioned in RFC5280.

1. Determine the prospective certificate path starting with end-entity certificate to trust anchor by following the AIA pointers in iterative manner.
2. for **each certificate** in the certification path starting with the certificate issued by the RCAI
 - a. verify the signature on the certificate using the public key from the previous certificate
 - b. verify that the current time is within the certificate validity
 - c. verify that certificate is not revoked (using CRL or OCSP). This will require verifying signature on the CRL using the same key that was used to verify the signature on the certificate in step 2.a above. For OCSP, the signature is verified on OCSP Response and signature on OCSP Responder certificate is verified using the same key that was used to verify the signature on the certificate in step 2.a above.
 - d. certificate issuer name corresponds to subject name in the previous certificate
3. Determine the intersection set of all the policies in the certification path and determine if it confirms to acceptable application policy

4. For all certificates other than end user certificate verify that basicConstraints extension is present and cA is set to TRUE and path length constraint is not violated per RFC 5280.
If any of the above fails, then reject the certificate. Once, the certificate passes the above mentioned validations, verify the use of the public key within the application is consistent with the Key Usage and Extended Key Usage extensions set on the certificate. If not, reject the certificate.

Certificate Use

The use of the certificate is to be consistent with the Key Usage and Extended Key Usage Extensions specified. The application can use the following information from the validated certificate: Subject DN, Subject Alternative Name, and Subject Public Key algorithm, public key and associated parameters. The use certificate is also consistent with policy-id listed in the Certificate Policies field to ascertain the certificate is used only for indented purpose,

Annexure V- Application Owner Guidelines

These Guidelines are intended for Application Owners for planning implementation of Digital Signature facility in their applications.

1. Based on Risk Analysis and security requirements for the applications and relying parties, Application Owners should decide the Assurance Level (Class) of the Digital Signature Certificates which is suitable for them.
2. Certifying Authorities are required to issue invoice to DSC applicant or DSC applicant's organisation from Aug 01, 2017 onwards. There should not be any contradictory requirements by the application owners in respect of invoice being raised to individual DSC applicants.
3. The DSCs issued by Licensed CAs hold same assurance level for the same class. In Digital Signature enabled applications, the application owners should accept DSCs issued by any of the Licensed CAs as long as they belong to the specified class or higher.
4. Application owners shall not impose the requirements of any additional DSC fields or private key storage requirements other than those mentioned in the Guidelines issued by CCA.
5. Application owners should accept higher class certificates if lower class certificates of the same been specified by Application Owners for their application.
6. Each type of certificate (Digital Signature, encryption, document signer, SSL, code signer etc) is intended for specific purpose. Application owners should use each type of certificates in consistent with their intended purpose

Controller of Certifying Authorities
Department of Information Technology
Ministry of Communications and Information Technology
Change History

1. Migration to 2048-bit RSA key lengths

Date	15-11-2010
Contents section	Field Definition 7. Field Name: Subject Public Key Info, Mandated Value
Page no	15

Version 2.0	Version 2.1
<p>For CA & sub-CA: rsaEncryption, 2048 RSA Key modulus, Public Exponent = $2^{16}+1$</p> <p>For end user: rsaEncryption, 2048 RSA Key modulus, Public Exponent = $2^{16}+1$</p>	<p>For CA & sub-CA: rsaEncryption, 2048 RSA Key modulus, Public Exponent = $2^{16}+1$</p> <p>For end user: rsaEncryption, 2048 RSA Key modulus, Public Exponent = $2^{16}+1$</p>

2. Migration to Secure Hash Algorithms SHA2

Date	15-11-2010
Contents Section	Field Definition 7. Field Name: SignatureAlgorithms, Mandated Value
Page no	17

Version 2.0	Version 2.1
<p>OID for SHA256 with RSA Encryption (null parameters) {iso(1) member-body(2) us(840) rsadsi(113549) pkcs(1) pkcs-1(1) 11}</p> <p>If parameters are present, in this field, they shall be ignored.</p>	<p>OID for SHA256 with RSA Encryption (null parameters) {iso(1) member-body(2) us(840) rsadsi(113549) pkcs(1) pkcs-1(1) 11}</p> <p>If parameters are present, in this field, they shall be ignored</p>

3. User Notice - IA5 string to Visible String

Date	15-11-2010
Contents section	Standard Extension Definition 4. Certificate Policies, Mandated Value

Page no	25
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Version 2.0	Version 2.1
The end entity certificate should contain User Notice qualifier 'explicit text' encoded as IA5 string	The end entity certificate should contain User Notice qualifier 'explicit text' encoded as Visible string

4. Key usage - CA and SubCA Certificate Profile

Date	15-11-2010
Contents	CA and SubCA Certificate Profile
section	key usage
Page no	76-79

Version 2.0	Version 2.1
keyCertSign, cRLSign, DigitalSignature, nonRepudiation	keyCertSign, cRLSign

5. CRL Profile – Hold Instruction removed

Date	15-11-2010
Contents	CRL Profile
section	CRL Entry Extension, Hold Instruction
Page no	90

Version 2.0	Version 2.1
Hold Instruction-O-NC- id-holdinstruction-reject. This extension must be present only if reason code = certificateHold	Removed

6. Key usage - System Certificate Profile

Date	18-04-2011
Contents	System Certificate Profile
section	key usage, Extended Key Usage
Page no	73

Version 2.1	Version 2.2
Key usage : Server authentication and Client authentication	Key Encipherment, Digital Signature
Extended Key Usage: none	id-kp-serverAuth {1 3 6 1 5 5 7 3 1}, id-kp-clientAuth {1 3 6 1 5 5 7 3 2}

7. End user certificate - Subject specification

Date	09-05-2011
Contents	End user certificate - Subject specification
section	Common Name
Page no	49

Version 2.2	Version 2.3
<p>Max Length: 64 Characters</p> <p>The Common name MUST be constructed in the following manner CN = “Surname” “Given Name” “Father / Husband’s name” “Initials”</p> <p>Surname The surname is name „inherited” by and individual from individual's parent or assumed by marriage.</p> <p>In the Indian context, Surname is same as last name or family name. In certain populations, where the use of Surname is not prevalent, the Surname will mean the part of the name which is common with the individual's parents or spouse (assumed from marriage).</p> <p>Where none of the above criteria are satisfied and where applicable, the house name, „gotra, trade, Indian tile, Indian salutation which is an integral part of the person's name is to be used as the surname.</p> <p>The Surname MUST not be Blank or substituted by initials.</p> <p>Given Names Given name is the name which is given to an individual by parent, or chosen by the individual, or by the name by which the individual is known.</p> <p>The given Name MUST not be Blank or substituted by initials.</p> <p>Generation qualifier if any (Jr. II) MUST be appended to the given name with a space distinguishing both.</p> <p>Father / Husband’s name This is the given name for the individual's father or husband. Father / Husband's name MAY be substituted with an initial.</p> <p>Initials This being a completely optional field and MAY contain initials of parts of person's name not</p>	<p>Max Length: 64 Characters</p> <p>The Common name should be constructed in the following manner CN = “Surname” “Given Name” “Initials”</p> <p>Surname The surname is name "inherited" by and individual from individual's parent or assumed by marriage.</p> <p>In the Indian context, Surname is same as last name or family name. In certain populations, where the use of Surname is not prevalent, the Surname will mean the part of the name which is common with the individual's parents or spouse (assumed from marriage).</p> <p>Given Names Given name is the name which is given to an individual by parent, or chosen by the individual, or by the name by which the individual is known.</p> <p>The given Name MUST not be Blank or substituted by initials.</p> <p>Generation qualifier if any (Jr. II) MUST be appended to the given name with a space distinguishing both.</p> <p>Initials This being a completely optional field and MAY contain initials of parts of person's name not</p>

already addressed in and of the above attributes	already addressed in and of the above attributes.
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Date	09-05-2011
Contents	Subject Distinguished Name -Common Name 1. End User Certificate Profile (issued for personal use) 2. End User Certificate Profile (issued for organization use) 3. Code Signing Certificate Profile 4. Encryption Certificate
Section	1- 79, 2-81, 3-86, 4-89
Page no	

Version 2.2	Version 2.3
“Surname” “Given Name” “Father / Husband’s name” “Initials”	“Surname” “Given Name” “Initials”

8. SSL Certificate - Profile

Date	13-06-2011
Contents	SSL Certificate Profile
section	Subject Distinguished Name, Subject Alternative Name
Page no	72

Version 2.3	Version 2.4
Subject Distinguished Name: The CN in the Subject Name MAY contain either Qualified domain name IP addresses of the server as a printable string in "network byte order", as specified in [RFC791]	Subject Distinguished Name: Common Name (CN) Fully Qualified Domain Name Optional Attributes State / Province State / province for verified Office address Organisation Unit(OU) Department / Division to which the individual belongs within his organisation Organisation (O) Legal Name of the organisation the person belongs to Country (C) Country code as per the verified Office address
Subject Alternative Name: dnsName for the server / web page as an IA5 string	Subject Alternative Name: dnsName(s) for the server(s) / web page as an IA5 string

	IP addresses of the server as a printable string in "network byte order", as specified in [RFC791]
--	--

9. Encryption Certificate Profile(Organisational use) New

Date	14-06-2011
Contents	Encryption Certificate Profile(Organisational use)
Version	2.4
Page no	91

Encryption Certificate (issued for organization use)

Sn.	Field	M/O	C/NC	Value
10.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
11.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
12.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters)
13.	Issuer Distinguished Name	M	NA	Must be same as Subject DN of the issuing CA
14.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
15.	Subject Distinguished Name	M	NA	<p>Common Name (CN) Name string of maximum 64 characters constructed in the following manner "Surname" "Given Name" "Initials"</p> <p>Serial Number This attribute should be populated with the <u>SHA 256 hash</u> of the PAN number of the end user. The hash must be calculated for the PAN number after deleting all leading and trailing blanks. In case PAN has not been provided, this field must be omitted.</p> <p>State / Province • State / province for verified Office address</p> <p>Postal Code • PIN Code for the for Subject's Office address.</p>

				<p>Organisation Unit(OU)</p> <ul style="list-style-type: none"> • Department / Division to which the individual belongs within his organisation <p>Organisation (O)</p> <ul style="list-style-type: none"> • Legal Name of the organisation the person belongs to <p>Country (C)</p> <ul style="list-style-type: none"> • Country code as per the verified residential address
16.	Subject Public Key Information	M	NA	rsaEncryption, 2048 RSA Key modulus, public exponent
17.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters)
18.	Signature Value	M	NA	Issuer CA's signature
Extensions				
10.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
11.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
12.	Key Usage	M	C	Key encipherment
13.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices.
14.	Subject Alternative Name	O	NC	Email Address
15.	CRL Distribution Points	M	NC	DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer reasons and cRLIssuer fields shall be absent.
16.	Authority Information Access	M	NC	<p>The id-ad-caIssuers OID MUST point to certificates issued to the CA issuing the certificate containing this field. The OID should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852].</p> <p>The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] for CAs using OCSP. If OCSP is not used, the OID must not be present.</p>

10. Key Usage -DigitalSignature, nonRepudiation

Date	25-08-2012
Contents	End User Certificate Profile (issued for personal use) End User Certificate Profile (issued for organization use)
Section	Key Usage
Version	2.4
Page no	79,80

Version 2.4		Version 2.5	
Key Usage - (M) (C)- nonRepudiation	DigitalSignature,	Key Usage - (M) (C)- nonRepudiation(optional)	DigitalSignature,

11. Document Signer Certificates

Date	08-09-2014
Contents	Document Signer Certificate Profile (issued for organizational software identity)
Section	Annexure II - Special Purpose Certificates
Version	2.6
Page no	76, 93

7. Organisational Document Signer Certificate

The Document Signer Certificates are issued to organisational software applications for operating automatically to authenticate documents/information attributed to the organisation by using Digital Signature applied on the document documents/Information. The certificate field requirements for Document Signer Certificates include.

Sn.	Field / Extension	Variation
1.	Subject Name	DS Legal Name of the Organisation (number) <ul style="list-style-type: none"> • DS represent Documents/Information Signer. • (number) should be appended to differentiate the certificate(s) issued to same organisation

2.	Key Usage	Digital Signature, nonRepudiation(O)
4	Extended Key Usage*	Secure E-Mail {1.3.6.1.5.5.7.3.4} (Optional) MSFT Document Signing {1.3.6.1.4.1.311.10.3.12} (Optional) Adobe Document Signing {1.2.840.113583.1.1.5} (Optional)
5	Certificate Policies	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices. The value must contain the policy ID, (2.16.356.100.10.1) to limits the usage of this certificate only in the context of automated signing and also to reflect organisational accountability. Relying party application should validate accordingly. This certificate is not meant for individual signing purpose.

* If there is no additional purpose other than the basic purposes defined in the key usage extension then extended Key Usage may not be present.

Organisational Document Signer Certificate Profile

Sn.	Field	M/O	C/NC	Value
10.	Version	M	NA	The mandated value is 2. (i.e., The certificate must be in a version 3 format)
11.	Serial Number	M	NA	Positive number of maximum Length 20 bytes and unique to each certificate issued by a CA.
12.	Issuer Signature Algorithm	M	NA	SHA256 with RSA Encryption (null parameters)
13.	Issuer Distinguished Name	M	NA	Must be same as Subject DN of the issuing CA
14.	Validity Period	M	NA	Validity expressed in UTC Time for certificates valid through 2049
15.	Subject Distinguished Name	M	NA	<p>Common Name (CN)</p> <ul style="list-style-type: none"> • DS Legal Name of the Organisation (number) <ul style="list-style-type: none"> • DS represent Documents/Information Signer. • (number) should be appended to differentiate the certificate(s) issued to same organisation <p>House Identifier Of the individuals verified Office address</p> <p>Street Address This attribute value MUST contain following parameters of the Subject's organisation address</p>

				<ul style="list-style-type: none"> • Locality / colony name • (nearest) Street Name • Town / Suburb / Village • City name (if applicable) • District <p>State / Province</p> <ul style="list-style-type: none"> • State / province for verified Office address <p>Postal Code</p> <ul style="list-style-type: none"> • PIN Code for the for Subject's Office address. <p>Country (C)</p> <p>Country code as per the verified Office address</p>
16.	Subject Public Key Information	M	NA	rsaEncryption, 2048 RSA Key modulus, public exponent
17.	Issuer's Signature	M	NA	sha256 WithRSAEncryption {1 2 840 113549 1 1 11} (null parameters)
18.	Signature Value	M	NA	Issuer CA's signature
Extensions				
9.	Authority Key Identifier	M	NC	Issuing CA SubjectkeyIndetifier
10.	Subject Key Identifier	M	NC	Octet String of unique value associated with the Public key
11.	Key Usage	M	C	DigitalSignature, nonRepudiation(O)
12.	Extended Key Usage	M	C	Secure E-Mail {1.3.6.1.5.5.7.3.4} (Optional) MSFT Document Signing {1.3.6.1.4.1.311.10.3.12} (Optional) Adobe Document Signing {1.2.840.113583.1.1.5} (Optional)
13.	Certificate Policies	M	NC	The value must contain the OID representing the CCA certificate policy the certificate is valid for; and all the lower level certificate polices. The value must contain the policy ID, 2.16.356.100.10.1
14.	CRL Distribution Points	M	NC	DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded full and complete CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer reasons and cRLIssuer fields shall be absent.
15.	Authority Information Access	M	NC	The id-ad-calssuers OID MUST point to certificates issued to the CA issuing the certificate containing this field. The OID should specify a HTTP URI which points to a single DER encoded certificate or a collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852]. The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] for CAs using OCSP. If OCSP is not used, the OID must not be present.

12. Certificate Use

Date	08-09-2014
Contents	Certificate Use
Version	2.5
Page no	94

Version 2.5	Version 2.6
<p>Certificate Use The use of the certificate is to be consistent with the Key Usage and Extended Key Usage Extensions specified. The application can use the following information from the validated certificate: Subject DN, Subject Alternative Name, Subject Public Key algorithm, public key and associated parameters,</p>	<p>Certificate Use The use of the certificate is to be consistent with the Key Usage and Extended Key Usage Extensions specified. The application can use the following information from the validated certificate: Subject DN, Subject Alternative Name, and Subject Public Key algorithm, public key and associated parameters. The use certificate is also consistent with policy-id listed in the Certificate Policies field to ascertain the certificate is used only for indented purpose</p>

13. Issuer and Subject field specification

Annexure I – Issuer and Subject field specification

Date	25-03-2015
Contents	Annexure I – Issuer and Subject field specification
Version	2.7
Page no	44

Sr. No	Attribute Type	Attribute Value Encoding
11	pseudonym	Printable
12	Telephone Number	Printable

14. End User Certificate Profile - Subject Specifications

End User Certificate Profile - Subject Specifications

Date	25-03-2015
Contents	End User Certificate Profile End User Certificate Profile (issued for personal use) End User Certificate Profile (issued for organization use) Encryption Certificate profile (issued for organisation use)
Version	2.6
Page no	49-50,80,82,92(examples in the remaining part of document)

Sn.	Attribute	Definition
1.	Common Name	"Name of the person as in records or " to be added prior to The Common name should be constructed in the following manner CN = "Surname" "Given Name" "Initials"
3.	Unique Identifier	This attribute should be populated with the SHA 256 hash of Aadhaar ID. In case Aadhaar ID has not been provided, this field must be omitted
*6	Pseudonym	Response code in the case of Aadhaar eKyc Service(optional) (2.5.4.65 - id-at-pseudonym)
*7	Telephone Number	"This attribute shall be used for SHA 256 hash of Mobile Number for individuals" (optional) (2.5.4.20 - id-at-telephoneNumber)

*6 & 7 are new fields

15. Organisational Document Signer Certificate Profile

Organisational Document Signer Certificate Profile

Date	25-03-2015
Contents	Organisational Document Signer Certificate Profile
Version	2.6
Page no	93

New

Sn.	Field	M/O	C/NC	Value
17.	Subject Alternative Name	O	NC	Email Address

New

Date	17-04-2015
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Contents	Organisational Document Signer Certificate Profile
Version	2.7
Page no	93

House Identifier Of the Subject's verified Office address

Organisation Unit(OU) Department / Division to which the Subject belongs within his organisation

Organisation (O) Legal Name of the organisation

Date	05-05-2015
Contents	Organisational Document Signer Certificate Profile
Version	2.7
Page no	93

Sn.	Field	M/O	C/NC	Value
4	Extended Key Usage	O	NC	Secure E-Mail {1.3.6.1.5.5.7.3.4} (Optional) MSFT Document Signing {1.3.6.1.4.1.311.10.3.12} (Optional) Adobe Document Signing {1.2.840.113583.1.1.5} (Optional)

16. SSL Certificate Profile

SSL Certificate Profile

Date	27-07-2015
Contents	Annexure III - Reference Certificate Profiles SSL Certificate Profile
Version	2.9
Page no	83-84

11.	Authority Information Access	M	NC	The id-ad-calssuers OID MUST point to certificates issued to the CA issuing the certificate containing this field. The OID should specify a HTTP URI which points to a single DER encoded certificate or a
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				<p>collection of DER encoded certificates in a BER or DER encoded "certs-only" CMS message as specified in [RFC3852].</p> <p>The id-ad-ocsp accesslocation must specify the location of the OCSP responder, using the conventions defined in [RFC2560] for CAs using OCSP. If OCSP is not used, the OID must not be present.</p>
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17. MODIFICATION FROM VERSION 3.0 TO 3.1

Date	05.05.2016
Version	3.0

1. Signature (for ECC)

Contents	Issuer Signature - ECC requirements added
<p>Page 11- 3.Field Name: Signature, Mandatory field description</p> <p>page 80- Sub-CA Certificate Profile</p> <p>page 82-End User Certificate Profile (issued for personal use)</p> <p>page 84-End User Certificate Profile (issued for organization use),</p> <p>page 85- SSL Certificate Profile</p> <p>page 87-System Certificate Profile</p> <p>page 88-Time Stamping Authority Certificate Profile</p> <p>page 90-Code Signing Certificate Profile</p> <p>page 91-OCSP Responder Certificate Profile</p> <p>page 92-Encryption Certificate profile (issued for personal use)</p>	
Issuer Signature	<p>or</p> <p><i>OID for ECDSA with SHA256 {1 2 840 10045 4 3 2}</i></p> <p><i>(encoding MUST omit the parameters Field)</i></p>

2. Subject Public Key Info (for ECC)

Contents	Subject Public Key Information- ECC requirements added
<p>page no 15- 7. Field Name: Subject Public Key Info,</p> <p>page 80- Sub-CA Certificate Profile</p> <p>page 82-End User Certificate Profile (issued for personal use)</p> <p>page 84-End User Certificate Profile (issued for organization use)</p> <p>page 85-SSL Certificate Profile</p> <p>page 87-System Certificate Profile</p> <p>page 88-Time Stamping Authority Certificate Profile</p> <p>page 90-Code Signing Certificate Profile</p> <p>page 91-OCSP Responder Certificate Profile</p>	
Subject Public Key Info	<p><i>ecPublicKey { 1.2.840.10045.2.1},</i></p> <p><i>namedCurve, { 1.2.840.10045.3.1.7} (NIST curve P-256)</i></p>

3 Signature Algorithm (for ECC)

Contents	Issuer Signature Algorithm - ECC requirements added
Page 17 - 9.	Field Name: signature Algorithm
page 80-	Sub-CA Certificate Profile
page 81-	End User Certificate Profile (issued for personal use)
page 83-	End User Certificate Profile (issued for organization use)
page 85-	SSL Certificate Profile
page 86-	System Certificate Profile
page 87-88-	Time Stamping Authority Certificate Profile
page 89-	Code Signing Certificate Profile
page 91-	OCSP Responder Certificate Profile

Issuer' s Signature	or OID for ECDSA with SHA256 {1 2 840 10045 4 3 2 }
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4. Extended Key Usage

Contents	Extended Key Usage - Added new Extended Key Usage field under extension
Page 36- 12.	Std. Extension : Extended Key Usage ,Mandated value
page 80 -	End User Certificate Profile (issued for personal use)
page 82-	End User Certificate Profile (issued for organization use)

Extended Key Usage	<ul style="list-style-type: none"> ▪ <i>id-kp-emailProtection {1 3 6 1 5.5 7 3 4}</i> ▪ <i>Smart Card Logon {1.3.6.1.4.1.311.20.2.2} (for end user certificates) – Non Critical</i> ▪ <i>MSFT Document Signing: {1.3.6.1.4.1.311.10.3.12} – Non Critical</i> ▪ <i>Adobe Certified Document Signing {1.2.840.113583.1.1.5} – Non Critical</i>
Contents	12. Std. Extension : Extended Key Usage
Page no	35
Recommended Value	Replaced "for server certificate" with " for SSL certificates"
Contents	In CA Certificate Profile and Sub-CA Certificate Profile New Extended Key Usage field has been added for the purpose CA issuing SSL
Page no	Page 79-81
Extended Key Usage	If present, extended key usage shall include(only for the CA issuing SSL certificates) id-kp-serverAuth {1 3 6 1 5 5 7 3 1} id-kp-clientAuth {1 3 6 1 5 5 7 3 2} id-kp-emailProtection {1 3 6 1 5.5 7 3 4}

5. Issuer and Subject field specification

Contents	Annexure I – Issuer and Subject field specification Annexure II - Special Purpose Certificates Annexure III - Reference Certificate Profiles
Page no	page 49-50 -End User Certificate –Subject Specifications page 83-84 End User Certificate Profile (issued for

	<p>organization use) page 72 SSL certificate page 85 SSL Certificate Profile Page 93-94 Encryption Certificate profile (issued for organisation use) Page -76 Organisational Document Signer Certificate Page 96-97 Organisational Document Signer Certificate Profile</p>
Organisation Unit	Added : In case meaningful OU has not been provided, this field must be omitted.
Contents	Annexure I – Issuer and Subject field specification Annexure II - Special Purpose Certificates
Page no	page 72-SSL Certificate page 85 SSL Certificate Profile
Common name	Note added Note : CommonName is optional. If present, this field MUST contain a Fully-Qualified Domain Name that is one of the values contained in the Certificate’s subjectAltName extension. Wildcard FQDNs are permitted. A CA may issue an SSL Certificate with wildcard in the right-most label of the Domain Name provided that issuance complies with the requirements as mentioned in the Guidelines for issuance of SSL Certificates

6. Annexure I – Issuer and Subject field specification, Naming convention

Contents	Modified re-issuance number to <i>issuance number</i> in the entire document Note Modified
Page no	Issuance number - 44, 45,51-71,78, 80,88
<p>Existing text : Note: The generation qualifier will be used only on re-issuance of certificate keys for the CA. The generation qualifier necessarily is to be in the form of 4 digit year (yyyy). In case multiple certificates have been issued in the same year, the year indicator is to be followed by hyphen and digit indicating the re-issuance of certificate. E.g. When a certificate is issued in 2009, the CA name will be XYZ CA 2009. When the certificate is reissued in the same year, the CA name will be indicate as 2009 – 1.</p>	<p>Modified text: Note: The generation qualifier will be the generation qualifier of Root CA. -. The generation qualifier necessarily is to be in the form of 4 digit year (yyyy). In case multiple certificates have been issued the year indicator is to be followed by hyphen and digit indicating the sequence number of issuance of certificate. E.g. When a root certificate is issued in 2009, the CA name will be XYZ CA 2009. When the next CA certificate is reissued -, the CA name will be indicate as 2009 – 1.</p>

Contents	The option of CN = "Surname" "Given Name" "Initials" format has been removed or replaced with "The Common name should be the name of the person as in records"
Page no	Page 48 End User Certificate –Subject Specifications Page 80 End User Certificate Profile (issued for personal use) Page 82 End User Certificate Profile (issued for organization use) Page 88 Code Signing Certificate Profile Page 91 Encryption Certificate profile (issued for personal use) Page 93 Encryption Certificate profile (issued for organisation use)
Common Name	Removed "Surname" "Given Name" "Initials" Added "The Common name should be the name of the person as in records"

7. Annexure II - Special Purpose Certificates-SSL certificate

Contents	Added Note and removed the option of IP address
Page no	71-72
1.Common Name 4. Subject Alternative Name	<p>Page :71 common Name , added "Note : CommonName is optional. If present, this field MUST contain a Fully-Qualified Domain Name that is one of the values contained in the Certificate's subjectAltName extension. Wildcard FQDNs are permitted. A CA may issue an SSL Certificate with wildcard in the right-most label of the Domain Name provided that issuance complies with the requirements as mentioned in the Guidelines for issuance of SSL Certificates."</p> <p>Page :72, Subject Alternative Name , added "Fully Qualified Domain Name(FQDN) Note: Subject Alternative Name extension MUST contain at least one entry. Each entry MUST be either a dNSName containing the Fully-Qualified Domain Name. Wildcard FQDNs are permitted. A CA may issue an SSL Certificate with wildcard in the right-most label of the Domain Name provided that issuance complies with the requirements as mentioned in the Guidelines for issuance of SSL Certificates"</p> <p>Deleted IP addresses of the server as a printable string in "network byte order", as specified in [RFC791]"</p>

8. Annexure II - Special Purpose Certificates- System certificate

Contents	Removed the option of dnsname and server authentication
Page no	73

3. Subject Alternative Name	Deleted : dnsName in IA5String format
4. Extended Key Usage	Deleted : id-kp-serverAuth {1 3 6 1 5 5 7 3 1},

9. Annexure II - Special Purpose Certificates- Organisational Document Signer Certificate

Contents	Added serial number under Other Attributes
Page no	Page -76 Organisational Document Signer Certificate Page 96-97 Organisational Document Signer Certificate Profile
1. Subject Name	Serial Number: This attribute should be populated with the SHA 256 hash of the PAN number of organisation. The hash must be calculated for the PAN number after deleting all leading and trailing blanks. In case PAN has not been provided, this field must be omitted.

10. Recommended Organization Hierarchy

Contents	Added serial number under Other Attributes
Page no	7
Existing : A CA with sub-CA must necessarily issue end entity certificates only through its sub-CA. The only exception will be for code signing and time stamping certificates, which may directly be issued by the CA.	Modified <ul style="list-style-type: none"> ○ The only exception will be for OCSP Responder Certificates, which may directly be issued by the CA. ○ A CA should have an offline certificate issuance system for issuance of SSL and Code signing certificates under special purpose trust chain. A separate CA must be used for issuance of SSL and Code Signing certificates. A single issuing CA must not be used to issue both server authentication and code signing certificates

18. Subject field specification

Annexure I – Issuer and Subject field specification

Date	30-01-2017
Contents	Annexure I – Issuer and Subject field specification End User Certificate –Subject Specifications End User Certificate Profile (issued for organization use)
Version	3.2
Page no	44,49,81

Sr. No	Attribute Type	Attribute Value Encoding
13	Title	Printable

End User Certificate –Subject Specifications

Sn.	Attribute	Definition
8	Title	Employee code in the case of organisational person certificate (Optional) 2.5.4.12 - id-at-title. This attribute should be populated with the SHA 256 hash of Employee code . In case Employee code has not been provided, this field must be omitted

End User Certificate Profile (issued for organization use)

In the field Subject Distinguished Name

Title Employee code in the case of organisational person certificate (Optional) (2.5.4.12 - id-at-title)
This attribute should be populated with the SHA 256 hash of Employee code . In case Employee code has not been provided, this field must be omitted

19. Application Owner Guidelines

Date	29-12-2017
Contents	Annexure V- Application Owner Guidelines (New)
Version	3.3
Page no	98

20 OCSP Responder Certificate Profile

Date	29-12-2017
Contents	OCSP Responder Certificate Profile
Version	3.3
Page no	88

Existing

5	Extended Key Usage	M	C	id-kp-OCSPSigning {1 3 6 1 5 5 7 3 9}
6	CRL Distribution Points	O	NC	<p>Must be present if no-check extension is absent.</p> <p>Must be absent if no-check extension is present.</p> <p>DistributionPointName MUST be set and MUST contain a complete HTTP URI pointing to a DER encoded partitioned CRL for all reasons. DistributionPointName shall contain the fullName and thus shall not contain nameRelativeToCRLIssuer</p> <p>reasons and cRLIssuer fields shall be absent.</p>

Modified

5. Extended Key Usage	id-kp-OCSPSigning {1 3 6 1 5 5 7 3 9}
6 OCSP No revocation checking	id-pkix-ocsp-nocheck=NULL (added)
7. CRL Distribution Points	removed

21 OCSP Responder Certificate Profile

Date	25-05-2018
Contents	Aadhaar Number to UID Token related
Version	3.3
Page no	48,49,78,79

Modified

Annexure I – Issuer and Subject field specification	Title (Optional) 2.5.4.12 - id-at-title.
i) End user Certificate – Subject Specifications, page 49	Last four digit of Aadhaar Number in the case of Aadhaar eKYC for personal certificate. In other cases this field must be omitted.
Annexure III – Reference Certificate Profiles	Unique Identifier: This attribute should be populated with UID Token in the case of Aadhaar authentication. In other cases, this field must be omitted.
i) End User Certificate Profile (issued for personal use) page 78	Removed
Annexure I – Issuer and Subject field specification	
i) End user Certificate – Subject Specifications, page 48	
Annexure III – Reference Certificate Profiles	
i) End User Certificate Profile (issued for personal use) page 78	
Removed the references of TCS CA and NIC CA from <u>Certificate Subject & Issuer Examples</u> section of the IOG	

26. Additional field : DnQualifier -Encoding

Date	19-06-2018
Contents section	Field Definition(addition) Annexure I – Issuer and Subject field specification, Encoding of Attribute values.
Page no	44

Sr. No	Attribute Type	Attribute Value Encoding
14	DnQualifier	Printable string

DnQualifier - End User Certificate –Subject Specifications

Date	19-06-2018
Contents section	Field Definition(addition) End User Certificate –Subject Specifications. Annexure III - Reference Certificate Profiles - End User Certificate Profile (issued for personal use)
Page no	49, 72

9	DnQualifier	<p>(Optional) : 2.5.4.46 id-at-dnQualifier Max Length: 69 Characters DnQualifier Value = YOB+Gender+Hash of photograph</p> <p>YOB : Year of birth, Numeric string , length= 4</p> <p>Gender: A single character (M/F/T), Length =1</p> <p>Hash of photograph: The base64 encoded image value that received from the UIDAI should be digested as is using SHA256 algorithm and expressed as a hex string, Length=64</p> <p>Each missing values of YOB or gender or Hash of the photograph, should be replaced by X so that total length remain 69</p> <p>In the case of Aadhaar eKYC for personal certificate this field is mandatory. In other cases this field must be omitted.</p>
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27. Fields DnQualifier, Unique identifier , SignedCertificateTimestampList

Date	18-12-2018
Contents section	Field Definition-Deletion DnQualifier -Page 44,49,73 Unique Identifier -Page 44,48,72

Date	18-12-2018
Contents section	Field Definition-added SignedCertificateTimestampList - Page 40,79

28. Basic Constraints and Extended Key Usage

Date	03-01-2019
Contents	EKU-Modification , Basic Constraints-addition

Basic Constraints

- Page 31- 9. Std. Extension : Basic Constraints
- Page 73- End User Certificate Profile (issued for personal use)
- Page 76-End User Certificate Profile (issued for organization use)
- Page 77--SSL Certificate Profile
- Page 79-System Certificate Profile
- Page 80- Time Stamping Certificate Profile
- Page 81-Code Signing Certificate Profile
- Page 81-OCSP Responder Certificate Profile
- Page 84-Encryption Certificate profile (issued for personal use)
- Page 86-Encryption Certificate profile (issued for organisation use)
- Page 89- Organisational Document Signer Certificate Profile

Extended Key Usage

- Page 35 -12. Std. Extension : Extended Key Usage
- Page 63- Annexure II -1. SSL Certificate
- Page 67- Annexure II 5. Encryption Certificate
- Page 67- Annexure II 7. Organisational Document Signer Certificate
- Page 74- End User Certificate Profile (issued for personal use)
- Page 76-End User Certificate Profile (issued for organization use)
- Page 84-Encryption Certificate profile (issued for personal use)
- Page 86-Encryption Certificate profile (issued for organisation use)
- Page 89- Organisational Document Signer Certificate Profile

29. Std. Extension : Certificate Policies

Date	05-01-2019
Contents	explicit Text- Value

4. Std. Extension : Certificate Policies

- Page 25 explicit Text- Values 'Aadhaar online eKYC Biometric- Single factor', 'Aadhaar online eKYC OTP-Single Factor', 'Aadhaar Offline eKYC OTP and PIN -Multi Factor', 'Organizational KYC OTP and PIN -Multi Factor', 'Banking eKYC OTP and PIN -Multi

Factor'

End User Certificate Profile (issued for personal use)

Page 73-74 explicit Text- Values 'Aadhaar online eKYC Biometric- Single factor', 'Aadhaar online eKYC OTP-Single Factor', 'Aadhaar Offline eKYC OTP and PIN -Multi Factor', 'Organizational KYC OTP and PIN -Multi Factor', 'Banking eKYC OTP and PIN -Multi Factor

End User Certificate Profile (issued for organization use)

Page 75-76 explicit Text- Values 'Aadhaar online eKYC Biometric- Single factor', 'Aadhaar online eKYC OTP-Single Factor', 'Aadhaar Offline eKYC OTP and PIN -Multi Factor', 'Organizational KYC OTP and PIN -Multi Factor', 'Banking eKYC OTP and PIN -Multi Factor

Date	04-02-2021
Contents	explicit Text- Value

Added 'PAN KYC OTP and PIN -Multi Factor', CA KYC OTP and PIN -Multi Factor'
Values for long validity DSC may be any one of the following:- 'Class III Certificate', :- 'Class II certificate – Remote' - to the above section with same page Number

the 1990s, the number of people in the world who are illiterate has increased from 400 million to 600 million.

It is not only the number of illiterate people that has increased, but also the number of illiterate children. In 1990, 100 million children were illiterate. In 2000, the number had increased to 150 million.

The number of illiterate people in the world is increasing at an alarming rate. This is a major cause of poverty and underdevelopment. It is essential that we take steps to reduce the number of illiterate people in the world.

One of the most effective ways to reduce the number of illiterate people is to provide universal access to primary education. This means that every child should have the opportunity to attend school.

Another important step is to provide training and education for adults. This will help them to improve their skills and find better jobs.

It is also important to provide access to information and communication technologies. This will help people to learn and improve their skills.

Finally, it is important to create a culture of learning. This means that people should be encouraged to learn throughout their lives.

By taking these steps, we can reduce the number of illiterate people in the world and improve the lives of billions of people.

By providing universal access to primary education, we can ensure that every child has the opportunity to learn.

By providing training and education for adults, we can help them to improve their skills and find better jobs.

By providing access to information and communication technologies, we can help people to learn and improve their skills.

By creating a culture of learning, we can encourage people to learn throughout their lives.

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