



Certificate, CRL and OCSP Profile for Organisation Certificates Issued by SK

Version 10.1
18.02.2020

Version information		
Date	Version	Changes/amendments
18.02.2020	10.1	Chapter 4 - added nonce extension support for OCSP; corrected responderID value by adding CN of KLASS3-SK 2010
15.08.2019	10.0	Approved version Chapter 3.1 – usage of OU field in certificate subject is changed. No pre-defined values are added; Chapter 3.2.3 – new OID's are added under certificate policies what are used to define the certificate type; Chapter 6 – ETSI documentation versions updated.
04.01.2019	9.0	Chapter 3.1 - Added certificate validity periods; Chapter 5.2 - corrections and improvements of AuthorityKeyIdentifier description; Chapter 4 - new extensions added: Archive Cutoff; Extended Revoked Definition and nextUpdate; CertStatus description is renewed.
30.11.2017	8.0	Approved version - Removed TLS Server Certificate profile; - Chapter 3.2.1 – CRL distribution point URL removed as it is not used in KLASS3-SK 2016; - Amended document wording and format.
01.09.2017	7.1	Draft of version 8.0
03.07.2017	7.0	Approved version - Chapter 3.1 - specified subject "Organisation Identifier" usage values;
04.04.2017	6.1	Draft of version 7.0
01.06.2017	6.0	Approved version - Chapter 2 – changed the name of the issuer CA from KLASS3-SK 2010 to KLASS3-SK 2016; - Chapters 3.1 and 5.1 – due to adding new CA KLASS3-SK 2016 to this document, updated the Common Name value; - Chapter 3.2.2 – replaced SK's former business name AS Sertifitseerimiskeskus with its new name SK ID Solutions AS; - Chapters 3.2.1 and 4 - due to adding new CA KLASS3-SK 2016 to this document, changed AIA OCSP name; - Chapter 3.2.1 – changed caIssuers certificate URL.



01.03.2017	5.1	Draft of version 6.0
03.02.2017	5.0	Approved version - Chapter 3.1 - added corrections in certification body (Issuer) and CPS reference; - Chapter 3.2.2 - specified Authentication Certificate key usage values; - Chapter 3.2.2 - added semantics identifier „id-etsi-qcs-semanticsId-Legal“ extension.
01.11.2016	4.1	Draft of version 5.0
01.07.2016	4.0	- Chapter 2 – added/renamed certificate profiles - Chapter 3.2 - improved certificate extensions table; - Chapter 3.2.3 - new OID's added in certificate policies.
01.04.2016	3.1	Draft of version 4.0. - Document name renamed; - Chapter 2 - renamed certificate profile types; - Chapter 2.1 - added terms and abbreviations; - Chapter 3.1 - improved “Technical Profile of the Certificate”; - Chapter 3.2 - improved certificate extensions table; - Chapter 3.3 - new OID's added in certificate policies; - Chapter 4 - added OCSP profile.
24.03.2016	2.1	Draft of version 3.0. Chapter 2.1 - removed exception for SHA-1 Signature Algorithm; Chapter 2.2.1 - added Qualified Certificate Identifier.
13.01.2015	2.0	Approved version
14.11.2014	1.5	Draft of version 2.0. - Chapter 2.1 - updated list of allowed key algorithms; - Chapter 3.1 - changed signature algorithm of CRL; - Chapter 4 - updated list of referred and related documents.
20.06.2014	1.4	- the term “web server certificate” replaced with “SSL server certificate”; - updated and amended the certificate technical profile; - added additional extension constraints to organisation certificate profile; - restructuring.
14.02.2011	1.3	- p 1 – Software signing certificate removed from certificates section; - p 3.2.2 – added „Data Encipherment“ value for authentication and encryption certificates; - p 3.3.2 – updated OID value and CPS reference.
10.05.2010	1.2	Updated list of certificate types in chapter 1. Specified certificate field descriptions and changed field value for „CRL Distribution Point“.



13.08.2009	1.1	Updated profiles to meet the requirements originated from Digital Signatures Act. Removed the term “device certificates”.
15.02.2005	1.0	Primary version.

1.1. Table of Contents

1.1.	Table of Contents	3
2.	Introduction	3
2.1.	Terms and Abbreviations.....	4
3.	Technical Profile of the Certificate	4
3.1.	Certificate Body	4
3.2.	Certificate Extensions.....	7
	Common Extensions of Organisation Certificates	7
	Variable Extensions.....	8
3.2.1.	Certificate Policy.....	9
3.2.2.	OCSP profile.....	10
3.2.3.	OCSP profile.....	10
5.	Profile of Certificate Revocation List.....	12
5.1.	CRL main fields	12
5.2.	CRL Extensions.....	13
6.	Referred and related Documents.....	14

2. Introduction

The document describes profiles of certificates issued by KLASS3-SK 2016. OCSP responses of KLASS3-SK 2016 and KLASS3-SK 2010. CRL profile is applicable only for and KLASS3-SK 2010. No organisation certificates are issued under KLASS3-SK 2010, but the CA still holds valid certificates.

This document complements Certificate Policy [2] and Certification Practice Statement [1].

The organisation certificates are divided into following types:

- **e-Seal Certificate** - used for proof of integrity of a digital document and the relation with the owner of such document (e-Seal certificate can be issued also without extension “id-etsi-qcs-QcSSCD” see [3.2.2]);
- **Certificate for Authentication** - certificate used for authentication of the subscriber in WWW or other data processing systems;
- **Certificate for Encryption** – certificate used for data encryption.

Various areas of application can be combined into a single certificate. The area of application of e-Seal Certificate cannot be combined with other areas of application.



2.1. Terms and Abbreviations

Refer to Certification Practice Statement [1].

3. Technical Profile of the Certificate

Organisation certificate is compiled in accordance with the X.509 version 3, IETF RFC 5280 [3] and clause 6.6 of ETSI EN 319 411-1 [11].

3.1. Certificate Body

Field	OID	Mandatory	Value	Changeable	Description
Version		yes	Version 3	no	Certificate format version
Serial Number		yes		no	Unique serial number of the certificate
Signature Algorithm	1.2.840.113549.1.1.11	yes	sha256WithRSAEncryption	no	Signature algorithm in accordance to RFC 5280
Issuer Distinguished name		yes		no	Distinguished name of the certificate issuer
Common Name (CN)	2.5.4.3	yes	KLASS3-SK 2016		Certificate authority name
Organisation Identifier	2.5.4.97	yes	NTREE-10747013	no	Identification of the issuer organisation different from the organisation name. Certificates may include one or more semantics identifiers as specified in clause 5.1.4 of ETSI EN 319 412-1.
Organisational Unit (OU)	2.5.4.11	yes	Sertifitseerimisteenused		Identity of certification service



Field	OID	Mandatory	Value	Changeable	Description
Organisation (O)	2.5.4.10	yes	AS Sertifitseerimiskeskus		Organisation name
Country (C)	2.5.4.6	yes	EE		Country code: EE – Estonia (2 character ISO 3166 country code [12])
Subject Distinguished Name		yes		yes	Unique subject (device) name in the infrastructure of certificates.
Serial Number	2.5.4.5	yes		yes	Registry code of the subscriber as described in certificate application.
Common Name (CN)	2.5.4.3	yes		yes	Informal value can be used, according to subscriber requirements (also abbreviations can be used).
Organisational Unit (OU)	2.5.4.11	no		yes	The name of organisational unit as described in certificate application. If the information about area of application is missing from the application then OU is not added.
OrganisationName (O)	2.5.4.10	yes		yes	Subject (organisation) name as stated in certificate application.



Field	OID	Mandatory	Value	Changeable	Description
Organisation Identifier ¹	2.5.4.97	yes	NP:{ISO3166 country code}-{registerCode} GO:{ISO3166 country code}-{registerCode} NTR{ISO3166 country code}-{registerCode}	yes	Identification of the subject organisation different from the organisation name as specified in clause 5.1.4 of ETSI EN 319 412-1. Used only in e-Seal certificates.
LocalityName (L)	2.5.4.7	no		yes	Name of the locality of the subject.
State (ST)	2.5.4.8	no		yes	State or province name of the subject as described in certificate application.
Country (C)	2.5.4.6	yes	zzz	yes	Country code of the Subscriber in accordance with ISO 3166.
Valid from		yes		no	First date of certificate validity.
Valid to		yes		no	The last date of certificate validity. Certificate validity can be 1, 2 or 3 years.
Subject Public Key		yes	RSA 2048, RSA 4096 or ECC 256, ECC 320, ECC 384, ECC 512, ECC 521	no	Public key created in RSA algorithm in accordance with RFC 4055. Public key of ECC algorithm is created in accordance with RFC

¹ NP:{ISO3166 country code} - Non-Profit Associations and Foundations Register;
GO:{ISO3166 country code} - Register of State and Local Government Organisations;
NTR{ISO3166 country code} -National Business Register



Field	OID	Mandatory	Value	Changeable	Description
					5480 or FIPS Publication 186-4.
Signature		yes		no	Confirmation signature of the certificate issuer authority.

3.2. Certificate Extensions

Common Extensions of Organisation Certificates

Extension	OID	Values and limitations	Criticality	Mandatory
Basic Constraints	2.5.29.19	SubjectType=End Entity Path Length Constraint=None	Non-critical	yes
Key Usage	2.5.29.15	Refer to p 3.2.2 "Variable Extensions "	Critical	yes
Extended Key Usage	2.5.29.37	Refer to p 3.2.2 "Variable Extensions "	Non-critical	yes
AuthorityKeyIdentifier	2.5.29.35	SHA-1 hash of the public key	Non-critical	yes
SubjectKeyIdentifier	2.5.29.14	SHA-1 hash of the public key	Non-critical	yes
Authority Information Access	1.3.6.1.5.5.7.1.1		Non-critical	yes
OCSP	1.3.6.1.5.5.7.48.1	http://aia.sk.ee/klass3-2016	Non-critical	yes
caIssuers	1.3.6.1.5.5.7.48.2	https://c.sk.ee/KLASS3-SK_2016_EECCRCA_SHA384.der.crt	Non-critical	yes



Variable Extensions

Extension	e-Seal Certificate on QSCD	e-Seal Certificate	Certificate for Authentication ²	Certificate for Encryption
Key usage				
Non-Repudiation	X	X		
Digital Signature			X	X
Data Encipherment			X	X
Key Encipherment			X	X
Key Agreement				
Qualified Certificate Statement				
id-etsi-qcs-QcCompliance	X	X		
id-etsi-qcs-QcSSCD	X			
id-etsi-qcs-QcType ³	2	2		
id-etsi-qcs-QcPDS	https://sk.ee/en/repository/conditions-for-use-of-certificates/	https://sk.ee/en/repository/conditions-for-use-of-certificates/		
id-qcs-pkixQCSyntax-v2 ⁴	X	X		
Extended key usage				
Client Authentication			X	

NOTE: Depending on the service description in the Estonian Trust List, the id-etsi-qcs-QcCompliance fields can be automatically interpreted as set even without being contained in the certificate if the Key Usage has nonRepudiation bit asserted.

² SK ID Solutions AS takes the right to change Key Usages according to subscriber requirements. Extended Key Usage must contain "Client Authentication".

³ Types according to clause 4.2.3 specified in ETSI EN 319 412-5.

⁴ Semantics identifier „id-etsi-qcs-semanticId-Legal“ is used as specified in clause 5.1.4 of ETSI EN 319 412-1.



Certificate Policy

OID of the extension: 2.5.29.32. The extension is marked non-critical.

Profile ⁵	PolicyIdentifier	PolicyQualifier
e-Seal Certificate on QSCD	1.3.6.1.4.1.10015.7.3; 0.4.0.194112.1.3; 1.3.6.1.4.1.10015.9.2	https://www.sk.ee/cps
e-Seal Certificate	1.3.6.1.4.1.10015.7.3; 0.4.0.194112.1.1; 1.3.6.1.4.1.10015.9.1	https://www.sk.ee/cps
Certificate for Encryption	1.3.6.1.4.1.10015.7.3; 0.4.0.2042.1.1; 1.3.6.1.4.1.10015.9.4	https://www.sk.ee/cps
Certificate for Authentication	1.3.6.1.4.1.10015.7.3; 0.4.0.2042.1.1; 1.3.6.1.4.1.10015.9.3	https://www.sk.ee/cps

⁵ Certificate profile can be distinguished by policy identifier value. Object identifier 1.3.6.1.4.1. 10015 represents SK ID Solutions, which is private enterprises OID registered under Internet Assigned Numbers Authority (IANA). Certificate profile can be distinguished as follows:

- e-Seal Certificate: 1.3.6.1.4.1.10015.9.1;
- e-Seal Certificate on QSCD: 1.3.6.1.4.1.10015.9.2;
- Certificate for Authentication: 1.3.6.1.4.1.10015.9.3;
- Certificate for Encryption: 1.3.6.1.4.1.10015.9.4



4. OCSP profile

OCSP⁶ v1 according to [RFC 6960] [10]

Field	Mandatory	Value	Description
ResponseStatus	yes	0 for successful or error code	Result of the query
ResponseBytes			
ResponseType	yes	id-pkix-ocsp-basic	Type of the response
BasicOCSPResponse	yes		
tbsResponseData	yes		
Version	yes	1	Version of the response format
responderID	yes	C=EE, O=SK ID Solutions AS, CN=KLASS3-SK 2016 AIA OCSP RESPONDER YYYYMM or C=EE, O=SK ID Solutions AS, CN=KLASS3-SK 2010 AIA OCSP RESPONDER YYYYMM	Distinguished name of the OCSP responder Note: the Common Name will vary each month and includes the month in YYYYMM format
producedAt	yes		Date when the OCSP response was signed
Responses	yes		
certID	yes		Serial number of the certificate
certStatus	yes		Status of the certificate as follows: <i>good</i> - certificate is issued and has not

⁶ OCSP profile is applicable for TLS Server Certificates issued by KLASS3-SK 2010 and KLASS3-SK 2016.



Field	Mandatory	Value	Description
			been revoked or suspended <i>revoked</i> - certificate is revoked, suspended or not issued by this CA <i>unknown</i> - the issuer of certificate is unrecognized by this OCSP responder
revocationTime	no		Date of revocation or expiration of certificate
revocationReason	no		Code for revocation Reason according to RFC5280
thisUpdate	yes		Date when the status was queried from database
nextUpdate	yes	ThisUpdate + 12 hours	The time at or before which newer information will be available about the status of the certificate.
Archive Cutoff	no	CA's certificate "valid from" date.	Archive CutOff date - the CA's certificate "valid from" date. Pursuant to RFC 6960 [10] clause 4.4.4
Nonce	no		Value is copied from request if it is included. Pursuant to RFC 6960 [10] clause 4.4.1.
Extended Revoked Definition	no	NULL	Identification that the semantics of certificate status in OCSP response



Field	Mandatory	Value	Description
			conforms to extended definition in RFC 6960 [10] clause 2.2
signatureAlgorithm	yes	sha256WithRSAEncryption	
signature	yes		
certificate	yes		Certificate corresponding to the private key used to sign the response.

5. Profile of Certificate Revocation List

SK issues CRLs in accordance to the guides of RFC 5280 [3].
CRL profile is not applicable for KLASS3-SK 2016.

5.1. CRL main fields

Field	OID	Mandatory	Value	Description
Version		yes	Version 2	CRL format version pursuant to X.509.
Signature Algorithm		yes	sha256WithRSAEncryption	CRL signing algorithm pursuant to RFC 5280
Issuer Distinguished Name		yes		Distinguished name of certificate issuer
Common Name (CN)	2.5.4.3	yes	KLASS3-SK 2010	Name of certification authority
Organisational Unit (OU)	2.5.4.11	yes	Sertifitseerimisteen used	Identity of certification service of SK



Field	OID	Mandatory	Value	Description
Organisation (O)	2.5.4.10	yes	AS Sertifitseerimiskesk us	Organisation
Country (C)	2.5.4.6	yes	EE	Country code: EE – Estonia (2 character ISO 3166 country code)
Effective Date				Date and time of CRL issuance.
Next Update				Date and time of issuance of the next CRL. The conditions are also described KLASS3- SK CP chapter 2.4.2.
Revoked Certificates				List of revoked certificates.
Serial Number				Serial number of the certificate revoked.
Revocation Date				Date and time of revocation of the certificate.
Reason Code	2.5.29.21			Reason code for certificate revocation.
Signature				Confirmation signature of the authority issued the CRL.

5.2. CRL Extensions

Field	OID	Values and limitations	Criticality
CRL Number	2.5.29.20	CRL sequence number	Non-critical
Authority Key Identifier	2.5.29.35	Matching the subject key identifier of the certificate	Non-critical

On the field “authorityKeyIdentifier”, SHA-1 hash of the public key corresponding to the private key.



6. Referred and related Documents

- [1] SK ID Solutions AS - Certification Practice Statement for KLASS3-SK, published: <https://sk.ee/en/repository/CPS/>;
- [2] SK ID Solutions AS - Certificate Policy for Organisation Certificates, published: <https://sk.ee/en/repository/CP/>;
- [3] RFC 5280 - Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile;
- [4] RFC 3647 – Request For Comments 2527, Internet X.509 Public Key Infrastructure, Certificate Policy and Certification Practices Framework;
- [5] RFC 4055 - Additional Algorithms and Identifiers for RSA Cryptography for use in the Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile;
- [6] RFC 5480 - Elliptic Curve Cryptography Subject Public Key Information;
- [7] FIPS PUB 186-4;
- [8] ETSI EN 319 412-1 v1.1.1 Electronic Signatures and Infrastructures (ESI); Certificate Profiles; Part 1: Overview and common data structures;
- [9] ETSI EN 319 412-5 v2.2.1 Electronic Signatures and Infrastructures (ESI); Certificate Profiles; Part 5: QCStatements;
- [10] RFC 6960 – X.509 Internet Public Key Infrastructure Online Certificate Status Protocol – OCSP;
- [11] ETSI EN 319 411-1 v1.2.2 Electronic Signatures and Infrastructures (ESI); Policy and security requirements for Trust Service Providers issuing certificates; Part 1: General requirements;
- [12] ISO 3166 Codes;
- [13] RFC 3279 - Algorithms and Identifiers for the Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile.