Siemens AG

Product PKI Certificate Management Service – Certificate Policy for Siemens Product PKI Infrastructure Certificates

V2.1

Document History

Version	Date	Author	Change Comment
1.0	Jan. 26, 2022	Michael Munzert, Antonio Vaira; T CST	First released version
1.1	Oct. 11, 2022	Kai Che, Michael Munzert T CST	New responsible for document authorization
1.2	Mar. 02, 2023	Kai Che, Michael Munzert, Antonio Vaira T CST	Detailed Chapter 6 key generation
2.0	Oct. 18, 2023	Kai Che, Michael Munzert, Antonio Vaira T CST	Copied parts of the description of the Central CP to Tenant CP (this document) Added explanation of the meaning of OIDs in Chapter 7.1.6.
2.0	July 10, 2024	Kai Che	Review performed, no changes.
2.1	Jan. 30, 2025	Kai Che	Updated department from T CST to FT RPD CST due to reorganization.

This document will be reviewed every year or in the event of an important ad-hoc change according to the Information Security update process for documents. Each new version will be approved by the respective management level before being released.

This document is published under www.siemens.com/pki.

Scope and Applicability

This document constitutes the Certificate Policy (CP) for the PKI service providing infrastructure certificates to Siemens Product PKI Tenant. The Product PKI is responsible for the operation of the Root CAs as well as for the Issuing CAs. Together with the Central CP, this document discloses to interested parties the business policies and practices under which the Product PKI operates.

The Central PMA ensures that the certification practices established to meet the applicable requirements specified in the present document are properly implemented in accordance with Siemens' Information Security Policy.

Document Status

This document has been classified as “Unrestricted”.

	Name	Department	Date
Author	Various authors, detailed information see document history.		
Checked by	Stenger, Meiko Kuechler, Markus	Siemens LC Siemens IT	May, 2020 Feb., 2022
Authorization	Dr. Kind, Andreas	Head of Siemens FT RPD CST	Jan., 2025

Content

308
309

1 Introduction

This document is structured according to RFC 3647 “Internet X.509 Public Key Infrastructure: Certificate Policy and Certification Practices Framework” [RFC3647].

The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] even in case the keywords are not capitalized.

1.1 Overview

This document describes the Certificate Policy of the Siemens Product PKI Certificate Management Service (in the following called “Product PKI”) of the Tenant providing Infrastructure Certificates for all other Product PKI Tenants.

Together with the central CP [CCP] it describes the services provided by the Product PKI as well as binding requirements that must be fulfilled by Product PKI participants. In case there are no additional requirements defined by the tenant (in this document, i.e. Tenant CP), the respective section will refer to the Central CP. In case specific requirements are listed they will apply in addition to the requirements set forth in the Central CP. Under no circumstances, provisions set forth in this document can weaken the requirements set forth in the Central CP.

Moreover - together with the CPSs – the CPs also define the certification process as well as the cooperation, duties and rights of the respective Product PKI participants.

The Product PKI is a PKI that provides and manages certificates (e.g. “IDevID certificates” or “Manufacturer Device certificates”) that are stored on and used by Siemens products and solutions. The private key might be used in bootstrapping scenarios for authentication purposes. Or the certificate might be used to proof that the device is a genuine Siemens device.

Unless otherwise stated, the term “Product PKI” or any of its entities, refer to “Siemens Product PKI Certificate Management Service”, or any of its respective entities, for the rest of this Certificate Policy.

Since different stakeholders are involved, also responsibilities are distributed between these stakeholders:

- **Product PKI Governance**: responsible for the Product PKI service is the organization listed in section 0

- Policy Administration.

- **IT Services**: The central Product PKI service is hosted in the Siemens Trust Center that is operated and managed by Siemens IT department.

- **Tenant**: Tenant can be every Siemens AG organizational unit or any other legal entity that has a contract in place that covers Product PKI services. The Tenants typically operate and maintain the registrations authorities (e.g. within their production facilities or data center). Therefore, the Tenants are responsible for RA operation and End-Entity authentication.

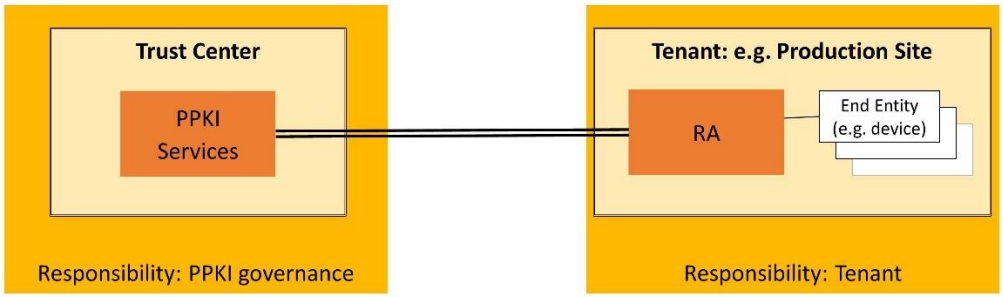


Figure 1: Stakeholders and typical responsibility split

In accordance with this responsibility split, there are two Certificate Policies, one for the central part of the Product PKI (Central CP) and additional ones for the Tenant specific aspects (this document).

The same holds for the corresponding Certification Practice Statements (CPSs).

The Tenant specific CP is always the master document. It defines all requirements for which the Tenant is responsible for. In particular, it comprises the management and operation of the RAs and/or LRAs, of publicly accessible repositories. Where appropriate, the Tenant specific CP will also refer to requirements valid for the operation of the central service. In that case the phrase “See also Central CP for central service aspects”. In those sections that are not relevant for the Tenant, it is referred to the central CP by using the phrase “See central CP”.

The Tenant specific CP is supplemented with the Central CP. In particular, the Central CP comprises all requirements for the management and operation of the Central PKI System including Root CA and Issuing CAs.

The Tenant CPS describes how the requirements defined in the Tenant CP are implemented.

In addition, the Central CPS supplements how the requirements defined in the Central CP are implemented.

The different documents and their interrelation are depicted in the following figure:

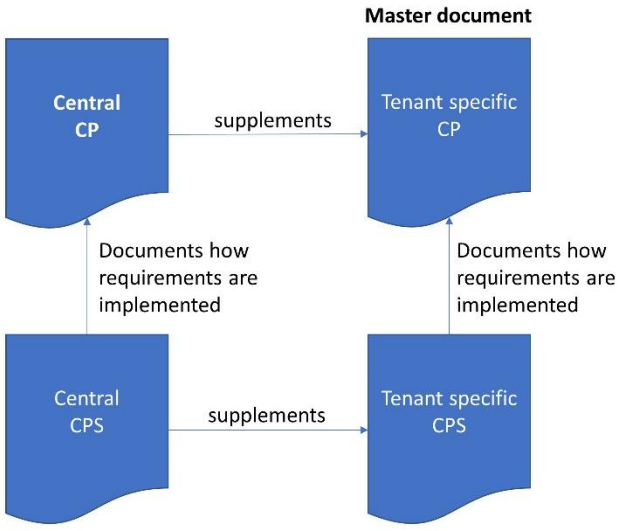
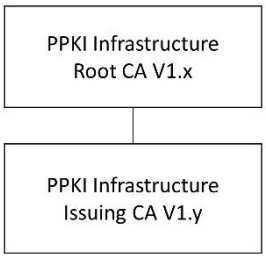


Figure 2: Document structure (CP and CPS)

In addition to the requirements defined in this CP and the corresponding CPSs, Siemens IT systems are operated according to the Siemens internal information security rules and respective execution guidelines, which define how IT systems must be operated securely. The corresponding documents can be retrieved on request.

These rules are part of a Siemens ISMS [ISMS], which is defined and implemented according to ISO 27001.

1.1.1 PKI hierarchy



The specific PKI hierarchy is shown in Figure 3.

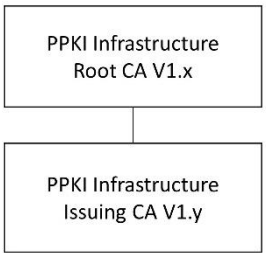


Figure 3: PPKI hierarchy for Infrastructure Certificates

The Issuing CA for Siemens Product PKI Infrastructure Certificates issues certificates that are used (together with the corresponding private keys) to identify and authenticate the different Tenants to provide the right, Tenant specific services (e.g. issuing CAs). These certificates are typically deployed on Local RAs, managed by the Tenants, but also on PPKI core components to correctly identify them and guarantee authenticated and integrity protected connections between the Tenants and the PPKI component, e.g. CMP gateway, or any generic PPKI servers.

1.2 Document Name and Identification

This CP is referred to as Certificate Policy for the 'Siemens Product PKI Infrastructure Certificates'.

Title: Product PKI Certificate Management Service – Certificate Policy for Siemens Product PKI Infrastructure Certificates

OIDs: 1.3.6.1.4.1.4329.99.1.2.1000.2

Expiration: This version of the document is the most current one until a subsequent release.

The set of all documents describing the Siemens Product PKI is referred to under the OID 1.3.6.1.4.1.4329.99.1.2.

For details about the OIDs, see Chapter 7.1.6.

1.3 PKI Participants

See Central CP.

1.3.1 Certification Authorities

A graphical overview of the CA hierarchy is depicted in Figure 3: PPKI hierarchy for Infrastructure Certificates.

1.3.1.1 Root CA

See Central CP.

1.3.1.2 Intermediate CA

See Central CP.

1.3.1.3 Issuing CAs

See Central CP.

1.3.2 Registration Authorities

See Central CP.

1.3.3 Subscribers

See Central CP.

1.3.4 Relying Parties

See Central CP.

1.3.5 Other Participants

1.3.5.1 Subject (End-Entity)

See Central CP.

1.4 Certificate Usage

1.4.1 Appropriate Certificate Usage

See Central CP.

1.4.2 Prohibited Certificate Usage

See Central CP.

1.5 Policy Administration

1.5.1 Organization Administering the Document

The organization responsible for drafting, maintaining, and updating this CP is:

Siemens Aktiengesellschaft (“Siemens AG”)
Technology (“T”) Research & Predevelopment 1 (“RPD1”)
Otto-Hahn-Ring 6, 81739 Munich, GERMANY
E-mail: contact.pki (at) siemens.com
Website: https://www.siemens.com/pki

1.5.2 Contact Person

Questions about this CP may be sent to:

Siemens AG
T RDA CST
Attn: Product PKI
Otto-Hahn-Ring 6, 81739 Munich, GERMANY
E-mail: contact.pki (at) siemens.com

Certificate Problem Reports shall be sent to: contact.pki (at) siemens.com

1.5.3 Person Determining CP and CPS Suitability for the Policy

The Policy Management Authority (Tenant PMA) in section 1.5.1 determines suitability of this document and the respective CPS.

1.5.4 CPS Approval Procedures

An annual risk assessment is carried out to evaluate business requirements and determine the security requirements to be included in the certificate policy for the stated community and applicability. In addition, the CP as well as the CPS will be reviewed every year regarding consistency with the actual PKI processes and services (see also section 8).

This document is accepted and approved by the Central PMA. Acceptance of the Siemens ACP process (which is part of the Siemens ISMS) constitutes acceptance of this document which therefore will not be explicitly signed. However, in case minor changes of this document will be necessary (see also 9.12.3), a new version will be published after release and official approval will be part of the next Siemens ACP process review.

1.6 Definitions and Acronyms

1.6.1 Definitions

Authority Revocation List	Certificate Revocation List containing CA certificates.
CA certificate	Certificate for a Certification Authority's public key.
Central PMA	PMA that is responsible for the management and operation of the Central Product PKI Certificate Management service.
Central Product PKI System	Technical components of the Product PKI Certificate Management System that are managed and operated in the Siemens Trust Center facility.
Certificate Policy (CP)	Compare section 1.1.
Certification Authority (CA)	Authority, that is entitled to certify public keys; compare section 1.3.1.
Distinguished Name	Sequence of data-fields uniquely identifying e.g. the issuer and the Subject within a certificate or a CRL. The format of a Distinguished Name is defined in the [X.520] standard.
EE certificate	See “End-Entity certificate”.
End-Entity	Equivalent to Subject; the identity of the End-Entity is connected to the certificate and the related key-pair. See also section 1.3.3.
End-Entity certificate	A digital certificate is used to prove ownership of a public key and the corresponding private key. It must not be used for certifying and issuing CRLs or other certificates.
End-User certificate	See “End-Entity certificate”.
HSM	Hardware Security Modul that can be used for random number generation and generation and storage of secret keys. The HSM can use the keys for digital signatures and for other PKI-applications.
Intermediate CA	Entity that issues and manages certificates of further Intermediate CAs or Issuing CAs and has a certificate signed by either a Root CA or by an Intermediate CA.
Issuing CA	Entity that issues and manages certificates of End Entities and has a certificate signed by either a Root CA or by an Intermediate CA.
Issuing CA System	Technical components (hardware and software) hosting Issuing and Intermediate CAs.
Multi-person Control	Sensitive activities typically are carried out by more than one person holding a trusted role. This is called Multi-person control.
Policy Management Authority	A body (of Siemens) that is responsible for setting, implementing and administering policy decisions regarding this CP and related documents and agreements in the Product PKI
Product PKI	Term used in this document for the Siemens Product PKI Certificate Management Service (due to ease of readability).
Product PKI System	Technical components (central and local) that are necessary to manage and operate the Product PKI Certificate Management System.
Qualified Auditor	Auditor who has appropriate knowledge in order to evaluate and assess and confirm the requirements and corresponding implementation of measures defined in the Certificate Policy documents and the Certification Practice Statements, respectively.
Registration Authority (RA)	PKI-incorporated facility for participant-authentication. See also section 1.3.2.

Relying Party	Individual or legal entity that uses certificates; see also section 1.3.5.
Root CA	Entity that issues and manages certificates of Intermediate or Issuing CAs (in case there do not exist Intermediate CAs). The certificate of the Root CA is self-signed.
Root CA System	Technical components (hardware and software) hosting Root and (optionally) Intermediate CAs.
Secure Device	A component (such as a Smart Card or HSM) that substantiated to protect the private key stored in that device. All cryptographic operations using the private key are performed inside this Secure Device.
Siemens Product PKI Certificate Management Service	Siemens internal organization that issues and manages certificates. This organization operates the Root CA System as well as the Issuing CA systems.
Smart Card	Integrated circuit card including a micro-processor that can be used for random number generation and generation and storage of secret keys. A Smart Card can use the keys for the generation of digital signatures and for other PKI-applications
Subject	End-Entity that uses the private End-Entity key (EE key). The End-Entity may differ from the Subscriber.
Subscriber	Subscriber for all certificates issued by the Product PKI is the respective Tenant as legal entity. See also section 1.3.3.
Tenant	Tenant can be every Siemens AG organizational unit or any other legal entity that has a contract in place that covers Product PKI services. The Tenants typically operate and maintain the Registration Authorities (e.g. within their production facilities or data center). In such a case the Tenants are responsible for RA operation and End-Entity authentication.
Tenant PMA	PMA that is responsible for the management and operation of the local Product PKI Certificate Management components such as RA and/or LRA as well as for identification of End-Entities.
Token	Transport-medium for certificates and keys
Trust Center	The term “Trust Center” refers to assets and components that are centrally operated and maintained at the Trust Center location as well to the respective processes.
Trusted Operator	Product PKI has the overall responsibility of issuing certificates to Subjects and managing and revoking certificates. Tenants delegate may delegate parts or these functions to the Central Product PKI Certificate Management Service or to other internal Service Providers of Siemens, which are called Trusted Operators

1.6.2 Acronyms

ARL	Authority Revocation List
CA	Certification Authority
CISO	Chief Information Security Officer
CMP	Certificate Management Protocol (RFC 4210)
CN	Common Name
CP	Certificate Policy
CPS	Certification Practice Statement
CRL	Certificate Revocation List
DN	Distinguished Name
EE	End-Entity
FIPS	Federal Information Processing Standard
FQDN	Fully qualified domain name
HSM	Hardware Security Module
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IDevID	Initial Device Identifier (IEEE 802.1AR)
ISO	International Organization for Standardization
ISMS	Information Security Management System
LDevID	Locally significant Device Identifier (IEEE 802.1AR)
OCSP	Online Certificate Status Protocol
OID	Object Identifier
PIN	Personal Identification Number
PKI	Public Key Infrastructure
PPKI	Product PKI
PMA	Policy Management Authority
RA	Registration Authority
RFC	Request for Comment
SLA	Service Level Agreement
URL	Uniform Resource Locator
UTF8	Unicode Transformation Format-8

2 Publication and Repository Responsibilities

2.1 Repositories

Tenant specific Product PKI Repositories are operated by trusted service provider(s).

The repository responsibilities include:

1. accurately publishing information;
2. archiving certificates;
3. publishing the status of certificates;
4. promptness or frequency of publication; and
5. security of the repository and controlling access to information published on the repository to prevent unauthorized access and tampering.

Subjects and Relying Parties have access to:

- Certificate Revocation List (CRL)
- and OCSP responder

via: ppki-va.siemens.com.

2.2 Publication of Certification Information

The Tenant publishes certificate status information at ppki-va.siemens.com.

The CP is published on the website specified in section 1.5.1 Organization Administering the Document.

2.3 Time or Frequency of Publication

Updates to this CP and the Central CP are published in accordance with the definitions in section 9.12 of this document.

2.4 Access Controls on Repositories

Information published in the repository can be accessed with read-only access.

Administration of the published information shall be carried out only by trusted roles with adequate access control restrictions.

3 Identification and Authentication

3.1 Naming

3.1.1 Types of Names

The complete policy of specifying names and CA certificate profiles is documented for each certificate type in the respective Certificate Profile Documentation [PROF], which can be retrieved on request.

3.1.2 Need of Names to be Meaningful

3.1.2.1 CA Names

The CN must be stated as the full name of the CA.

3.1.2.2 End-Entity Names

For details see Certificate Profile Documentation [PROF].

3.1.3 Anonymity or Pseudonymity of Subscribers

3.1.3.1 CA Names

The use of pseudonyms for CA names is not permitted.

3.1.3.2 End-Entity Names

The use of pseudonyms for End Entity names is not permitted unless otherwise stated in the *Tenant* CP.

3.1.4 Rules for Interpreting Various Name Forms

See Central CP.

3.1.5 Uniqueness of Names

3.1.5.1 CA Names

See Central CP.

3.1.5.2 End-Entity Names

The Issuing CAs ensure during the enrollment process that uniqueness of certificates is guaranteed within the scope of the respective CA signing the certificate.

3.1.6 Recognition, Authentication, and Roles of Trademarks

See Central CP.

3.2 Initial Identity Validation

Applicants for certificates are End Entities. The applicant always acts on behalf of the Subscriber (Tenant).

A certificate shall be issued to a Subject only when

- the Subject has submitted a certificate request and
- the Subject or the RA confirm private key possession.

3.2.1 Method to Prove Possession of Private Key

The key pairs are either generated by the corresponding issuing CA or by the End-Entity in case of automatic certificate update. In the latter case proof of private key possession is realized via state-of-the-art certificate management protocol, e.g. CMP.

3.2.2 Authentication of Organization Identity

The identity of the requesting organization is checked as part of the onboarding process.

3.2.3 Authentication of Individual Identity

The individual identity of the corresponding (L)RA, or End-Entity, is determined within the onboarding process.

3.2.4 Non-verified Subscriber Information

Only verified Information is included into the certificate.

3.2.5 Validation of Authority

The authority of the requester is checked as part of the onboarding process.

3.2.6 Criteria for Interoperation

No interoperation with other communities of trust is foreseen, unless otherwise stated in the Tenant CP.

3.2.7 Identification and Authentication for Re-key Requests

Not supported.

3.2.8 Identification and Authentication for Routine Re-Key

Not supported.

3.2.9 Identification and Authentication for Re-Key After Revocation

Not supported.

3.3 Identification and Authentication for Revocation Requests

The validity of revocation request shall be checked before forwarding a revocation request to the Product PKI service.

Revocation of Intermediate CA and Issuing CA certificates must be authorized by the Tenant PMA.

Revocation of Intermediate CA and Issuing CA certificates shall only be performed manually by Product PKI trusted employees under dual control.

Revocation request of End-Entity certificates can be performed by Product PKI trusted employees (manually) and the corresponding authorized RA (automatically).

4 Certificate Lifecycle Operational Requirements

4.1 Certificate Application

4.1.1 Who can submit a certificate application?

4.1.1.1 Root and Intermediate CA

See Central CP.

4.1.1.2 Issuing CAs

See Central CP.

4.1.1.3 End-Entity Certificates

EE certificates (for examples, certificates used by RAs or by PPKI service internal components to authenticate against the central services) are generated as part of the onboarding process.

4.1.2 Enrollment Process and Responsibilities

4.1.2.1 CA Certificates

For CA certificates to be generated, following information shall be documented:

- ❑ A name for the CA in accordance with regulations in section 3.1, “Naming”, of this CP
- ❑ Date of the request
- ❑ Duration of the CA certificate, which cannot exceed the duration of the Root CA’s certificate
- ❑ Certificate profile of the new CA and
- ❑ Profiles of the End Entity certificates to be signed by that new CA, in case of an Issuing CA

4.1.2.2 End-Entity Certificate

End-Entity certificate applicants shall undergo an enrollment process consisting of:

- generating, or arranging to have generated, a key pair
- completing a certificate application and providing the required information
- either demonstrating to the respective RA or CA that the certificate applicant has possession of the private key corresponding to the public key included in the certificate application

  or guaranteeing by comparable measure that the certification request is originating from a legitimate End-Entity and that the End-Entity controls the private key.

Certificate applications are submitted for processing, either approval or rejection, to the respective RA.

4.2 Certificate Application Processing

4.2.1 Performing identification and authentication functions

The tenant shall ensure that certificate applicants (= “Subjects”) are properly identified and authenticated.

4.2.2 Approval or Rejection of Certificate Applications

After a certificate applicant submits a certificate application, the Tenant shall approve or reject it.

For EE certificates these tasks can be delegated to respective RAs.

See also Central CP and section 4.2.1.

4.2.3 Time to Process Certificate Applications

See Central CP.

4.3 Certificate Issuance

4.3.1 CA Actions during Certificate Issuance

A Certificate is created and issued using secure means after the approval of a certificate application.

Product PKI shall:

1. check authorization of the respective RA by validating the signature of the certification request,
2. generate for the Subject a Certificate based on the information in the certificate application after its validation, and
3. deliver the Certificate through the respective RA.

4.3.2 Notification to Subscriber by the CA of Issuance of Certificate

The CA informs the RA whether an EE Certificate has been generated or that the certification request could not be successfully executed.

The End-Entity (e.g., the operator of a RA), for which the subscriber has requested a certificate, shall be notified w.r.t. the status of certificate issuance.

4.4 Certificate Acceptance

4.4.1 Conduct constituting certificate acceptance

The Subjects shall securely obtain the Certificate through the respective RA.

4.4.2 Publication of the certificate by the CA

No stipulation.

4.4.3 Notification of Certificate issuance by the CA to other entities

No stipulation.

4.5 Key Pair and Certificate Usage

The Issuing CA private key is only used for:

- ❑ Issuance of certificates to End-Entities
- ❑ Issuance of Issuing CA's CRLs
- ❑ Issuance of CRL signer certificates and OCSP signer certificates
- ❑ Signing of CMP messages sent to the RA

See also Central CP

4.5.1 Subject Private Key and Certificate Usage

See Central CP.

4.5.2 Relying Party Public Key and Certificate Usage

See Central CP.

4.6 Certificate Renewal

Certificate renewal is the issuance of a new certificate to an entity without changing the public key or any other information in the certificate.

Not supported.

4.6.1 Circumstance for Certificate Renewal

No stipulation.

4.6.2 Who may request renewal?

No stipulation.

4.6.3 Processing Certificate Renewal Request

No stipulation.

4.6.4 Notification of new Certificate Issuance to Subscriber

No stipulation.

4.6.5 Conduct Constituting Acceptance of a Renewal Certificate

No stipulation.

4.6.6 Publication of the Renewal Certificate by the CA

No stipulation.

4.6.7 Notification of Certificate Issuance by the CA to other Entities

No stipulation.

4.7 Certificate Re-key

"Re-key" addresses the generating of a new Key Pair and applying for the issuance of a new certificate and replacing the existing Key Pair.

4.7.1 Circumstances for Certificate Re-key

See Central CP.

4.7.2 Who may request certification of a new Public Key?

4.7.2.1 Re-keying of an Issuing CA certificate

See Central CP.

4.7.2.2 Re-keying of End-Entity certificates

For re-keying of EE certificates, the same requirements apply as for certificate Issuance (see section 4.3).

No previously validated information shall be reused.

4.7.3 Processing Certificate Re-keying Requests

See section 4.3.1

4.7.4 Notification of new Certificate Issuance to Subscriber

See section 4.3.2

4.7.5 Conduct Constituting Acceptance of a Re-keyed Certificate

See section 4.4.1

4.7.6 Publication of the Re-keyed Certificate by the CA

See section 4.4.2

4.7.7 Notification of Certificate Issuance by the CA to other Entities

See section 4.4.3

4.8 Certificate Modification

Certificate modification means that the keys of a certificate remain unchanged, but more certificate information than for a certificate renewal is changed.

Not supported.

4.8.1 Circumstance for Certificate Modification

No stipulation.

4.8.2 Who may request Certificate modification?

No stipulation.

4.8.3 Processing Certificate Modification Requests

No stipulation.

4.8.4 Notification of new Certificate Issuance to Subscriber

No stipulation.

4.8.5 Conduct Constituting Acceptance of Modified Certificate

No stipulation.

4.8.6 Publication of the Modified Certificate by the CA

No stipulation.

4.8.7 Notification of Certificate Issuance by the CA to Other Entities

No stipulation.

4.9 Certificate Revocation and Suspension

4.9.1 Circumstances for Revocation

See Central CP.

4.9.2 Who can request revocation?

RA owners can request revocation of the EE certificates that have been issued for their RA.

4.9.3 Procedure for Revocation Request

See also central CP.

See also section 3.4.

4.9.4 Revocation Request Grace Period

See Central CP.

4.9.5 Time within which CA must Process the Revocation Request

See Central CP.

4.9.6 Revocation Checking Requirement for Relying Parties

Relying Parties shall check the status of certificates on which they wish to rely by consulting the most recent CRL or using another applicable method.

4.9.7 CRL Issuance Frequency

ARLs are regularly issued every 6 month or in exceptional cases when a specific CA certificate needs to be revoked.

CRLs are regularly issued once per day or in exceptional cases when a specific EE certificate needs to be revoked.

4.9.8 Maximum Latency for CRLs

CRLs shall be posted to the repository within a reasonable time after generation.

4.9.9 On-line Revocation/Status Checking Availability

Not supported.

4.9.10 On-line Revocation Checking Requirements

No stipulation.

4.9.11 Other Forms of Revocation Advertisements Available

No stipulation.

4.9.12 Special Requirements for Private Key Compromise

In case of a CA certificate compromise the RA owners shall be informed.

If the RA operator has a reason to believe that there has been a compromise of an EE private key, then it shall notify the respective Issuing CA to take appropriate action, including request for revocation.

See also central CP for central service aspects.

4.9.13 Circumstances for Suspension

Not supported.

4.9.14 Who can request suspension?

No stipulation.

4.9.15 Procedure for suspension request

No stipulation.

4.9.16 Limits on suspension period

No stipulation.

4.10 Certificate Status Services

4.10.1 Operational Characteristics

See section 4.9.

4.10.2 Service Availability

The service to retrieve CRLs shall be available twenty-four (24) hours a day, seven (7) days a week, except in case of Force Majeure Events (CP section 9.16.5).

4.10.3 Optional Features

No stipulation.

4.11 End of Subscription

See Central CP.

4.12 Key Escrow and Recovery

Not supported.

4.12.1 Key Escrow and Recovery Policy and Practices

No stipulation.

4.12.2 Session Key Encapsulation and Recovery Policy and Practices

No stipulation.

5 Management, Operational, and Physical Controls

As this tenant for providing key material and certificates to securely connect RAs with the Central Product PKI service is operated as part of the Central PPKI service, all relevant requirements are set forth in the Central CP [CP].

5.1 Physical Security Controls

5.1.1 Site Location and Construction

See central CP.

5.1.2 Physical Access

See central CP.

5.1.3 Power and Air Conditioning

See central CP.

5.1.4 Water Exposure

See central CP.

5.1.5 Fire Prevention and Protection

See central CP.

5.1.6 Media Storage

See central CP.

5.1.7 Waste Disposal

See central CP.

5.1.8 Off-site Backup

See central CP.

5.2 Procedural Controls

5.2.1 Trusted Roles

See central CP.

5.2.2 Numbers of Persons Required per Task

See central CP.

5.2.3 Identification and Authentication for Each Role

See central CP.

5.2.4 Roles Requiring Separation of Duties

See central CP.

5.3 Personnel Controls

5.3.1 Qualifications, Experience and Clearance Requirements

See central CP.

5.3.2 Background Check Procedures

See central CP.

5.3.3 Training Requirements

See central CP.

5.3.4 Retraining Frequency and Requirements

See central CP.

5.3.5 Job Rotation Frequency and Sequence

See central CP.

5.3.6 Sanctions for Unauthorized Actions

See Central CP.

5.3.7 Independent Contractor Requirements

See Central CP.

5.3.8 Documents Supplied to Personnel

See Central CP.

5.4 Audit Logging Procedures

5.4.1 Types of Events Recorded

See central CP.

5.4.2 Frequency of Processing Log

See Central CP.

5.4.3 Retention Period for Audit Log

See central CP.

5.4.4 Protection of Audit Log

See central CP.

5.4.5 Audit Log Backup Procedures

See central CP.

5.4.6 Audit Collection System (Internal vs. External)

See central CP.

5.4.7 Notification to Event-Causing Subject

See Central CP.

5.4.8 Vulnerability Assessments

See central CP.

5.5 Records Archival

5.5.1 Types of Records Archived

See central CP.

5.5.2 Retention Period for Archived Audit Logging Information

See central CP.

5.5.3 Protection of Archive

See central CP.

5.5.4 Archive Backup Procedures

See central CP.

5.5.5 Requirements for Time-Stamping of Record

See Central CP.

5.5.6 Archive Collection System (internal or external)

See central CP.

5.5.7 Procedures to Obtain and Verify Archived Information

See Central CP.

5.6 Key Changeover

In the event of a CA key changeover, the new CA public key shall be published with a suitable interval between certificate expiry date and the last certificate signed to prevent service interruption.

5.7 Compromise and Disaster Recovery

5.7.1 Incident and Compromise Handling Procedures

See Central CP.

5.7.2 Corruption of Computing Resources, Software, and/or Data

See Central CP.

5.7.3 Entity Private Key Compromise Procedures

See Central CP.

5.7.4 Business Continuity Capabilities After a Disaster

See Central CP.

5.8 CA or RA Termination

See central CP.

6 Technical Security Controls

6.1 Key Pair Generation and Installation

6.1.1 Key Pair Generation

For generation of Root CA keys and Issuing CA keys see Central CP [CCP].

EE keys (for TLS and CMP communication) can either be generated centrally by the PKI software or by the respective subject (RA or LRA).

6.1.2 Private Key Delivery to Subscriber

In case a RA requests a Key Pair as subscriber from the central service, the corresponding private key shall be delivered securely using technical and/or organizational means.

See also Central CP [CCP] for central service aspects.

6.1.3 Public Key Delivery to Certificate Issuer

In case of centrally generated key pairs no public key needs to be delivered to the CA.

In case of automated rekeying the public key and the certification request shall be transmitted securely to the CA.

6.1.4 CA Public Key Delivery to Relying Parties

Relying party is only the central PPKI service. The delivery of CA public keys is performed as part of the initial key event (set-up of issuing CA).

See also Central CP [CCP].

6.1.5 Key Sizes

Minimum requirements for key sizes and algorithms are defined in accordance with [BSI], [ECRYPT], and [NIST].

6.1.6 Public Key Parameters Generation and Quality Checking

CAs and subscribers shall generate Key Pairs using secure algorithms and parameters based on state-of-the-art cryptography and industry standards.

These Key Pairs shall be generated in Hardware Security Modules certified according to FIPS 140-2 level 3, hence guaranteeing sufficient quality of the parameters used and the overall Key Pair generation procedure.

6.1.7 Key Usage Purposes (as per X.509 v3 Key Usage Field)

See Central CP.

6.2 Private Key Protection and Cryptographic Module Engineering Controls

6.2.1 Cryptographic Module Standards and Controls

It is strongly recommended that end-entities securely store the private key (e.g. within a TPM if possible).See also central CP for central service aspects.

6.2.2 Private Key (n out of m) Multi-person Control

4 eyes principle is applied for private keys of end entities (see 6.1.2 Private Key Delivery to Subscriber).

See also central CP for central service aspects.

6.2.3 Private Key Escrow

No supported.

6.2.4 Private Key Backup

See Central CP.

6.2.5 Private Key Archival

No stipulation.

6.2.6 Private Key Transfer into or from a Cryptographic Module

Not supported for End-Entity keys.

See also central CP for central service aspects.

6.2.7 Private Key Storage on Cryptographic Module

End-Entity keys shall be stored in a security module if technically feasible.

See also central CP for central service aspects.

6.2.8 Method of Activating Private Key

End-Entity private keys are automatically active after generation.

See also central CP for central service aspects.

6.2.9 Method of Deactivating Private Key

Deactivating Private Keys is not supported.

6.2.10 Method of Destroying Private Key

End-Entity private keys shall be deleted in case of resetting the RA.

See also central CP for central service aspects.

6.2.11 Cryptographic Module Rating

See section 6.2.1.

6.3 Other Aspects of Key Pair Management

6.3.1 Public key archival

Public key and related certificate shall be archived in accordance with Section 5.5.

6.3.2 Certificate operational periods and key pair usage periods

The respective maximum validity periods for keys are:

Certified Entity	Validity Period
PPKI Infrastructure Root CA	Up to two years
PPKI Infrastructure Issuing CA	Up to two years
CMP certificate	Up to one year
TLS certificate	Up to one year

Table 1: Maximum validity periods

See also central CP.

6.4 Activation Data

6.4.1 Activation Data Generation and Installation

Passphrase for PKCS#12 container is defined during the onboarding and securely delivered to the Tenant.

See also central CP for central service aspects.

6.4.2 Activation Data Protection

See Central CP.

6.4.3 Other Aspects of Activation Data

See Central CP.

6.5 Computer Security Controls

6.5.1 Specific Computer Security Technical Requirements

Specific computer security requirements for RAs are defined in [ISMS].

See also central CP for central service aspects.

6.5.2 Computer Security Rating

No stipulation.

6.6 Life Cycle Security Controls

6.6.1 System Development Controls

See Central CP.

6.6.2 Security Management Controls

RA security management controls shall follow regulations equivalent to Siemens ISMS [ISMS].

See also central CP for central service aspects.

6.6.3 Life Cycle Security Controls

See Central CP.

6.7 Network Security Controls

The (L)RA network security controls shall follow regulations equivalent to Siemens ISMS [ISMS].

See also central CP for central service aspects.

6.8 Time Stamp Process

See Central CP.

7 Certificate, CRL, and OCSP Profiles

7.1 Certificate Profile

Details of the tenant specific certificate profile can be found in [PROF].

See also central CP.

7.1.1 Version Number(s)

See Central CP.

7.1.2 Certificate Extensions

See Central CP.

7.1.3 Algorithm Object Identifiers

Product PKI shall issue Subject certificates using only algorithms that are compatible with section 6.1.5.

7.1.4 Name Forms

Product PKI shall only issue Subject certificates whose Issuer and Subject information is consistent with the Tenant CP.

7.1.5 Name Constraints

No stipulation.

7.1.6 Certificate Policy Object Identifier

If OIDs are present the following applies.

Digital certificates use Object Identifiers (OIDs) to uniquely identify objects like data structures, algorithm definitions, or key usages. OIDs are structured in a hierarchical manner. They are not only used by digital certificates but in a variety of protocols.

7.1.6.1 *Definition of OIDs*

Object Identifiers are strings of numbers with dots as separators. They are allocated in a hierarchical manner, so that, each number represents an authority. For instance, the authority for "1.2.3" is the only one that can say what "1.2.3.4" means. They are used in a variety of frameworks and protocols.

The formal definition of OIDs comes from ITU-T X.680 (ASN.1).

Each position in an OID sequence identifies a node in a tree structure. The ASN.1 standard assigns each node a name and meaning. E.g., the positions in the OID 1.2.840.10045.4.3.4 represent the following tree nodes:

iso(1).member-body(2).us(840).ansi-x962(10045).signatures(4).ecdsa-with-SHA2(3).ecdsa-with-SHA512(4)

This OID string as defined by ANSI is the identifier for the Elliptic Curve Digital Signature Algorithm (ECDSA) coupled with the hash algorithm SHA-512.

7.1.6.2 *Enterprise numbers*

The Internet Assigned Numbers Authority (IANA) is a department of the Internet Corporation for Assigned Names and Numbers (ICANN) responsible for coordinating some of the key elements that keep the Internet running smoothly. Whilst the Internet is renowned for being a worldwide network free from central coordination, there is a technical need for some key parts of the Internet to be globally coordinated and this coordination role is undertaken by IANA.

Specifically, IANA allocates and maintains unique codes and numbering systems that are used in the technical standards (frameworks and protocols) that drive the Internet.

Private enterprise numbers (PENs) are a subset of Object Identifiers, starting with the prefix 1.3.6.1.4.1 and representing the following path in the ASN.1 tree:

iso(1).org(3).dod(6).internet(1).private(4).enterprise(1).

A company or organization may apply for a private enterprise number to use these numbering systems without conflicting with other companies and users. This number is assigned by the IANA and is appended to the OID string above.

7.1.6.3 *Siemens OIDs*

The Enterprise Number of Siemens AG is 4329. So, all OIDs starting with 1.3.6.1.4.1.4329 are Siemens specific. The position behind the 4329 identifies Siemens organizations, services, and applications. The top-level OIDs below 4329 are centrally managed, currently by T TIM RSQ TMR, Ms. Uschi Obermeier, GID:Z0004FTO.

7.1.6.4 *Product PKI CP/CPS Document OIDs*

The OID 1.3.6.1.4.1.4329.99.1.2 is reserved in the Siemens MIB for the documents related to Siemens Certificate Policies of Siemens Product PKI.

Hierarchically subordinated under this OID the Siemens PKI services manage an OID sub-tree to identify objects relevant for its operation like organizational units and document versions. Currently this sub-tree consists of the nodes x indicating the Product PKI tenant, y indicating the major version of the document (1.3.6.1.4.1.4329.99.1.2.x.y).

7.1.6.4.1 Tenant

The first position in the Siemens Product PKI OID sub-tree identifies the tenant of the Siemens Product PKI service. A tenant is a part of the Siemens Product PKI system which is provided to one organization (usually a Siemens BU or factory) acting as customer of the Siemens Product PKI service. The Siemens Product PKI service hosts a dedicated set of Root and/or Issuing CAs for each tenant.

The OID 1.3.6.1.4.1.4329.99.1.2.1 identifies the first tenant of the Siemens Product PKI service. This number is incremented for each new tenant. All objects related to this tenant start with this sequence.

The number 1000 identifies a special tenant – the Siemens Product PKI service itself. All objects not related to a dedicated tenant but to the central Siemens Product PKI service are identified by OIDs starting with 1.3.6.1.4.1.4329.38.1000.

Document version number

The version number of the Certificate Policy (CP) is identified by the next position.

Changes, which will materially change the acceptability of certificates for specific purposes, will lead to a corresponding change in the CP OID.

Changes, which will not materially reduce the assurance that the CP or its implementation provides and will be judged by the Policy Management Authority to have an insignificant effect on the acceptability of certificates, do not require a change in the CP OID.

7.1.6.5 *Product PKI certificate type and key store OIDs*

The OID 1.3.6.1.4.1.4329.38 is reserved in the Siemens MIB for the Product PKI services. Hierarchically subordinated under this OID the Product PKI services manage an OID sub-tree to identify objects relevant for its operation like documents, organizational units, services, and certificate types. Currently this sub-tree consists of the nodes x indicating the Product PKI tenant, y indicating the certificate type, and z indicating the type of key storage (1.3.6.1.4.1.4329.38.x.y.z).

7.1.6.5.1 Tenant

The first position in the Siemens Product PKI OID sub-tree identifies the tenant of the Siemens Product PKI service. A tenant is a part of the Siemens Product PKI system which is provided to one organization (usually a Siemens BU or factory) acting as customer of the Siemens Product PKI service. The Siemens Product PKI service hosts a dedicated set of Root and/or Issuing CAs for each tenant.

The OID 1.3.6.1.4.1.4329.38.1 identifies the first tenant of the Siemens Product PKI service. This number is incremented for each new tenant. All objects related to this tenant start with this sequence.

The number 1000 identifies a special tenant – the Siemens Product PKI service itself. All objects not related to a dedicated tenant but to the central Siemens Product PKI service are identified by OIDs starting with 1.3.6.1.4.1.4329.38.1000.

7.1.6.5.2 Certificate Type

The type of certificate is identified by the next position. The following certificate categories are defined:

- Manufacturer Certificates (OID 1.3.6.1.4.1.4329.38.x.1)
  These certificates identify Siemens hardware devices during their whole existence. Usually, the certificates' validity conforms to the expected lifetime of the devices. Renewal of these certificates is foreseeable only in

exceptional cases, but revocation and the publication of appropriate status information is required by the manufacturer.

- Operational Certificates (OID 1.3.6.1.4.1.4329.38.x.2)
  This category includes all certificates issued by a tenant for usage by devices, applications, or persons (e.g. service technicians) during regular operation at the end customer site. The applications may be running directly on the devices or on arbitrary hardware (e.g., PCs or virtual machines). Examples are certificates for TLS session establishment (TLS client and/or server certificates), VPN, or for signing of log data. Operational certificates have a limited lifetime and need to be managed after issuance. Also, revocation and the publication of appropriate status information may be required for these certificates.
- Infrastructure Certificates (OID 1.3.6.1.4.1.4329.38.x.3)
  These are the certificates used by the Siemens Product PKI service to secure its own operational processes. Infrastructure Certificates are used, e.g., for TLS based client-server-authentication between the single components of the Siemens Product PKI service (like LRA and CMP Gateway) or for the signing of CMP messages by these components. Infrastructure Certificates have to be renewed regularly and may be revoked on demand. Certificate status information must be available via OCSP and CRLs.
- Signature Certificates for Manufacturer Data (OID 1.3.6.1.4.1.4329.38.x.4)
  These certificates identify Siemens code, licenses, device specific configurations, product information, etc. by digitally signing such data. The validity of these certificates conforms to the expected lifetime of devices, similar to the Manufacturer Certificates. The actual usage time may be much shorter so frequent certificate updates may be required. Furthermore, revocation and publication of appropriate status information by the manufacturer are required.
- Signature Certificates for Third Party Usage (OID 1.3.6.1.4.1.4329.38.x.5)
  These certificates are similar to Signature Certificates used by the manufacturer, but given to Siemens' partners (e.g., system integrators, value-add partners, OEM manufacturers) to identify their data (code, device specific configurations, etc.) by digitally signing. The validity of these certificates may also conform to the expected lifetime of related devices. The actual usage time may be much shorter so frequent certificate updates may be required. Furthermore, revocation and publication of appropriate status information by the manufacturer (who gives the certificates to partners) are required.

7.1.6.5.3 Key Store

The final position in the OID string denotes the type of key store:

- Secure Device - internal generation (OID 1.3.6.1.4.1.4329.38.x.y.1)
  This OID indicates that the private key corresponding to the public key in the certificate is created and stored inside a secure element that applies hardware-based security mechanisms to prevent reading/extraction or misusing the private key. The private key only exists inside the secure element.
  Examples for such secure elements are embedded security controllers, smart cards or hardware security modules.
- Software Key Store (OID 1.3.6.1.4.1.4329.38.x.y.2)
  The corresponding private key is stored in a software based Personal Security Environment. This is usually an encrypted file (e.g., according to the PKCS#12 standard).
- Secure Device - external generation (OID 1.3.6.1.4.1.4329.38.x.y.3)
  This OID indicates that the private key is created outside but imported into and stored inside a secure element that applies hardware-based security mechanisms to prevent reading/extraction or misusing the private key. The private key may exist also outside the secure element.

The information on the key store is important for certificate users to determine the trust level of the certificate. Secure Device based key stores should offer a much higher level of security compared to software-based key stores.

Subject certificates issued under this CP shall assert one or more of the Certificate Policy OIDs listed in section 1.2 of Certificate Policy. Issuing CA certificate shall either contain the policy OIDs of all policies under which it issues certificates or the anyPolicy OID (2.5.29.32.0).

7.1.7 Usage of Policy Constraints Extension

No stipulation.

7.1.8 Policy Qualifiers Syntax and Semantics

No stipulation.

7.1.9 Processing Semantics for the Critical Certificate Policies Extension

Critical Certificate Policy extension shall conform to IETF RFC 5280 [RFC5280].

7.2 CRL Profile

7.2.1 Version number(s)

See Central CP.

7.2.2 CRL and CRL entry extensions

See Central CP.

7.3 OCSP Profile

7.3.1 Version Number(s)

See Central CP.

7.3.2 OCPS Extension

See Central CP.

8 Compliance Audit and Other Assessment

8.1 Frequency or Circumstances of Assessment

Compliance to this CP and the relevant CPSs shall be checked on a yearly basis. In addition, an bi-annual asset classification of the PKI components takes place. The asset classification is performed in accordance with the Siemens Enterprise Risk Management Process [ERM]. A possible outcome of either the audit or the asset classification is the adaption of the implemented security mechanisms and controls, which may result in changes in CP and CPSs.

8.2 Identity / Qualifications of Assessor

Compliance audits shall be performed by a qualified auditor.

See also central CP for central service aspects.

8.3 Assessor's Relationship to Assessed Entity

The assessor shall be organizationally independent from the assessed entity's operational authority.

See also central CP for central service aspects.

8.4 Topics Covered by Assessment

See Central CP.

8.5 Actions Taken as a Result of Deficiency

If a compliance audit or other assessments show deficiencies of the assessed entity, a determination of actions to be taken shall be made. This determination is made by Tenant PMA with input from the auditor/assessor. Tenant PMA is responsible for developing and implementing a corrective action plan.

If Tenant PMA determines that such deficiencies pose an immediate threat to the security or integrity of the Product PKI or the respective Tenant, a corrective action plan shall be developed in accordance with the incident response procedures described in section 5.7.1 within thirty (30) days and implemented within a commercially reasonable period of time, and a re-assessment is to be performed within thirty (30) days after completion of the corrective action. For less serious deficiencies, Tenant PMA shall evaluate the significance of such issues and determine the appropriate response.

Possible actions taken include but are not limited to:

- ❑ temporary suspension of operations until deficiencies are corrected
- ❑ revocation of certificates issued to the assessed entity
- ❑ changes in personnel
- ❑ triggering special investigations or more frequent subsequent compliance assessments, and
- ❑ claims for damages against the assessed entity

8.6 Communication of Results

An Audit Compliance Report, including identification of corrective measures taken or being taken by the component, shall be provided to the Tenant PMA.

9 Other Business and Legal Matters

All business and legal matters will be regulated within specific contracts if necessary.

9.1 Fees

9.1.1 Certificate Issuance or Renewal fees

No stipulation.

9.1.2 Certificate Access fees

No stipulation.

9.1.3 Revocation or Status Information Access fees

No stipulation.

9.1.4 Fees for other Services

No stipulation.

9.1.5 Refund Policy

No stipulation.

9.2 Financial Responsibility

No stipulation.

9.2.1 Insurance Coverage

No stipulation.

9.2.2 Other Assets

No stipulation.

9.2.3 Insurance or Warranty Coverage for End-Entities

No stipulation.

9.3 Confidentiality of Business Information

9.3.1 Scope of Confidential Information

No stipulation.

9.3.2 Information not within the Scope of Confidential Information

No stipulation.

9.3.3 Responsibility to Protect Confidential Information

No stipulation.

9.4 Privacy of Personal Information

9.4.1 Privacy plan

No stipulation.

9.4.2 Information treated as private

No stipulation.

9.4.3 Information not deemed private

No stipulation.

9.4.4 Responsibility to protect private information

No stipulation.

9.4.5 Notice and consent to use private information

No stipulation.

9.4.6 Disclosure pursuant to judicial or administrative process

No stipulation.

9.4.7 Other information disclosure circumstances

No stipulation.

9.5 Intellectual Property Rights

No stipulation.

9.5.1 Intellectual Property Rights in Certificates and Revocation Information

No stipulation.

9.5.2 Intellectual Property Rights in CP

No stipulation.

9.5.3 Intellectual Property Rights in Names

No stipulation.

9.5.4 Property rights of Certificate Owners

No stipulation.

9.6 Representations and Warranties

9.6.1 CA representations and warranties

No stipulation.

9.6.2 RA representations and warranties

No stipulation.

9.6.3 Subscriber representations and warranties

No stipulation.

9.6.4 Relying party representations and warranties

No stipulation.

9.6.5 Representations and warranties of other participants

No stipulation.

9.7 Disclaimers of Warranties

No stipulation.

9.8 Limitations of Liability

No stipulation.

9.9 Indemnities

No stipulation.

9.10 Term and Termination

9.10.1 Term

No stipulation.

9.10.2 Termination

See Central CP.

9.10.3 Effect of Termination and Survival

No stipulation.

9.11 Individual Notices and Communication with Participants

No stipulation.

9.12 Amendments

9.12.1 Procedure for Amendment

In the case of CP amendments, change procedures may include:

- a notification mechanism to provide notice of proposed amendments to affected Product PKI Participants
- a comment period; a mechanism by which comments are received, reviewed and incorporated into the document and
- a mechanism by which amendments become final and effective

9.12.2 Notification Mechanism and Period

A modification or amendment of the CP/CPS leads to a new version of the CP/CPS.

The new version of the CP/CPS will be published after its release on the website stated in section 1.5.1.

9.12.3 Circumstances under which OID must be changed

Changes, which will not materially reduce the assurance that the CP or its implementation provides and will be judged by the Policy Management Authority (CP section 1.5) to have an insignificant effect on the acceptability of certificates, do not require a change in the CP OID.

Changes, which will materially change the acceptability of certificates for specific purposes, may require corresponding changes to the CP OID.

9.13 Dispute Resolution Provisions

No stipulation.

9.14 Governing Law

No stipulation.

9.15 Compliance with Applicable Law

No stipulation.

9.16 Miscellaneous Provisions

No stipulation.

9.16.1 Entire Agreement

No stipulation.

9.16.2 Assignment

No stipulation.

9.16.3 Severability

No stipulation.

9.16.4 Enforcement (attorneys' fees and waiver of rights)

No stipulation.

9.16.5 Force Majeure

Siemens shall be not held liable for violations of this CP due to causes that are reasonably beyond its control, including but not limited to, an event of Force Majeure, act of the authority, failure of equipment, failure of telecommunications lines, failure of internet access or any unforeseeable events.

9.17 Other Provisions

9.17.1 Order of Precedence of CP

This CP provides baseline requirements that are applicable to all CAs operated in the name of the Tenant. In the event of a conflict between this CP and any other documents, the following documents shall be given precedence with the same order of the list:

For the scope of applicability for the Product PKI as defined in section 1.1:

1. Product PKI Central CP
2. Tenant CP that is applicable to a Tenant operated by the Product PKI [this document]
3. Documentation executed or expressly authorized by respective PMA

For the scope of applicability for the Tenant specific parts (in particular (L)RA operation and End-Entity authentication) as defined in section 1.1:

1. Tenant CP that is applicable to a Tenant operated by the Product PKI [this document]
2. Product PKI Central CP
3. Documentation executed or expressly authorized by respective PMA

10. References

In case of legitimate interest, Siemens internal regulations and guidelines as well as other internal documents can be retrieved on request.

[ACP] Asset Classification & Protection; https://intranet.siemens.com/acp

[CCP] Siemens Product PKI Certificate Management Service – Central Certificate Policy; Jan. 14, 2022, Version 1.8, www.siemens.com/pki.

[CCPS] Siemens Product PKI Certificate Management Service – Central Certification Practice Statement; Jan. 14, 2022, Version 1.2, www.siemens.com/pki.

[ECRYPT] ECRYPT-CSA; Algorithms, Key Size and Protocols Report; February 2018; https://www.ecrypt.eu.org/csa/documents/D5.4-FinalAlgKeySizeProt.pdf

[ERM] Siemens Enterprise Risk Management; "Enterprise Risk Management – Integrated Framework"; https://intranet.for.siemens.com/cms/054/en/about/org/Pages/cf-a-erm-org.aspx and https://intranet.for.siemens.com/cms/080/de/processes/office/Pages/ric-ch-erm.aspx

[ETSI 401] ETSI EN 319 401; Electronic Signatures and Infrastructures (ESI); General Policy Requirements for Trust Service Providers; August 2017

[ETSI 411] ETSI EN 319 411-1; Electronic Signatures and Infrastructures (ESI); Policy and security requirements for Trust Service Providers issuing certificates; Part 1: General requirements; August 2017

[FIPS] National Institute of Standards and Technology; SECURITY REQUIREMENTS FOR CRYPTOGRAPHIC MODULES; May 2001; https://nvlpubs.nist.gov/nistpubs/FIPS/NIST.FIPS.140-2.pdf

[IEEE802.1AR] IEEE 802.1AR; IEEE Standard for Local and Metropolitan Area Networks - Secure Device Identity; June 2018; https://standards.ieee.org/standard/802_1AR-2018.html

[IHP] The Siemens Incident Handling process as part of the ISMS; https://www.cert.siemens.com/incident-response/process/

[ISMS] SFeRA - Security Framework and Regulations Application; https://webapps.siemens.com/sfera

[ISO27001] ISO/IEC 27001; Information technology — Security techniques — Information security management systems — Requirements; October 2013

[NIST] Recommendation for Key Management, Special Publication 800-57 Part 1 Rev. 5 (Draft), NIST, 10/2019; https://www.nist.gov/news-events/news/2019/10/recommendation-key-management-part-1-general-draft-nist-sp-800-57-part-1

[PROF] Certificate Profile Naming Convention for Infrastructure Certificates, https://wiki.ct.siemens.de/display/ProductPKI/PPKI+Naming+Conventions

[RFC2119] IETF; RFC 2119; Key words for use in RFCs to Indicate Requirement Levels; March 1997.

[RFC3647] IETF; RFC 3647; Internet X.509 Public Key Infrastructure - Certificate Policy and Certification Practices Framework; November 2003.

[RFC5280] IETF; RFC 3647; Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile; May 2008; https://tools.ietf.org/html/rfc5280

[TÜV] TÜV IT; Sichere Infrastrukturen für IT-Systeme – Trusted Site Infrastructure; Version 4.0; https://www.tuvit.de/fileadmin/user_upload/TUEViT_TSI_V4_0.pdf

[X.520] ITU-T; X520 Information technology – Open Systems Interconnection – The Directory: Selected attribute type