

UNIZETO



**POWSZECHNE
CENTRUM CERTYFIKACJI**

Certification Practice Statement of CERTUM's Certification Services

Version 3.3

Date: 7th of October, 2011

Status: valid

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1. Introduction

Certification Practice Statement¹ of CERTUM's Certification Services (further referred to as **Certification Practice Statement** or **CPS**) details rules of certification practice stated in **Certification Policy of CERTUM's Certification Services** (further referred to as **Certification Policy** or **CP**) and describes the process of public key certification and the applicability range of the certificates resulting from this certification. The nature, aim and role of Certification Practice Statement is particularly important from the point of view of a **subscriber²** and a **relying party³**.

Certification Policy describes general rules of certification practice of **CERTUM – Powszechne Centrum Certyfikacji** (further referred to as CERTUM), defines certification parties, their responsibilities and obligations, types of certificates, authentication procedures and applicability range. Certification Policy states what level of trust can be applied to a given type of a certificate issued by CERTUM. Certification Practice Statement – on the other hand – describes how CERTUM secures the level of trust guaranteed by the policy.

Certification Policy and Certification Practice Statement were defined by CERTUM, which is a supplier of certification services rendered on the basis of CP and CPS. The procedure of defining and updating of Certification Policy and Certification Practice Statement is in accordance with the rules stated in Chapter 7.4.1.2.

Certification Practice Statement describes a set of four main and several additional certification policies⁴ applied by CERTUM to issuance of certificates to authorities and end users. These policies represent different levels of credibility⁵ corresponding to public key certificates. The applicability ranges of certificates issued in compliance with the policies might be the same. However, responsibility (also legal) of a certification authority and certificate users is different.

Structure and contents of Certification Practice Statement are in accordance with the recommendation of RFC 3647 *Certificate Policy and Certification Practice Statement Framework*. Certification Practice Statement was created, assuming that the reader is generally familiar with the notions concerning certificates, electronic signature and Public Key Infrastructure (PKI).

*Applicable nations, terms and their meaning are defined in the **Glossary** at the end of this document.*

Unizeto Technologies S.A. is a legal successor of Unizeto Sp. z o.o. According to Polish Kodeks Spółek Handlowych (commercial partnership regulation - Dz.U. No 94, pos. 1037 inc. later changes) universal succession was executed, resulting in Unizeto Technologies S.A. inherited all the rights and obligations of Unizeto Sp. z o.o.

¹ Terms introduced for the first time are marked in bold; they are defined in Glossary at the end of the document.

² The subject of a certificate who is the initiator of a message and signs it using a private key corresponding to a public key contained within the certificate.

³ The receiver who acts basing on reliance upon a certificate and an electronic signature.

⁴ Information (identifier, address) on certification policy used by CERTUM. Terms Certification Policy – the document – and certification policy – a set of parameters unique for a given type of certificate – have to be distinguished.

⁵ The term of *credibility* refers to what extent a relying party can be certain that the correspondence between a public key and a private or legal entity, or device (the subject of a certificate), whose data were stated in the certificate is univocal. Additionally, the credibility reflects: (a)relying party's belief that the subject of a certificate controls the usage of a private key corresponding to a public key in the certificate and (b)the level of security in the procedure of supplying the subject with a public key when it is generated also by the system creating public key certificates

1.1. Overview

Certification Practice Statement is a description and basis for functioning of CERTUM and **certification authorities, registration authorities, subscribers and relying parties** associated with it. It also specifies rules of certification services delivery, such as subscribers' registration, public key certification, rekey and certificates renewal and certificates revocation.

CERTUM's non-qualified certification services forms a separate certification domain **certum** (Old Certum Trusted Network (OTCN)) within CERTUM Certification Authority (see Tab. 1.1), with a separate root certification authority **Certum CA** and **ctnDomena** (Certum Trusted Network (CTCN)) with a separate root certification authority **Certum Trusted Network CA** and **Certum Trusted Network CA 2**. Root certification authorities are independent from the each other and issue the so called self-certificates⁶ to itself.

Tab. 1-1 Authorities operating within non-qualified services CERTUM

certum
<ul style="list-style-type: none"> • Certum CA <ul style="list-style-type: none"> ↳ Certum Level I CA ↳ Certum Level II CA ↳ Certum Level III CA ↳ Certum Level IV CA ↳ Certum Time Stamp Authority ↳ Certum Global Services CA
ctnDomena
<ul style="list-style-type: none"> • Certum Trusted Network CA <ul style="list-style-type: none"> ↳ Certum Class 1 CA ↳ Certum Extended Validation CA ↳ Certum Code Signing CA • Certum Trusted Network CA 2

Fig.1.1 Authorities operating within non-qualified services CERTUM and other certification services of CERTUM Certification Authority

In terms of hierarchy, there are certification authorities subordinate to Certum CA root certification authority. These are: **Certum Level I** (CA will no longer issue certificates to this root), **Certum Level II** (CA will no longer issue certificates to this root), **Certum Level III** (CA will no longer issue certificates to this root), **Certum Level IV** (CA will no longer issue certificates to this root), **Certum Level I CA**, **Certum Level II CA**, **Certum Level III CA**, **Certum Level IV CA** and **Certum Global Services CA** issuing certificates with different credibility levels. On the other hand, there are **Certum Extended Validation CA**, **Certum Code Signing CA** and **Certum Class 1 CA** authorities within **ctnDomena** subordinate to **Certum Trusted Network CA** root certification authority.

⁶ **Self-certificate** – any public key certificate used for the verification of a signature made on a certificate in which the signature is verifiable by means of a public key contained in the field **subjectKeyInfo**; the contents of the fields **issuer** and **subject** are the same, the field **cA** of the extension **BasicConstraints** is set to true (see Chapter 7.1.1.2)

This Certification Practice Statement refers to all certification and registration authorities, subscribers and relying parties that use the service or exchange any information within **certum** domain or **ctnDomena** domain.

Certificates issued by CERTUM within **certum** and **ctnDomena** domains contain the identifiers⁷ of certification policies, enabling relying parties to state if the application of a certificate being verified by the party is in accordance with the declared purpose of the certificate. The declared purpose might be specified on the basis of values set in **PolicyInformation** structure of the extension **certificatePolicies** (see Chapter 0) of every certificate issued by CERTUM.

CERTUM obeys the law in force in the Republic of Poland and the rules resulting from the compliance, interpretation and validity of Certification Policy.

There are many additional documents connected with Certification Practice Statement. They are used in CERTUM and regulate its functioning (see Table 1.2). These documents have a different status. They are usually not available for the public because of the importance of the information they contain and the system security.

Tab.1.2 Important document connected with Certification Practice Statement

	Document name	Status	Availability
1.	Certification Policy of CERTUM's Non-qualified Certification Services	public	http://www.certum.pl
2.	Certification Policy of Non-qualified Time-Stamping Authority	public	http://www.certum.pl
3.	Personnel book, range of duties and responsibilities	Non-public	Locally – only entitled persons and auditor
4.	Registration authority book	Non-public	Locally – only entitled persons and auditor
5.	Technical infrastructure book	Non-public	Locally – only entitled persons and auditor
6.	Business continuity plan	Non-public	Locally – only entitled persons and auditor
7.	Identity verification instruction	Non-public	Locally – only entitled persons and auditor

Additional information and service are available by electronic mail at: info@certum.pl.

1.2. Document Name and its Identification

The present document of Certification Practice Statement is given a proper name of **Certification Policy of CERTUM's Certification Non-qualified Services**; the document is available:

- As an electronic version at the repository at: <http://www.certum.pl> or on request sent to: info@certum.pl,
- As a paper copy - on request sent to the address of CERTUM (see Chapter 1.5).

⁷ Identifiers of CERTUM certification policies are constructed on the basis of the object identifier of Unizeto Sp. z o.o. registered in Krajowy Rejestr Identyfikatorów Obiektów – KRIO (National Register of Object Identifiers), <http://www.krio.pl>. The identifier has the following value:

```
id-unizeto OBJECT IDENTIFIER ::= { iso(1) member-body(2) pl(616) organization(1) 113527}
```

The following registered object identifier is connected with the certification policy document (OID: 1.2.616.1.113527.2.2.0.1.3.3):

```
id-ccert-kpc-v3 OBJECT IDENTIFIER ::= { iso(1) member-body(2) pl(616)
  organization(1) id-unizeto(113527) id-ccert(2) id-certum(2)
  id-certPolicy-doc(0) id-ccert-kpc(1) version(3) 3 }
```

in which the two last numeric value corresponds to the current version and subversion of this document.

Certification Practice Statement Object Identifier is not included in the contents of issued certificates. Only certification policies identifiers belonging to the collection of certification policies incorporated by the present Certification Practice Statement (described in Chapter 0 hereinafter) are included in certificates issued by CERTUM.

1.3. Certification Practice Statement Parties

Certification Practice Statement regulates the most important relations between the entities belonging to CERTUM, its advisory teams (including auditors) and customers (users of supplied services). The regulations particularly apply to:

- certification authorities within **certum** domain (i.e. **Certum CA**, **Certum Level I CA**, **Certum Level II CA**, **Certum Level III CA**, **Certum Level IV CA**, **Certum Global Services CA**), certification authorities within **ctnDomena** domain (i.e. **Certum Trusted Network CA**, **Certum Extended Validation CA**, **Certum Code Signing CA**, **Certum Class 1 CA**) and any other authority established in accordance with the rules stated in the present Certification Practice Statement,
- Primary Registration Authority (PRA),
- Registration Authorities (RA),
- subscribers,
- relying parties.

CERTUM provides certification services to all private and legal entities accepting the regulations of the present Certification Practice Statement. The purpose of these practices (including key generating and certificate issuance rules as well as information system security) is to convince the users of CERTUM services that the declared credibility levels of issued certificates are the reflection of certification authorities' practices.

1.3.1. Certification Authorities

Certification authorities, forming domains of certification authorities called **certum** and **ctnDomena**, are a part of CERTUM (see Fig. 1). **Certum CA** certification authority is a root certification authority of **certum** domain and **Certum Trusted Network CA** certification authority is a root certification authority of **ctnDomena** domain. All certification authorities in these domains are subordinated to their roots.

Currently, there are several certification authorities subordinate to **Certum CA**: **Certum Level I CA**, **Certum Level II CA**, **Certum Level III CA**, **Certum Level IV CA** and **Certum Global Services CA** and there are two authorities subordinate to **Certum Trusted Network CA**: **Certum Extended Validation CA**, **Certum Code Signing CA** and **Certum Class 1 CA**.

1.3.1.1. Certum CA Root Certification Authorities

Certum CA and **Certum Trusted Network CA** root certification authorities can register and issue certificates only to certification authorities and authorities issuing electronic confirmation of non-repudiation that belong to their domains, i.e. respectively to **certum** and

ctnDomena. **Certum CA** and **Certum Trusted Network CA** operate on the basis of the self-certificate issued by themselves. In such a self-certificate, the extension **certificatePolicies** is not placed, which should be interpreted as lack of limits to the set of **certification paths**⁸, to which **Certum CA** and **Certum Trusted Network CA** certificates can be attached.

***Certum CA** certification authority must be a **point of trust**⁸ for all subscribers of CERTUM within **certum** domain and **Certum Trusted Network CA** certification authority must be a point of trust for all subscribers of CERTUM within **ctnDomena** domain. What follows is that every certification path must start with a certificate of **Certum CA** authority or **Certum Trusted Network CA** authority.*

Certum CA renders certification services to:

- itself (issues and renews self-certificates),
- **Certum Level I CA, Certum Level II CA, Certum Level III CA, Certum Level IV CA** and **Certum Global Services CA** authorities and other certification authorities registered in certification domain **certum**,
- entities delivering services of on-line certificate status verification (OCSP) and other entities rendering services of non-repudiation (e.g. time-stamping service).

Certum Trusted Network CA renders certification services to:

- itself (issues and renews self-certificates),
- **Certum Extended Validation CA, Certum Code Signing CA, Certum Class 1 CA** authorities and other certification authorities which will be registered in certification domain **ctnDomena**,
- entities delivering services of on-line certificate status verification (OCSP) and other entities rendering services of non-repudiation (e.g. time-stamping service).

1.3.1.2. Intermediate Certification Authorities

Intermediate certification authorities issue certificates to subscribers in compliance with the policies which identifiers are stated in Table 1.3.

⁸ See **Glossary**

Table 1.3 The names of intermediate certification authorities and certification policy identifiers, included in certificates issued by these authorities

Certification policy	Certification policy identifier
Certum Level I CA	1.2.616.1.113527.2.2.1
Certum Level II CA	1.2.616.1.113527.2.2.2
Certum Level III CA	1.2.616.1.113527.2.2.3
Certum Level IV CA	1.2.616.1.113527.2.2.4
Certum Global Services CA	2.5.29.32.0 (anyPolicy) ⁹ lub 1.2.616.1.113527.2.2.9 ¹⁰
Certum Extended Validation CA	1.2.616.1.113527.2.5.1.1
Certum Code Signing CA	1.2.616.1.113527.2.5.1.4
Certum Class 1 CA	1.2.616.1.113527.2.5.1.5

*The certificates, issued to intermediate certificates and certificates issued by **Certum CA** or **Certum Trusted Network CA** to other authorities and end-entities contain extension **certificatePolicies**.*

The above authorities do not include any other identifiers of certification policies in issued certificates.

*Only two authorities can issue certificates to other certification authorities: **Certum Level I CA** (test certification authorities) and **Certum Global Services CA** (commercial certification authorities).*

Primary Registration Authority and other registration authorities fully cooperate with CERTUM. Registration authorities represent CERTUM in contacts with subscribers and act within the rights delegated by certification authorities, concerning customers' identification and registration. The functioning and the scope of duties of registration authorities depend on the credibility of a certificate issued to subscribers and related certification policy.

Intermediate certification authorities are adjusted to issuing certificates to:

- employees of CERTUM and registration authority operators,
- certificate users who wish to ensure security and credibility for their electronic mail, stored data and service servers (e.g. web shops, information and software libraries),
- hardware devices (physical and logical) owned by private and legal entities;
- other certification authorities (applicable to **Certum Level I CA** and **Certum Global Services CA** authorities).

⁹ Certum Partners certification authority enters in the certificates issued to accredited certification authorities the **certification policy identifier** 2.5.29.32.0 (anyPolicy). In turn, all the certificates in the certification path between the certificate of an accredited authorities and certificate of end-entities, inclusiv must bear the **certification policy identifier** established on the basis of the tree node identifiers of the value of 1.2.616.1.113527.2.2.9. An example of such a policy identifier is a policy value 1.2.616.1.113527.2.2.9.1.

¹⁰ According to the certification policy Certum Partners issues certificates to all other authorities that are not a certification authorities.

1.3.2. Registration Authorities

Registration authorities receive, verify and approve or reject applications for registration and issuance of a certificate, and rekey, renewal, or revocation of a certificate. Verification of applications intends to authenticate (on the basis of the documents enclosed to the applications) the requester, as well as the data included in the application. Registration authorities can submit applications – to an appropriate certification authority – for cancellation of a subscriber registration and the subscriber's certificate withdrawal.

The level of precision of subscriber's identity identification results from the very subscriber's needs and it is imposed by the level of a certificate the issuance of which the subscriber requests (see Chapter 3). In the case of the simplest identification, a registration authority checks the correctness of a submitted email address. The most precise identification may require the subscriber's attendance in person to a registration authority and submission of suitable documents. This identification might be achieved either automatically or manually by a registration authority operator.

Registration authorities function on the basis of the authorization by an appropriate certification authority belonging to **certum** or **ctnDomena** domains; the authorization concerns the identification of the identity of a current or future subscriber and the verification of the proof of the possession of a private key. In the case of RAs managed by entities other than Unizeto Technologies S.A. (external RAs), a detailed scope of duties of registration authorities and their operators may be specified in an additional agreement between Unizeto Technologies S.A. and such RA, this CPS and the procedures concerning operating of registration authorities, which are an integral part of this agreement.

Any institution (legal entity) might function as a registration authority and might be accredited by CERTUM, provided that this institution submits an appropriate application to Primary Registration Authority and fulfils other conditions stated in Certification Practice Statement.

The list of registration authorities currently accredited by Primary Registration Authority is available in the repository at:

<http://www.certum.pl>

Certification authorities operating within CERTUM can delegate a part of their authority to two types of registration authorities:

- registration authorities,
- Primary Registration Authority (PRA).

The main difference between these types is that registration authorities, unlike Primary Registration Authority, cannot accredit other registration authorities and register new certification authorities. Moreover, registration authorities do not have the rights to confirm all requests of a subscriber. The rights might be limited only to some of all available types¹¹ of certificates. Therefore,

- **RAs** register end subscribers (private and legal entities) that request certificates of the credibility level up to **Certum Level IV CA** (including Level IV),
- **PRA** registers registration authorities, new certification authorities and end subscribers (private and legal entities, devices); there are no restrictions (apart from the ones that result from the role played in public key infrastructure of CERTUM) imposed on the types of certificates issued to subscribers registered in PRA; additionally, PRA approves of distinguished names (DNs) of current and future registration authorities.

¹¹ Types of certificates are described in Charter 1.4

Primary Registration Authority is located at the seat of CERTUM. Contact addresses with PRA are listed in Chapter 1.5.2

1.3.3. Subscribers

Any private or legal entities and hardware devices they own could be the subscriber of CERTUM, provided that they fulfil the terms of the definition of a subscriber.

Organizations willing to receive certificates issued by CERTUM for their employees could do it by means of their authorised representatives, whereas individual subscribers always request a certificate by themselves.

CERTUM offers certificates of different types and of different levels of credibility. Subscribers should decide what type of certificate is the most suitable for their needs (see Chapter 1.4).

1.3.4. Relying Parties

A relying party, using CERTUM services can be any entity whose decision making is dependant on validity of the connection between subscriber's identity and his/her/its public key (confirmed by one of certification authorities subordinate to **Certum CA** or **Certum Trusted Network CA**).

A relying party is responsible for verification of the current status of a subscriber's certificate. Such a decision must be taken any time when a relying party wishes to use a certificate to verify an electronic signature, to identify the source or the author of a message, or to create a secret communication channel with the owner of a certificate. A relying party should use the information in a certificate (e.g. identifiers and qualifiers of certification policy) to state whether a given certificate was used in accordance with its declared purpose.

1.3.5. Other parties

As a part of the CERTUM there are also entities that provide complementary services for issuing and revoking certificates.

1.3.5.1. Certum Time-Stamping Authority

Certum Time-Stamping Authority, operating within **certum** domain (Table . 1.1) is a part of CERTUM infrastructure.

Time-stamping authority issues timestamp tokens in accordance with ETSI¹² recommendation. Each timestamp token contains identifier of the policy, under which the token has been issued (identifier value is described in Table 1.4 and Chapter 7.3). Timestamp tokens are signed only with private key issued especially for time-stamping service.

¹²

ETSI TS 101 861 *Time stamping profile*, August 2001

Tab. 1.4 **Certum Time-Stamping Authority** identifier, included in timestamp tokens

Token name	Certification Policy Identifier	Compliance
Timestamp token	1.2.616.1.113527.2.2.5	RFC 3161
	1.2.616.1.113527.2.2.5.1	ETSI TS 101 861

Tokens, issued in accordance with policy described in Tab. 1.4, are used primarily in securing long-term electronic signatures¹³ and global transactions.

Certum Time-Stamping Authority employs solutions which guarantee synchronization with international time source (Coordinated Universal Time - UTC) with the accuracy more than 1 second.

1.3.5.2. Certificate Validation Service

CERTUM beside standard certificate status verification based on Certificate Revocation List (CRL) offers online services – based on Online Certificate Status Protocol (OCSP). This service is provided by **Certum Validation Service** which includes the following authorities:

- within **certum** domain: Certum OCSP Level I CA, Certum OCSP Level II CA, Certum OCSP Level III CA, Certum OCSP Level IV CA and Certum OCSP Level IV (until last valid certificate issued under root Certum Level IV),
- within **ctnDomena** domain: Certum OCSP EVCA, Certum OCSP Code Signing CA, Certum OCSP Class 1 CA.

All Certum's Certificate Status Validation Authorities operate using the Authorized Responder.

1.4. Certificate Applicability Range

Certificate applicability range states the scope of permitted certificate usage. This scope defines the character of certificate applicability (e.g. electronic signature, confidentiality or certification policy identifier).

Certificates issued by CERTUM can be used to process and secure information (including authentication) of various credibility levels. Information credibility level and information vulnerability to **breach**¹⁴ should be evaluated by a subscriber

¹³ IETF RFC 3126 *Electronic Signature Formats for long term electronic signatures*, September 2001

¹⁴ See **Glossary**

Tab.1.5 Sensitivity level of the information and the name of the policy

Information Sensitivity Level	Certification Policy Name	Applicability Range
Level I (testing)	Certum Level I CA	<p>The lowest credibility level of the identity of a certificate entity. Level I certificates should be applied to test the compatibility of CERTUM services with the services of other deliverers of PKI services, and to test certificate functionality in cooperation with applications being tested. These certificates can also be used for other purposes, as long as assurance of the credibility of a message being sent or received is not important.</p> <p>Attention. Relying party has no guarantee that a user of certificate is actually person that was mentioned in the certificate</p>
Level I (testing)	Certum Class 1 CA	The same as Certum Level I CA
Level II (basic)	Certum Level II CA	<p>The level gives the basic security of information in the environment of slight risk of data breach¹⁵ (risk with no substantial consequences). It concerns access to private information where the likelihood of unauthorized access is not very high. These certificates can be used to authenticate and control the integrity of the information that was signed, and to secure confidentiality of information, in particular electronic mail.</p>
Level III (intermediate)	Certum Level III CA	<p>The level applies to information security in the environment where the risk of information breach exists and the consequences of the breach are moderate. The certificates can be applied to financial transactions or transactions of a substantial level of fraud occurrence risk. They can also be used if the likelihood of unauthorized access to private information is substantial.</p>
Level IV (high)	Certum Level IV CA	<p>This level is appropriate in the cases of strong likelihood of data breach and if the consequences of security service failure are very serious. The certificates can be applied to transactions with unlimited financial value (unless it is stated differently in a certificate), or of the high level of fraud occurrence risk.</p>
Level EV SSL	Certum Extended Validation CA	<p>This level is appropriate in the cases of strong likelihood of data breach and if the consequences of security service failure are very serious. The certificates can be applied to transactions with unlimited financial value (unless it is stated differently in a certificate), or of the high level of fraud occurrence risk. The certificates are issued to legally recognized entities only.</p> <p>Attention. The validation process requires the CA to follow by <i>Guidelines for the issuance and Management of Extended Validation Certificates</i> requirements (see [29])</p>

¹⁵

See **Glossary**

A relying party or the subscriber bears responsibility for stating the credibility level of a certificate that is applied to a given purpose. On considering various important risk factors, this parties should state which of the certificates issued by CERTUM meet the formulated requirements. Subscribers should be familiar with the requirements of a relying party (e.g. the requirements can be published as **signature policy** or the policy of information system security) and then apply to CERTUM for issuance of an appropriate certificate that meets these requirements.

CERTUM also issues certificates in accordance with **Certum Global Services CA** policy, which has defined sensitivity level that depends of the certain certificate type.

1.4.1. Certificate Types and Recommended Applicability

CERTUM issues nine basic types of certificates with different applicability ranges. They are:

- 1) **personal certificates** – allow for encryption and signing of electronic mail, and securing electronic documents (electronic mail based on S/MIME or PGP standard),
- 2) **SSL and EV SSL certificates of server authentication confirmation** – they are used by global or extranet services operating in the shield of SSL/TLS/WTLS protocol,
- 3) **certificates used for authenticating a subscriber** (private and legal entities, hardware devices) – used e.g. in SSL/TLS/WTLS protocol,
- 4) **certificates confirming certificate status** – they are issued to the servers functioning in accordance with OCSP protocol and issuing tokens of the current status of a verified certificate,
- 5) **certificates for encrypting** – applied to the security of files, folders and file systems,
- 6) **certificates for code signing** – applied by computer programmers to secure software from forgery,
- 7) **certification authorities certificates** – the usage is not restricted to the defined range; the range might result from the private key usage stated in a certificate (see the field **keyUsage**, Chapter 7), or from its roles (e.g. a subscriber, a certification authority or other authority delivering PKI services); this type also comprises certification authorities operational certificates¹⁶,
- 8) **timestamping authorities certificates** – they are issued to servers which as a response for subscriber's request issue timestamp tokens binding any data (documents, messages, electronic signature, etc.) with timestamp, which allow for alignment (unambiguous in particular cases) of data,

Certificates issued in accordance with any of the certification policies can be used with applications that meet at least the following requirements:

- they appropriately manage private and public keys, as well as their application and sending of them,

¹⁶ Operational certificates are universal certificates issued to certification authorities. These certificates enable certification authorities to operate and comprise the certificates applied to: verification of a signature in messages, data encryption, verification of signatures created on issued certificates and CRL's, key exchange, key agreement and non-repudiation services (see the certificate extension **keyUsage**).

- certificates and the public keys associated with them are applied in compliance with their declared purpose that is confirmed by CERTUM,
- have built-in mechanisms of certificate status verification, certification path creation and validity control (signature validity and expiry date, etc),
- delivers appropriate information of certificate and application condition to a subscriber, etc.

1.4.2. Prohibited Applications

It is prohibited to use CERTUM certificates not in accordance with their declared purpose and in the applications that do not fulfil the minimal requirements specified in Chapter 1.4.1

In addition, certificates of subscribers (except for certificates issued under the certification policy CERTUM Global Services CA) cannot be used as certificates of certification authorities. In other words, they cannot be used to verify the certificates of certification authorities and certificates of other entities that provide certification services.

1.5. Certification Practice Statement management

Every version of Certification Practice Statement is in force (has a **current** status) up to the moment of publication and approval of its new version (see Chapter 9.10). A new version is developed by **CERTUM employees** and with the status **requested for comment** supplied to approval questionnaire. Upon reception and inclusion of the remarks from the approval questionnaire, the new version of Certification Practice Statement is supplied for approval. During CPS approval process, new version of the document has the status **under approval**. After completion of the approval procedure, a new version of Certification Practice Statement is marked with the status **valid**.

Beside different versions, Certification Practice Statement has also builds, having the same status as version. The new build of Certification Practice Statement is marked with unique number, placed after the version number of the valid CPS, separated by the dot.

Decision on acceptance of the changes in Certificate Practice Statement version or build number is made by PKI Service Development Team.

Further rules and requirements concerning Certification Practice Statement management are described in Chapter 9.10.

Subscribers are obligated to comply only with the currently valid Certification Policy and Certification Practice Statement.

1.5.1. The organization responsible for administration of the document

Unizeto Technologies S.A.
70-486 Szczecin, ul. Królowej Korony Polskiej 21
Polska

1.5.2. Contact

Unizeto Technologies S.A.
CERTUM – Powszechne Centrum Certyfikacji

PL 70-486 Szczecin, Królowej Korony Polskiej St. 21

E-mail: info@certum.pl

Phone: +48 91 4801 340

1.5.3. The operators defining the validity of the principles set out in the document

CERTUM team, directly administers the present Certification Practice Statement, Certification Policy and other documents concerning PKI services delivered by CERTUM. Above mentioned Team also test the compliance of Certification Practice Statement and Certification Policy. All inquiries and comments concerning the contents of the mentioned documents should be directed to the address given in the chapter. 1.5.2.

1.5.4. CPS approval procedure

The comment period for any material amendments to the Certification Practice Statement incorporated on the basis of suggestions made on the stage of its acceptance questionnaire (method described in Chapter 9.10) is ten (10) days starting on the date on which the amendments are published in the repository with the status under approval. After this period the Certification Practice Statement will become a governing document of the certification policy, respected by all subscribers of CERTUM, and the status of the version is changed into valid.

The decision to publish a new version of the Certificate Practice Statement shall be taken by Chief of CERTUM.

1.6. Definitions and abbreviations

Definitions and abbreviations used in this document can be found in Appendix 2 and Appendix 1.

2. Responsibility for publishing and the repository

2.1. Repository

Repository is a collection of publicly available catalogues which is managed and controlled by CERTUM.

*For the purposes of CERTUM's non-qualified certificate services there is the only one common repository for subscribers of domains **certum** and **ctnDomena** and for all certificate authorities which operates within these domains.*

The repository is managed and controlled by CERTUM. Therefore, CERTUM is committed to:

- ensure that all certificates published in the repository belong to the subscribers stated in a certificate and the subscribers approved of their certificates in accordance with the requirements specified in Chapters and 4.4,
- make sure that certificates of certification authorities, registration authorities belonging to **certum** domain and **ctnDomain**, and subscribers' certificates (upon their prior approval) are published and archived on time,
- publish and archive Certification Policy, Certification Practice Statement, templates of subscriber and relying party agreements,
- give access to the information concerning certificates status by publishing of CRL's, OCSP server or questions submitted by means of HTTP protocol,
- secure constant access to information in the repository for certification authorities, registration authorities, subscribers and relying parties,
- publish CRL's and other information swiftly and in accordance with the deadlines specified in this document,
- secure safe and controlled access to the information in the repository.

All subscribers, except for relying parties, have an unlimited access to the whole information in the repository. Limitations on relying parties' access usually concern subscribers' certificates.

2.2. Information Published by CERTUM

The whole information published by CERTUM is available in the repository at:

<http://www.certum.pl>

The information consists of:

- Certification Policy,
- Certification Practice Statement,
- templates of agreements with subscribers,
- certificates of all types, registration authorities, subscribers,

- Certificates Revocation Lists (CRLs); CRLs are accessible at the so called CRL distribution points, whose addresses are set in every certificate issued by CERTUM; the basic point of CRLs distribution is repository at: <http://crl.certum.pl>,
- records (as detailed as possible) of audits carried out by an authorized institution,
- supplementary information, e.g. announcements and notices.

Certificates belonging to certification authorities, registration authorities and subscribers are accessible on request submitted to WWW server at:

<http://www.certum.pl>

Additionally they may also be published in directory services at:

<ldap://directory.certum.pl>

Besides periodical publication of revoked certificates, the repository gives on-line access to the up-to-date information regarding a certificate status, by means of WWW site (address <http://www.certum.pl>) or OCSP (address <http://ocsp.certum.pl>) service.

2.3. Frequency of Publication

CERTUM publications below are issued with the following frequency:

- Certification Policy and Certification Practice Statement – see Chapter 9.12,
- the certificates of certification authorities functioning within CERTUM – upon every issuance of new certificates,
- registration authorities certificates – upon every issuance of new certificates,
- subscribers' certificates – upon every issuance of new certificates, on subscribers' prior approval,
- Certificate Revocation List – see Chapter 4.9.7,
- records of audits carried out by an authorized authority – every time CERTUM receives them,
- supplementary information – upon every updating of it.

2.4. Access to Publications

The whole information published by CERTUM in its repository at <http://www.certum.pl> is accessible for the public.

CERTUM service unit has implemented logical a physical mechanisms protecting against unauthorized adding, removing and modifying of the information published in the repository.

On discovering the breach of information integrity in the repository, CERTUM shall take appropriate actions intending to re-establish the information integrity, impose legal sanctions in relation to the abusers, notify the affected entities and compensate their loss.

3. Identification and Authentication

This Chapter presents general rules of subscribers' identity verification applied by CERTUM to certificate issuance. The rules are based on particular types of information that is included in certificates and they specify the means indispensable for assuring that the information is precise and credible at the time of issuing a certificate.

The verification is **obligatorily** performed in the stage of subscriber's registration and **on request** of CERTUM in the instance of any other certification service.

3.1. Names

3.1.1. Types of Names

Certificates issued by CERTUM comply with the norm X.509 v3. In particular, it means that a certificate issuer and a registration authority operating on behalf of the issuer approve of subscribers' names that comply with the standard X.509 (with referring to recommendations of the series X.500). Basic names of subscribers and certificate issuers placed in CERTUM certificates are in accordance with Distinguished Names - DNs – (also known as directory names), created according to the recommendations X.500 and X.520. Within DN, it is possible to define attributes of Domain Name Service (DNS), described in RFC 2247. It allows subscribers to use two types of names: DN and DNS simultaneously. It might be substantial in the cases of issuing certificates to servers controlled by the subscriber.

To ensure easier electronic communication with a subscriber, an alternative name of a subscriber is used in CERTUM certificates. The name can also contain subscriber's electronic mail address that is in accordance with the recommendation RFC 822.

The names of directories where certificates, CRLs and Certification Policy are retained, as well as the names of CRLs distribution points, comply with the recommendation RFC 1738 and names schemes applied by the protocol LDAP (see RFC 1778).

Table 3.1 shows minimal requirements imposed on subscribers' names within certification policies defined in Chapter 1.

Table 3.1 Requirements imposed on the name of a certificate subject.

Certification policy	Requirements
Certum Level I CA	Non-empty value of the field subject or empty in the case when the field of the alternative name exists (SubjectAltName) and it is marked as non-critical ¹⁷ .
Certum Level II CA	Non-empty value of the field subject and optional field of the subject's alternative name (SubjectAltName) in the case when it is marked as non-critical
Certum Level III CA	Subject's DN in accordance with X.500 and optionally the alternative name in the case when it is marked as non-critical
Certum Level IV CA	Subject's DN in accordance with X.500 and optionally the alternative name in the case when it is marked as non-critical
Certum Class 1 CA	Non-empty value of the field subject or empty in the case when the field of the alternative name exists (SubjectAltName) and it is marked as non-critical
Certum Code Signing CA	The names used in the certificates in accordance with X.500.
Certum Extended Validation CA	The names used in the certificates in accordance with X.500, and EV SSL requirements set out in Appendix 3 (chapter 6).
Certum Partners	Subject's DN in accordance with X.500 and optionally the alternative name in the case when it is marked as non-critical

The whole information, submitted in subscriber's application for registration and included in the certificate is accessible for the public. The list of data included in a certificate is in accordance with the recommendation X.509 v.3 and is presented in Chapter 7 (see also Chapter 3.1.2).

3.1.2. Need for Names to be Meaningful

The names included in subscriber's Distinguished Name have their meaning in Polish or other congress language.

Distinguished Name structure, approved/assigned and verified by a registration authority, depends on the type of certificate and a subscriber.

DN name may consists of the following fields (descriptions of a field follows its abbreviated name that complies with the recommendation RFC 3280 and X.520):

- **field C** – international abbreviation of the country name (**PL** for Poland),
- **field ST** – the region/province where the subscriber lives or runs his/her business,
- **field L** – the city where the subscriber lives or has a seat,

¹⁷ Defined names might contain attributes that are not attributes in X.500 documents; particularly, an attribute defining e-mail address might appear in these fields.

- **field CN** – the subscriber’s common name or the name of the organization in which the subscriber works provided that fields O or OU (see below) appeared in DN; the name of a product or a device may also be provided in this field,
- **field O** – the name of the institution which the subscriber represents or additional distinguished name,
- **field OU** – the name of the organizational unit the subscriber represents or additional distinguished name,
- **field E** – the subscriber’s email address,
- **field UN** – router’s or network device name,
- **field D** – subscriber’s additional distinguished name.

Subscriber’s DN must be confirmed by a registration authority operator and approved by a certification authority.

3.1.3. Anonymity of Subscribers

CERTUM does not issue certificates and other credentials to ensure the anonymity of the subscriber’s data (e.g. name).

3.1.4. Rules for Interpreting Various Names Forms

The interpretation of the fields provided in certificates issued by CERTUM is in compliance with certificates profile described in Chapter 7 of this CPS. In creating and interpreting of DNs, the recommendations specified in Chapter 3.1.2 of this document are employed.

3.1.5. Names Uniqueness

Subscriber’s DN is suggested by the subscriber. If the name is in accordance with general requirements stated in Chapter 3.1.1 and 3.1.2 the submitted proposition is initially accepted.

To provide uniqueness of the issued certificates, CERTUM assigns unique (within its domain) serial number for each issued certificate. Serial number, combined with subscriber’s DN, precisely and uniquely distinguishes a specific subscriber.

Within CERTUM domain, the uniqueness of the names of directories within the repository is also guaranteed. Applications basing on this property of the names of Certum CA directories and services rendered within them have a guaranteed service continuance, without any risk of service disruption or substitution.

3.1.6. Recognition, authentication and role of trademarks. Name Claim Dispute Resolution Procedure

Names that are not owned by a subscriber cannot be used in his/her/its applications. In the event of any question or doubt, the applicant is obliged to attach documents proving their ownership. CERTUM checks if a subscriber is entitled to use the name placed in the application for registration but does not play a role of an arbiter resolving disputes concerning the property rights to any distinguished name, trademark or trade name.

In disputes concerning name claims, CERTUM is entitled to reject or suspend a subscriber’s application without taking liability in virtue of this suspension/rejection. CERTUM is also entitled to take all decisions concerning the syntax of a subscriber’s name and assigning the subscriber with the names resulting from it.

3.2. Initial Registration

Subscriber's registration takes place when a subscriber applying for registration does not possess a **valid certificate**¹⁸ issued by any authority issuing certificates and affiliated by CERTUM.

Registration comprises a number of procedures which allow a certification authority – prior to issuing a certificate to a subscriber - to gather authenticated data concerning a given entity or identifying this entity.

Every subscriber is subjected to a registration process only once. After the verification of data supplied by a subscriber, the subscriber is included on the list of authorized users of CERTUM services and supplied with a public key certificate.

Every subscriber requesting public key infrastructure services and applying for certificate issuance should (prior to certificate issuance):

- remotely fill in a registration form on WWW site of CERTUM or submit data required for certificate issue (e.g. as an Order),
- generate RSA or DSA asymmetric key pair and supply a registration authority with the proof of the possession of a private key (see Chapter 3.2.1); optionally, a subscriber can charge a certification authority or registration authority with generating a key pair,
- suggest a distinguished name (**DN**, see Chapter 3.1.1),
- optionally attend a registration authority and provide required documents (if it is required by a given certification policy on the basis of which a certificate is being issued),
- optionally (depending on the type of certificate being issued) make an agreement with Unizeto Technologies S.A. about delivery of services by CERTUM.

Registration might require subscriber or a representative authorized by the subscriber to personally attend a registration authority. Nevertheless, CERTUM permits (for specified certificate types) sending applications for registration by mail, electronic mail, WWW sites, etc.; examination of the applications does not necessitate a physical contact with the requester.

3.2.1. Prove of Possession of Private Key

If an entity possesses a private key when applying for certificate issuance, certification authorities functioning within CERTUM and registration authorities (if a certificate issuer gave them authority concerning identity verification) need to make sure that the entity possesses a private key corresponding to the submitted public key.

The verification of private key possession is performed on the basis of the so called proof of possession (POP) of private key. This proof is the confirmation that a public key being subjected to the procedure composes a pair with a private key, exclusively owned by a subscriber.

The form of the proof depends on the type of a key pair being certified (a key pair for creation of an electronic signature, encryption and key agreement)

The basic proof is an electronic signature made (by subscriber's application):

- on requests for registration and modification of data and periodically on requests for key/certificate renewal or certificate revocation (in the case of loss of a private key or the secret of certificate revocation), submitted to a registration authority,

¹⁸

See **Glossary**

- on certification requests, certificate/key renewal and certificate revocation, submitted directly to a certification authority.

In the case of encryption keys or agreeing, the proof of possession (POP) of private key can be implemented in accordance with the general principles outlined in the chapter. 4.1 RFC 4211.

The requirement of proof of private key possession presentation is not applicable if upon subscriber's request, a key pair is generated by a certification authority or a registration authority.

Private keys should be generated inside a token (e.g. electronic cryptographic card). Any entity can possess a token at the very moment of generating and key import, or the token may be supplied to the entity after the key generation¹⁹. In the latter case, CERTUM must guarantee that the token and the key shall reach securely the entity for which they are intended. (See Chapter 6.1.2).

3.2.2. Authentication of Legal Entity's Identity

The registration authority is required to request suitable documents from the subscriber, which without any doubts confirm the identity of the legal entity on whose behalf the application is submitted and the private entity that represent it (or submits the application). In the case of email certificates, registration authority verifies an email address. The aim of this action is to receive by the subscriber an authentication data sent to the address which has previous placed in the certification request.

In the case of certificates issued for devices, authentication may be accomplished by verifying access to the domain placed in the certificate request. CERTUM may verify the subscriber's right to use the domain name and email address by using one of the following methods:

- domain verification – when a verification element indicated by CERTUM is placed on destination server
- email address verification – when the Subscriber is required to be able to answer an e-mail sent by CERTUM to his/her/its address.

Registration authority may collect the data required for identification by its own, e.g. through publicly available databases. Authentication of legal entity's identity has two purposes. The first purpose is to prove that at the time of application examination the legal entity stated in the application existed; the second purpose is to prove that a private entity applying for a certificate or receiving it is authorized by this legal entity to represent it. Submitted documents (or collected data) should prove:

- identity of the subscriber or certificate administrator (in the case of certificates issued for legal entities or devices),
- existence of the legal entity or institution,
- the right of the subscriber or the certificate administrator to act on behalf of the institution or legal entity.
- registration authority operator may – in doubtful cases – verify the registration of the domain in publicly available WHOIS services.

There are two basic ways of legal entity's identity authentication. The first one requires the legal entity's authorized representative's personal attendance in a registration authority, or a

¹⁹ It may be performed by the mans of a certification authority or registration authority.

registration authority representative's presence in person in the legal entity's seat (specified in the application). In the second case, the identity can be authenticated on-line by means of messages exchanged directly with a certification authority or its agent.

Detailed requirements on the identification documents and their verification are specified on the <https://www.certum.pl>.

A registration authority is committed to verify the correctness and truthfulness of all data provided in an application. In the case of EV SSL certificates additional procedure set out in Appendix 3 shall be applied.

If the verification is successful, an authorized operator of a registration authority:

- assigns a distinguished name to the legal entity or approves the name suggested in the submitted application,
- issues a **token** confirming the truthfulness of data provided in the application being examined and sends the token to a certification authority,
- registers all the documents and certificates (or information of the public data source) used by the operator to verify the legal entity's identity and the identity of representative acting on behalf of the entity,
- (optionally) on behalf of a certification authority, makes an agreement with the legal entity about certification services delivery; the agreement may be made if the legal entity plays a role of a subscriber, a registration authority, a certification authority, or an entity rendering other certification services. The confirmation (token) is sent to a certification authority which checks if the token was issued by an authorized registration authority.

The process of authentication is recorded. The type of recorded information and actions depend on the credibility level of a certificate which is a subject of the application and it concerns:

- the identity of a registration authority operator verifying the identity of a subscriber,
- submission of the statement by the operator expressing that he/she verified the requester's identity in accordance with the requirements of the present Certification Practice Statement,
- day of the verification,
- operator's identifier and subject's identifier in the case of subject's attendance in person in the registration authority (provided the subject has been supplied with such identifier),

If a legal entity is not capable of effective authenticating of its application or upon certification authority request, an authorized representative of the entity must attend in person a registration authority to confirm the application.

In the case where the entity already possesses the certificates issued by CERTUM, which have been subjected to identity verification required by a specific sensitivity level, further identity verification may be based on previous documents and data.

3.2.3. Authentication of Private Entity's Identity

Authentication of private entity's identity has two purposes. The authentication must prove that (1) data provided in an application concern an existing private entity and (2) the requester is indeed the private entity stated in the application. Procedures and requirements for private entity identity authentication are the same as for legal entities. The only difference is that the existence

of the legal entity and the right to act on its behalf verification is amended by verification of the right to use distinguished names other than name and surname. An email address verification is conducted in similar way as in section 3.2.2

3.2.4. Non-verification data

Verification processes are not intended to accomplish the following:

- organization unit name (OU),
- fields which belong to Subscriber name placed in all certificates issued under the policy certification **Certum Level I CA**, with the exception of SSL and code signing certificates,
- any other data as indicated in the application as non-verified.

3.2.5. Government Entities and Organizations validation

In the case where a person's name placed on the certificate contains the name of the organization (O), then this should be interpreted as the person's affiliation or authorization of that person to act on behalf of the organization. This means that CERTUM:

- verified that the organization was existing at the time of issued the certificate, the verification was based on independent sources of information or based on an extract from the National Court Register;
- verified that the individual whose data are included in the certificate was an employee organization or its subcontractor at the time of issuance of the certificate of organization and has the right to act on behalf of the organization; the scope of authorization and the period of validity may be regulated by separate legislation or the relying party in the course of verification a digital signature or decryption the received document and is outside the scope of liability of CERTUM; individual's identity and authorization may be checked by CERTUM on the basis of available records or database, contact by phone or e-mail to the organization.

3.2.6. Criteria for Interoperation

CERTUM may provide interoperation services that allow other entities to be able to interoperate with the CERTUM by certifying that entities. Accreditation is carried out at the request of the company when it meets the following conditions:

- accredited entity enabled to interoperate in this way will comply with the CP and CPS as supplemented by additional policies when required. Both documents can not be in conflict with this document;
- data communication network and the organizational structure of the accredited entity obtain a favorable opinion of the authorized CERTUM units or other auditor accepted by CERTUM;
- service or services provided by an accredited entity shall ensure interoperability with the corresponding services provided by CERTUM,
- the agreement shall constitute the business relationship between the accredited entity and CERTUM

Accredited entities shall receive a certificate for the provision of adequate services. These certificates are issued by CERTUM Global Services CA. Such certificate may be revoked if an annual audit results - carried out by authorized unit of CERTUM or other acceptable auditors –

show a gross negligence accredited company and which are not remedied within the period specified by the auditor.

3.3. Subscriber's Identity Authentication in Rekey, Certificate Renewal or Certificate Modification

If a subscriber has an active (one that is neither expired nor revoked) it may request a new certificate. A new certificate may be issued for a new key pair, generated by the subscriber or CERTUM (rekey) or the current key pair (recertification) CERTUM also permits the modification of the certificate due to changes in the information in an existing certificate and in the public key (more precisely - to the subscriber keys, see Chapter 3.3.1.3 and 4.8).

Authentication of the identity of subscribers who apply for rekey, renewal or modification of certificates must be performed by a registration authority operator in the following cases:

- the application has been authenticated only by means of a password,
- the data set in the certificate have been modified,
- on every request of a certification authority operator,
- when it concerns key certification resulting in a certificate issued for the first time to a given subscriber according to a new certification policy.

Subscribers submitting applications directly to a certification authority are authenticated by this authority on the basis of electronic signature authenticity and the public key certificate associated with this signature or by other methods accepted by both parties and complying with this document.

3.3.1. Subscriber Identity Authentication in regular updating of key

3.3.1.1. Rekey

Rekey might be performed by a subscriber periodically, on the basis of parameters of a given certificate that is already owned by the subscriber. The result of rekey is a new certificate whose parameters are the same as the parameters of the certificate mentioned in the application, except for a new key, certificate serial number, validity period and certification authority signature (see Chapter 4.7)

If the subscriber is to send a complete and digitally signed application or provide the correct password, an update to the key issue of the new certificate is automatically, provided that the new certificate is the same type as the certificate currently held by the subscriber and is issued according to the same certification policy.

It is not possible to update the keys associated with the type of SSL certificates and EV SSL in automatic mode. Subscribers of these certificates are subject to a similar identification and authentication, as in the case of the first time request for a certificate (see Chap. 3.2).

Verification of the identity of the subscriber requesting rekey is carried out on the basis of documents submitted for modified (renewed) certificate. Detailed requirements are specified at <https://www.certum.pl>.

3.3.1.2. Recertification

A subscriber or certification authorities uses recertification if he/she/it already possesses a certificate and a private key associated with it, and wishes to continue to use the same key pair. The new certificate, created as the result of renewal, consist in the same public key, the same

subject name and other information originating from the previous certificate, but the validity period, serial number and issuer signature varies from respective data in previous certificate. (See Chapter 4.6)

Recertification applies only to certificates which were not revoked and information contained within the certificate are intact.

Each recertification request is processed in off-line mode, i.e. it requires manual acceptance by the certification authority operator.

Currently CERTUM does not support recertification of the same key pair of the subscribers', due to security reasons. Such restriction does not apply certification authority key recertification (see Chapter 6.1.1.4)

3.3.1.3. Certificate Modification

Certificate modification means creation of a new certificate on the basis of the certificate that is currently owned by the subscriber. A new certificate has a different public key, a new serial number, and it differs in at least one field (its contents or appearance of a completely new field) from the certificate on the basis of which it is being issued.

Modification might be necessary e.g. in the case of changing of position at work or the change of name, on the condition that these data were previously stated in the certificate or they should be added. If data that are verified in accordance with subscriber's authentication procedures on the basis of appropriate documents (e.g. certification of the position at work) have been modified, every application must be confirmed in a registration authority (see Chapter 4.8).

Only valid certificates that have not been revoked and which subscriber's name and other attributes have not changed are subject to modification.

3.3.2. Subscriber Identity Authentication in Rekey after Revocation

If a subscriber upon a certificate revocation does not have an active (within a given certification policy) certificate and applies for renewal, the application must be confirmed by a registration authority or certification authority operator. The subscriber's identification and authentication may be performed analogically to the case of initial registration (see Chapter 3.2) or may be based of previously submitted documents.

Every subsequent application for certificate renewal, certificate modification or rekey is examined in the standard manner (see Chapter 4.7)

3.4. Subscriber's Identity Authentication in Certificate Revocation

Applications for revocation can be submitted by e-mail directly to an appropriate certificate issuer or indirectly to a registration authority. It is possible to submit non-electronic application.

In the first case, a subscriber must submit an authenticated application for certificate revocation. The subscriber authenticates the application by making an electronic signature on it or by providing previously agreed password on the web page.

A subscriber who has lost an active private key (or it has been stolen) and secret of certificate revocation should submit the application in registration authority. Application for revocation must be certified by a registration authority or certification authority operator. This certification does not have to be electronic.

In both cases, an application needs to enable univocal identification of the subscriber's identity. Application for revocation might concern more than one certificate.

Authentication and identification of a subscriber in a registration authority is performed analogically to initial registration (see Chapter 3.2) or rekey (see Chapter 3.3.1.1). Authentication of a subscriber in a certification authority consists in verification of application authentication or identity of the requester.

Detailed procedure of revocation is disclosed in Chapter 4.9.3.

4. Operational Requirements

Basic certification procedures are presented below. Every procedure starts with a subscriber's submitting a suitable application indirectly (upon prior confirmation of the application by a registration authority) or directly to a certification authority. On the basis of the application, the certification authority takes an appropriate decision about the delivery/rejection of the requested service. Submitted applications should contain information necessary for correct identification of the subscriber.

CERTUM provides access to the following basic services: registration, certification, certificate renewal, rekey, certificate modification and revocation.

If a submitted application contains a public key, the key must be prepared in the way that – disregarding of applied certification policy – cryptographically binds a public key with other data listed in the application, particularly with the subscriber's identity data.

An application might contain, instead of a public key, subscriber's request to generate an asymmetric key pair on his/her/its behalf. It might be carried out in a certification authority or a registration authority. Upon generating, the keys are safely submitted to the subscriber.

4.1. Application Submission

Subscriber's applications are submitted directly to a certification authority or indirectly by a registration authority. Applications submitted directly might concern: certificate renewal, rekey and certificate revocation. Applications submitted indirectly concern: certificate registration, modification, although other applications connected with other certification services delivered by a certification authority are also permitted.

A registration authority operator has a double role: the role of a subscriber and the role of a person authorized to represent a certification authority. In the first case, the operator can submit the same applications as any other subscriber. In the second case, the operator can confirm application submitted by the subscribers and in well-founded cases create applications for revocation of certificates belonging to subscribers that violate the present Certification Practice Statement.

Applications are submitted by means of network protocols such as HTTP, S/MIME or TCP/IP, or in non-electronic form – e.g. Orders (applicable only for certificates generated on cryptographic cards).

CERTUM issues certificates solely on the basis of registration, modification, rekey, certificate renewal or certificate modification request.

4.1.1. Who can submit applications

An application for registration is submitted to a registration authority indirectly or directly to a certification authority and the requester of certificate can be any entity belonging to one of the following categories:

- individual person, which is or will be a subject of certificate
- authorized representative of the legal person or institution, called an applicant or a sponsor
- authorized representative of the certification authority **certum** and **ctnDomena** domains or authorized representative of the accredited external authority.

- authorized representative of the Primary Registration Authority or Registration Authority

4.1.2. Application Processing and the relevant obligations

4.1.2.1. Subscribers certificates

All subscribers of certificates and end users (including entities providing certification services except issuance of certificates and revocation) should accept the commitments and guarantees defined in the contract with the subscriber (see 9.6.3) and undergo a registration process that requires the implementation of the following:

- submission of an application which is completed and containing true and correct information;
- subscriber generates his/her/its key pair by himself/herself/itself. The generation may also be delegated to CERTUM
- in the case of self-generate a key pair subscriber should provide the public key to CERTUM directly or through the registration authority associated with CERTUM, and also prove possession of private key corresponding to public key submitted (see Chap. 3.2.1).

4.1.2.2. Certification Authority and Registration Authority certificates

These certificate authorities and registration authorities, which provide services for, or under the authority of CERTUM and are not an organizational units of CERTUM must first enter into an agreement with CERTUM. The agreement, in addition to the rights and obligations of both parties, determine the identity of persons and their authorization to represent both parties during the execution of a contract. The person or persons authorized by the applicant should determine, before issuing a certificate, the distinguished name of the subject of certificate.

The keys and certificates of CAs may be generated only during the Key Ceremony in which persons authorized by CERTUM must participate.

Based on the concluded agreement with the registration authority, certificates can be issued to eligible individuals and to their devices when necessary to provide services to the CERTUM.

4.1.2.3. Application for registration

An application for registration is submitted to a registration authority or directly to a certification authority by a subscriber and includes the following information:

- full name of the institution or the name and surname of the subscriber or certificate administrator,
- distinguished name whose structure depends on the subscriber's category (see Chapter 3.1.2),
- identifiers: NIP (Tax Identification Number) or REGON (Business Entity Identification Number)/PESEL (Personal Identification Number),
- subscriber's postal address (state or province, postal code, city or town, building number and street, fax number),
- email address,
- certificate type that the subscriber applies for,

- the identifier of certification policy on the basis of which the certificate is to be issued,
- a public key that is to be certified.

4.1.2.4. Certificate renewal, rekey, certification or modification application

An application of this type is submitted to a registration authority or directly to a certification authority by a subscriber. Applications are submitted to a registration authority in the following cases:

- directly upon certificate revocation,
- applying for a certificate which is supposed to be issued in accordance with a certification policy different than certificates currently owned by a subscriber,
- upon explicit demand of a registration authority operator.

If none of these conditions occurs, a subscriber might submit an application directly to a certification authority. Nevertheless, submission of the application to a registration authority is not prohibited.

An application for certificate modification, rekey or certificate renewal, must contain at least:

- the requester's (subscriber's) distinguished name,
- certificate type that the subscriber applies for,
- the identifier of certification policy on the basis of which the certificate is to be issued,
- a public key (previously used in the case of certificate renewal or modification or new in the case of rekey) that is to be certified.

A part or whole of data contained in above application may be authenticated by application of an electronic signature, provided that a subscriber possesses a currently valid private key for signature creation.

Upon authentication of the identity of the subscriber (see Chapters 3.2.2, 3.2.3 and 3.2.5) applying for registration and upon reception of confirmation issued by a registration authority, the application is sent to a certification authority.

4.1.2.5. Certificate Revocation or Suspension Application

An application for certificate revocation is submitted to a registration authority or directly to a certification authority by a subscriber. Applications are submitted to a registration authority in the following cases:

- lack of a currently valid private key for an electronic signature creation,
- upon explicit demand of a certification authority operator.

If none of these conditions is fulfilled, a subscriber might submit an application directly to a certification authority. Nevertheless, submission of the application to a registration authority is not prohibited.

Information included in electronic certificate revocation or suspension application:

- the requester's (subscriber's) distinguished name,
- list of certificates to be revoked or suspended, containing pairs: serial number, reason for revocation.

The part or whole the data included in above application must be authenticated by means of an electronic signature, provided that a subscriber possesses a currently valid private key for signature creation.

An application for revocation might be submitted by e-mail along with authentication, as a written version (as a letter, by fax) or orally (telephone call). Detailed requirements on revocation request are presented at <https://www.certum.pl>.

In the moment of certificate suspension, registration authorities operators and the subscribers are notified about this fact (e.g. by means of email).

4.2. Application Processing

CERTUM accepts applications submitted individually and collectively. Applications might be submitted *on-line* and *off-line*.

On-line submission is performed by means of WWW pages of CERTUM server at: <https://www.certum.pl>. A subscriber, having visited a suitable site, fills in (in accordance with the instruction on that site) an appropriate application form and sends it to a certification authority. Applications for **Certum Level I CA** certificates are mostly processed automatically, whereas applications for certificates of other levels are processed manually – if the application requires the comparison of data included in the application with documents submitted to the CERTUM or automatically if the comparison with CERTUM database is sufficient.

Off-line submission of an application requires subscriber's or an authorized representative's of a company attendance in person in a registration authority or certification authority, representative's of the certification authority attendance in requester's / payer's seat or submission of trustworthy data or documents for issuing the certificate to CERTUM or its representative. Authorization of the documents or persons is carried out as described at <https://www.certum.pl>. For the requests provided *off-line*, CERTUM may prepare dedicated processes for certificate retrieval or generate the certificate and keys by itself (solely on the smart cards).

Off-line submissions concern also collective applications. These applications are confirmed by a certification or registration authority operator and processed in groups.

Every *on-line* certification application is sent to:

- **request confirmation box**, if an application requires the issuance of confirmation by a registration authority,
- **request box**, if an application does not require the issuance of confirmation by a registration authority.

Both boxes are fully controlled by a certification authority.

Applications processed on the basis of *off-line* request, upon successful verification by a registration or certification authority operator, are usually submitted to a **request box**.

4.2.1. Implementing identification and authentication function

The functions of identification and authentication of all required subscriber's data is performed by CERTUM and registration authorities associated with CERTUM in accordance with the conditions set out in Ch. 3.2 and 3.3.

4.2.2. Acceptance or rejection of the application

4.2.2.1. Application Processing in Registration Authority

Every application submitted to a request confirmation box or submitted to a registration authority in a paper version, is processed in the following way:

- a registration authority operator obtains subscriber's application (a paper version or an electronic version from the request confirmation box),
- a registration authority operator checks whether the subscriber has made a charge for processing an application for a certificate, provided that such payment is provided in the price list of CERTUM, in the absence of such a charge, the request is rejected.
- the operator verifies data listed in the application, e.g. subscriber's personal data (see the procedure described in Chapter 3.2.2, 3.2.3 or 3.2.5) and checks the proof of private key possession if it exists (see Chapter 3.2.1),
- upon the positive verification, the operator confirms (signs) the request; if the original application contains wrong data, it is rejected,
- the confirmed application is submitted to a request box of a certification authority,
- a registration authority may also verify other data that are not listed in an application and required by CERTUM to run a business.

4.2.2.2. Application Processing in Certification Authority

A certification authority retrieves applications out of a request query. The applications might contain confirmation issued by a registration authority. If a given application does not contain confirmation, a certification authority:

- binds the application with registered subscribers' database,
- verifies authentication of the application (electronic signature or authentication code),
- verifies formal correctness of the application (syntax and contents),
- checks if the subscriber is authorized to issue the type of request he/she/it has sent and its contents,
- records these procedures in database and system journals.

If the application contains confirmation, a certification authority checks whether the confirmation was issued by an authorized registration authority. If it is the case, further processing is carried out analogically to processing an application without confirmation. Additionally, if the application contains request for issuance of a signature verification certificate, the certification authority checks the proof of a private key possession submitted by the subscriber.

4.2.2.3. Certificate Issuance Denial

CERTUM can refuse certificate issuance to any requester without taking any obligations or responsibility that might follow the requester's damages or loss resulting from this denial. The certification authority should immediately refund the requester the certificate fee (if the requester paid it), unless the requester stated false data in his/her/its application.

Certificate issuance denial can occur:

- the subscriber cannot prove his/her rights to proposed **DN**,

- if there is suspicion or certainty that the subscriber falsified the data or stated false data,
- if the subscriber in especially inconvenient manner engaged resources and processing means of CERTUM by submitting number of request clearly in excess of his/her/its needs,
- subscriber did not make a payment for issuing a certificate, provided that such payment is provided in the price list of CERTUM,
- from other reasons not specified above.

Information concerning the decision about certificate issuance denial and its reasons is sent to the requester. The requester can appeal to CERTUM within 14 days of the reception of the decision.

4.2.3. Certificate Issuance Awaiting

A certification authority should make efforts to ensure that on receiving application for registration and certification, and certification or renewal (of keys or certificate), the authority examines the application and issues a certificate within the period no longer than 7 days.

This period depends mainly on completeness of a submitted application and possible administration co-ordinations and explanations between CERTUM and the requester.

4.3. Certificate Issuance

4.3.1. Processing

On receiving an appropriate application and processing it (see Chapter 4.2), a certification authority **issues a certificate**. A certificate is considered valid (active or ready status) of the moment of the subscriber's approval (see Chapter 4.4). Validity periods of the issued certificate depend on the certificate type and the subscriber's category and they are in accordance with periods presented in Table 6.6.

Every certificate is issued on-line. The issuance procedure is the following:

- a processed application is sent to certificate issuance server,
- if the application contains the request for generating of a key pair, the server charges hardware key generator complying with the requirements of at least FIPS 140 Level 2 with this task,
- quality of submitted or generated by a certification authority public keys is tested,
- if the procedures are successful, the server issues a certificate and charges hardware security module with signing the certificate; the certificate is stored in certification authority database,
- the certification authority prepares the answer containing the issued certificate (if it was issued) and sends it to the subscriber; the certificate is not published in the repository (even if the subscriber approved of that) until the reception of the subscriber's confirmation of approval of the certificate (see Chapter 4.4).

4.3.2. Communication of information

CERTUM certification authority employs two basic methods concerning notifying a subscriber about the certificate issuance. The first method uses mail or electronic mail and consists in sending (to the address provided by the subscriber) the information allowing the subscriber to obtain the certificate. This method is also used in the case of necessity of notifying

all subscribers of a given certification authority about the issuance of a new certificate to this authority or notifying some subscribers about the issuance of a new certificate (e.g. to a server) of the organization these subscribers work for.

The second method consists in issuance of a certificate and placement of the certificate (usually in the same place as a private key) on the electronic cryptographic card and submission of the certificate (by mail) to the subscriber's address (a PIN is sent in a separate letter).

Every issued and accepted certificate is published in CERTUM repository. Certificate publication is equal to notifying other relying parties that a certificate has been issued to a subscriber who as the owner of the certificate is entitled to be authorized as a relying party.

CERTUM publishes a certificate in the repository upon approval of the certificate by the subscriber (see Chapter 4.4)

4.4. Certificate Acceptance

4.4.1. Confirmation of acceptance certificate

On receiving a certificate, a subscriber is committed to check its contents, particularly the correctness of the data and complementariness of a public key with the private key he/she/it possesses. If the certificate has any faults that cannot be accepted by the subscriber, the certificate should be immediately revoked (it is equal to lack of approval of the valid certificate expressed by the subscriber).

Certificate acceptance means occurrence of one of the following things within 7 days of the reception of a certificate:

- Certificate installation using WWW site: (<https://www.certum.pl>) or,
- lack of certificate revocation in above mentioned period.

If a certificate is not clearly rejected within 7 days of the reception of the certificate, the certificate is considered to be accepted.

Every accepted certificate is published in CERTUM repository and accessible for the public.

Certificate acceptance is univocal to the subscriber's stating that prior to applying the certificate to any cryptographic operation, he/she/it thoroughly familiarized with certificate issuance procedures, described in this document.

Accepting the certificate, the subscriber accepts the rules of Certification Practice Statement and Certification Policy and agrees to comply with the agreement made with Unizeto Technologies S.A.

A relying party might check whether the certificate associated with a private key by means of which a document was signed, has been accepted by the document issuer (see Chapter 4.9.9)

4.4.2. Publication of certificate

Each issued and accepted certificate is published in repository of CERTUM. Publication of the certificate is equivalent to the notice of relying parties that CERTUM issued a certificate to subscriber who, as owner of the certificate may be authorized to the role of the relying party.

4.4.3. Information for other parties

The registration authority, which has confirmed the subscriber's data and the applicant, on the basis of contract with CERTUM, may be informed about the new certificate.

4.5. Certificate and Key Usage

4.5.1. By the subscriber

Subscribers, including registration authorities' operators, must use private key and certificates:

- in accordance with their purpose stated in the present Certification Practice Statement and in compliance with the certificate contents (the fields **keyUsage** and **extendedKeyUsage**),
- in accordance with the optional agreement between the subscriber and Unizeto Technologies S.A.,
- only within the validity period (not applicable to certificates for digital signature verification),
- until the certificate revocation; when the certificate is suspended, the subscriber cannot use the private key, particularly for creating a signature.

4.5.2. By the relying parties

Relying parties, including registration authority operators, must use public keys and certificates:

- in accordance with their purpose stated in the present Certification Practice Statement and in compliance with the certificate contents (the fields **keyUsage** and **extendedKeyUsage**),
- only upon their status verification (see Chapter 4.9) and verification of the signature of the certification authority that issued the certificate,
- until the key revocation (applicable to public keys for key exchange, data encryption or key agreement); when the certificate is suspended, the relying party cannot use the public key.

4.6. Recertification

CERTUM provides the services of recertification of the same pair of cryptographic keys solely to the certification authorities. If the recertification procedure turns successful, the certificate being the subject of the update is not revoked.

4.7. Certification and rekey (key update)

Certification and rekey (key update) occurs when a subscriber (already registered) generate a new key pair (or order a certification authority to generate such key pair) and requires issuance of a new certificate confirming possession of a newly created public key. Certification and rekey should be interpreted as follows:

- **key certification** is not associated with any valid certificate and is used by subscribers to obtain one or more (usually additional) certificate of any type, not necessarily within the same certification policy,
- **rekey** refers to a particular certificate, indicated in the request; due to above new certificate includes the same content; the only differences are: a new public key, a serial number, a validity period and a new certification authority signature; rekey may also be referred to as certificate renewal.

Certification and rekey could also apply to certification authority certificates.

CERTUM always informs subscribers (at least 7 days in advance) about forthcoming validity period expiry. This information is also submitted when it is related to certificates of certification authority.

4.7.1. Certification and rekey circumstances.

Rekey request supplied by a subscriber can apply only to:

- a currently valid certificate and certificate not revoked before.

On the other hand, key certification also applies to situations when a subscriber:

- does not have a current and valid private key for electronic signatures creation,
- requests an additional certificate of the same type or of different type, but only within the certification policy used for issuance of at least one certificate,
- does not have any valid certificate, issued within one of the certification policies defined in this Certification Practice Statement.

4.7.2. Who can request key update?

Certification or rekey is performed only on subscribers or applicant representative demand and must be preceded by subscription of a suitable request form.

4.7.3. Rekey and certification request processing

Rekey and certification request authorization is carried out in accordance with specifications of instructions published at <https://www.certum.pl>.

Rekey and certification requests are processed in accordance with Chapter 4.2. and 4.3.

4.7.4. Information for subscriber

The subscriber is notified of the new certificate in accordance with Chapter 4.3.2

4.7.5. Confirmation of acceptance of a new certificate

The subscriber should submit an authorized certificate acceptance confirmation to a certification authority,

4.7.6. Publication of a new certificate

A new certificate is published in the publicly available repository of CERTUM

4.7.7. Information for other parties

The registration authority, which has confirmed the subscriber's data and the applicant, on the basis of contract with CERTUM, may be informed about the new certificate.

4.8. Certificate modification

4.8.1. Certificate modification circumstances

Modification of a certificate means replacement of a certificate being used (**currently valid**) with a new certificate in which – in contrast to the certificate being replaced – some of the data can be modified, including public key change.

Modification procedure can be also applicable for certification authority certificates, although in such a case all customers of the certification authority should be informed about procedure execution.

Reasons for modification of certificate (see Chapter 3.3.1.3) are defined in the certificate modification request (Chapter 4.1).

4.8.2. Who can request certificate modification

Certificate modification is performed only on subscriber's demand and must be preceded by submission of a suitable certificate modification request.

See Chapter 4.1.1

4.8.3. Certificate modification request processing

Certificate modification is treated and processed as rekey (certificate renewal) in the case of modification of data of lesser sensitivity, such as:

- email address,
- subscriber's postal address.

or the modification is treated as certification when some more sensitive data is modified.

*If modification procedure is successful, a certificate being modified might be revoked and placed on Certificate Revocation List (CRL). As a reason for revocation, **affiliationChanged**²⁰ term is provided, meaning that (1) the revoked certificate was replaced by another one, which contains modified data, i.e. subscriber's name and (2) informing relying parties that there is no reason to suspect that a private key related with the certificate was compromised.*

4.8.4. Information for subscriber

See Chapter 4.3.2

4.8.5. Confirmation of acceptance of a modified certificate

See Chapter 4.4.1

4.8.6. Publication of a modified certificate

See Chapter 4.4.2

4.8.7. Information for other parties

Modification procedure can be also applicable for certification authority certificates, although in such a case all customers of the certification authority should be informed about procedure execution.

²⁰ This case incorporate by default the replacement of the certificate

See also Chapter 4.4.3

4.9. Certificate revocation and suspension

Certificate revocation and suspension has a significant influence on a certificate and obligations of subscriber owning such certificate.

Certificate suspension is carried out only in closed corporate systems affiliated by CERTUM.

During suspension period or shortly after subscriber's certificate revocation, the certificate should be considered as not valid (in state of revocation). Similarly, the case of certification authority certificate – cancellation of validity of a certificate of this type means withdrawal of the rights to issue certificates for its owner but does not affect validity of certificates issued by the certification authority when such a certificate was valid.

Certificate revocation or suspension does not affect transactions made before revocation or suspension or obligations being result of following of present Certification Practice Statement.

This Chapter states conditions which need to be fulfilled or exist for certification authority to have reasons for certificate revocation or suspension. Although certificate suspension is a specific form of revocation, this CPS will distinguish both terms to emphasize the essential difference between them: certificate suspension can be cancelled while revocation – cannot.

Certificate suspension is temporary (usually lasts until explanation of reasons of the suspension). If a subscriber, for example, losses control over media which contains a key pair, secured by password or PIN, such a situation should be reported at once to a certification authority, along with certificate suspension request. In the case of swift media restoration and assurance that the private key has not been compromised, the certificate may be (on subscriber's demand) unsuspended, restoring its valid status.

If a private key, corresponding to a public key, contained in the revoked certificate, remains under the subscriber's control, it should be still protected in a manner guaranteeing its authenticity for a whole period of suspension and it should be stored securely after revocation until it is physically destroyed.

4.9.1. Circumstances for certificate revocation

A basic reason for revoking a subscriber's certificate is loss of control (or even suspicion of such a loss) over a private key being owned by the subscriber of the certificate or material breach of obligation or requirements of Certification Policy or Certification Practice Statement by the subscriber.

Certificate revocation may be performed if the following situation occurs:

- when any information within the certificate has changed,
- when a private key, associated with a public key contained in the certificate or media used for storing it has been, or there is a reason to strongly suspect it would be compromised²¹; certificate revocation procedure is in this case executed by a subscriber,
- the subscriber decides to terminate the agreement with Unizeto Technologies S.A. (in such a case, revocation is strictly bounded with cancellation of registration of the subscriber in a certification authority); if the subscriber does not request the revocation

²¹ Private key compromise means: (1) the occurrence of unauthorized access to a private key or a reason to strongly suspect this access, (2) loss of a private key or the occurrence of a reason to suspect such a loss, (3) theft of a private key or the occurrence of a reason to suspect such a theft, (4) accidental erasure of a private key.

by himself/herself/itself, a certification authority or a representative of the institution in which the subscriber is employed, has the right to do it,

- on each request of the subscriber indicated in the certificate,
- by its issuer, CERTUM, for example when the subscriber does not comply with accepted Certification Policy or resolutions of other documents signed by a certification authority,
- if a certification authority terminates its services, all the certificates issued by this certification authority before expiration of declared period of service termination have to be revoked, along with the certificate of the certification authority ,
- the subscriber lingers over fees for services provided by a certification authority or other duties or obligations he/she decided to take,
- a certification authority private key or security of its systems have been breached in a manner directly endangering the certificate reliability,
- the subscriber, being an employee of an organization, has not returned the electronic cryptographic card, used for storing the certificate and the corresponding private key, when terminating the contract for employment
- other circumstances, delaying or preventing the subscriber from execution of regulations of this Certification Practice Statement, emerging from disasters, computer system or network malfunction, changes in the subscriber's legal environment or official regulations of the government or its agencies.

These circumstances may also decide to revoke EV SSL certificate (a more detailed list of revocation events is in the chapter. 27 Appendix 3).

The certificate belonging to a certification authority may be revoked or suspended by its issuing authority. Such revocation may occur in the following situation:

- the certification authority has reasons to believe that information in issued certificate is false,
- the certification authority private key or its information system were breached in a manner affecting credibility of certificates issued by this authority,
- the certification authority has breached material obligation arising from this Certification Practice Statement.

Revocation request might be submitted (see Chapter 3.4) by means of a registration authority (this requires the subscriber to contact the registration authority) or directly to a certification authority (request might be authenticated with a signature). In the former case, a request signed by the registration authority or a paper document is submitted to the certification authority, whereas in the latter one – the subscriber personally authenticates the revocation request and submits it directly to the certification authority.

Revocation request should contain information which allows indubitable authorization of a subscriber in a registration authority, in accordance with Chapter 3.2.2 or 3.2.3.

4.9.2. Who can request certificate revocation?

The following entities may submit subscriber's certificate request revocation:

- a subscriber who is the owner of a certificate,
- an authorized representative of a certification authority (in the case of CERTUM this role is reserved for the security inspector),

- a subscriber's requester / payer²², for example his/her employer; the subscriber has to be immediately informed about such fact,
- a registration authority operator, which may request revocation on behalf of a subscriber or on its own, if it has information justifying certificate revocation.

Registration authorities are to act with extreme caution when processing revocation requests not submitted by a subscriber and accept only the requests complying with Chapter 4.9.1, and in the case of situations when loss of trust for subjected certificate outreach the subscriber's potential losses which arise from revocation.

When an entity requesting certificate revocation is not an owner of this certificate (i.e. the subscriber), a certification authority has to:

- check whether the requester is authorized to request the revocation (e.g. acts as a subscriber's requester / payer),
- submit notification to the subscriber about revocation or initiation of revocation process.

Every request might be submitted:

- directly to a certification authority as an electronic request with or without registration authority confirmation,
- directly or indirectly (by means of another registration authorities) to the main certification authority as a non-electronic request (paper document, fax, phone call, etc).

4.9.3. Procedure for certificate revocation

4.9.3.1. Procedure for end-user certificate revocation

Certificate revocation may be carried out in following manners:

- **the first method** is based on submission of electronic revocation request, signed with a currently valid private key, or authorized by a password, to a certification authority; such revocation may be initiated solely on subscriber's demand (any entity being the owner of certificate being revoked),
- **the second method** requires submission of electronic revocation request to a certification authority, confirmed with an electronic signature of a registration authority; this method applies to situations when (a) the subscriber has lost his/her/its private key or its password or his/her/its private key has been stolen or (b) revocation request has been submitted by the subscriber's sponsor, an authorized representative of a certification authority or a registration authority, provided that there are sufficient reasons to request such revocation,
- **the third method** involves submission of an authenticated non-electronic request (paper document, fax, phone call, etc) to Primary Certification Authority; authentication of a paper document (including fax) is described at <https://www.certum.pl>.

In all the cases the certification authority – after successful verification of the request – **revokes** the certificate. Information about the revoked or suspended certificate is placed on **Certificate Revocation List** (see Chapter 7.2), issued by the certification authority.

²²

See **Glossary**.

A certification authority submits proof of the certificate revocation or decision about cancellation of the request, along with the reasons for the cancellation to the entity requesting certificate revocation.

Every request for certificate revocation has to provide the means to undeniably identify the certificate being revoked, contain reasons for revocation, and should have been authenticated (signed electronically or a hand-signature).

Certificate revocation procedure is carried out as follows:

- a certification authority, upon receiving certificate revocation request, authorizes it: if the request is made electronically, the certification authority verifies the correctness of the certificate being requested for revocation and (optionally) the correctness of the **token** attached to the request, issued by the registration authority; request made on paper (compare above – the third method of revocation or suspension) requires authorization of the requester; such confirmation may be obtained by phone call, by fax or may be submitted while the subscriber personally visits an authorized representative of the certification authority (or vice-versa),
- if the request is verified successfully, the certification authority places information about certificate revocation on Certificate Revocation List (CRL), along with information concerning the reasons for revocation or information about certificate suspension (see Chapter 7.2.2),
- the certification authority submits proof of the certificate revocation or decision about cancellation of the request, along with the reasons for the cancellation to the entity requesting certificate revocation,
- additionally, if the entity requesting certificate revocation is not a subscriber of the certificate, the certification authority must notify the subscriber about revocation of the certificate or initiation of revocation process.

It is required that requests for revocation, submitted by an authorized representatives of a certification authority or by a subscriber's sponsor, have to be authorized by the entitled registration authority.

If a certificate being revoked or a private key, corresponding to the certificate, were stored on an electronic cryptographic card, upon certificate revocation, the card may be physically destroyed or securely wiped out. This operation is to be carried out by the holder of the card – a private or legal entity (a representative of such an entity). The holder of the card should store it in a manner preventing it from being stolen or unauthorized usage until physical destruction or the private key erasure.

4.9.3.2. Procedure for Certification Authority or Registration Authority certificate revocation

The certificate belonging to a certification authority or registration authority may be revoked by its issuing authority. Such entity is required to submit request revocation directly to CERTUM.

CERTUM may also submit Certification Authority's or Registration Authority's certificate revocation request. (see Chapter 4.9.2)

4.9.4. Certificate revocation grace period

CERTUM guarantees the following maximum grace period²³ for revocation request processing:

- submitted electronically (with the correct format) or by phone call,
- submitted in paper form (from the time of reception of the request by certification authority operator)

as described in Table 4.2.

Tab. 4.2 Allowable grace period in certificate revocation request processing

Certification Policy	Allowable grace period
Certum Level I CA	No obligation to revoke
Certum Level II CA	Within 48 hours
Certum Level III CA	Within 48 hours
Certum Level IV CA	Within 24 hours
Certum Global Services CA	Within 24 hours
Certum Code Signing CA	Within 24 hours
Certum Extended Validation EV	Within 24 hours
Certum Class 1 CA	No obligation to revoke

Certificate revocation requests submitted by certification authorities to the issuer of the certificate are processed within 1 hour from reception of the requests, independently from the certification policy used for the certificate issuance.

Information concerning certificate revocation is stored in CERTUM database. Revoked certificates are placed on Certificate Revocation List (CRL) according to disclosed CRL publishing periods (see Chapter 4.9.16).

In the moment of certificate revocation registration authorities' operators and the affected subscribers are automatically informed about this revocation.

4.9.5. Time limit for processing of revocation request

Request for revocation of the certificate is processed by CERTUM without undue delay, to a maximum after 1 hour of its receipt.

4.9.6. Certificate Revocation List checking

A relying party, upon receiving an electronic document signed by a subscriber, is obligated to check whether a public key certificate, corresponding to the subscriber's private key used for

²³ Allowable grace period means maximum allowable time between reception of revocation request and the completion of its processing, update in certification authority's database and notification to the subscriber. This period should not be misinterpreted with CRL publication frequency (see Chapter 4.9.9).

creating electronic signatures, is not placed on Certificate Revocation List. The relying party is obligated to retain a current CRL.

Certificate status verification may be based solely on CRL only in the cases if CRL issuance frequency periods, declared by CERTUM, do not bear the risk of serious damages or losses to relying party. In other cases, a relying party should contact (by phone, fax, etc) the authority issuing the certificate or employ *on-line* certificate status verification service (see Chapter 4.9.10).

If a certificate being verified is placed on a CRL, the relying party is obligated to reject a document associated with the certificate, if the reason for revocation has been one of the following:

unspecified	- unknown
keyCompromise	- violation of private key security
cACompromise	- violation of the CA key security
cessationOfOperation	- cessation of services associated with the private key
certificateHold	- suspension of the certificate

If a certificate was revoked because of the following reasons:

affiliationChanged	- data modification
superseded	- amendment of the key
removeFromCRL	- certificate removed from the CRL (unsuspended)

the final decision about the certificate credibility is to be made by a relying party. When making this decision, the relying party should take under consideration that according solely to the above there are no reasons to believe the subscriber's private key was compromised.

4.9.7. CRL issuance frequency

Every certification authority being a part of the CERTUM issues separate Certificate Revocation List.

Every Certificate Revocation List is updated at least once a month²⁴ if no additional certificate has been revoked within this period. Notwithstanding, the new CRL is published in the repository after every certificate revocation. Certificate Revocation List for **Certum CA** and **Certum Trusted Network CA** authorities is issued at least every 5 years, provided that there is no revocation of the certificate of one of the authorities affiliated by **Certum CA** or **Certum Trusted Network CA**

In the case of revocation of the certificate of the authority affiliated by CERTUM this certificate is immediately published on Certificate Revocation List.

4.9.8. The maximum delay in the publication of the CRL

Each CRL is published without undue delay as soon as it is created (usually this is done automatically within a few minutes).

4.9.9. On-line certificate status verification availability

CERTUM provides real-time certificate status verification service. This service is carried out on the basis of OCSP, described in RFC 2560²⁵. Using OCSP, it is possible to acquire certificate status information without requiring CRL.

OCSP functions on the basis of **request – response** model. As a response for each request, OCSP server, providing services for CERTUM, supplies the following information about the certificate status:

²⁴ Notification of the time of the next issuance may be also included in the contents of current CRL (see contents of the field **NextUpdate**, Chapter 7.2). Contents of this field describe not excessive date of the next CRL issuance. Publication of the succeeding CRL can be also made before this date. In the case of CERTUM, value of this field is set to one month (except **Certum CA**).

²⁵ RFC 2560 *Internet X.509 Public Key Infrastructure: Online Certificate Status Protocol – OCSP*.

- **good** – meaning a positive response to the request, which should be interpreted as confirmation of certificate validity²⁶,
- **revoked** – meaning the certificate has been revoked,
- **unknown** – meaning the certificate has not been issued by any of the affiliated certification authorities.

OCSP service generates response based on CRL. OCSP response is valid for 7 days.

4.9.10. Requirements for on-line certificate status verification

A relying party is not obligated to verify certificate status *on-line* on the basis of mechanisms and services described in Chapter 4.9.9. Notwithstanding above, it is recommended to employ OCSP service when the risk of forgery of the electronic documents utilizing electronic signature is high or if it is required by other regulations concerning such situations.

4.9.11. Other forms of revocation advertisements availability

In the case of security breach of private keys (their revelation) of the certification authorities within CERTUM, the appropriate information is placed immediately in CRL and (optionally) submitted via electronic mail to every subscriber of the certification authority whose private key has been revealed. The information is submitted to every subscriber whose interests may be (directly or indirectly) endangered.

4.9.12. Special requirements regarding key security violation

In the case of security breach of the private key (their revelation) of certification authorities or other entities operating within **certum** or **ctnDomena** domains, CERTUM immediately informs the relying parties, referring to the information collected in a repository managed by CERTUM.

4.9.13. Reasons for certificate suspension

Certificate suspension is applicable only for the certification authority certificates. Suspension may be carried out solely in the case of certification policies modification, termination of providing certification services by CERTUM or justified suspicion related to certification authority key security.

4.9.14. Who can request certificate suspension

Due to availability of suspension services solely for the certificates of the certification authority, suspension request may be submitted only by the Security Inspector together with Chief of CERTUM.

4.9.15. Procedure of certificate suspension and unsuspension

Certificate suspension requires formal request of the Security Inspector, confirmed by Chief of CERTUM.

4.9.16. Limitation on suspension grace period

CERTUM guarantees the grace period in suspension request processing, as well as availability of certificate status verification to be the same as the in the case of certificate revocation (see Chapter 4.9.4).

²⁶ See **Glossary**.

Information concerning certificate suspension (i.e. certificate status) is available through certificate status verification service, immediately after the declared grace period. This service may be requested not only by a subscriber, but also by a relying party verifying validity of an electronic signature on the document submitted by the subscriber.

4.10. Certificate Status Verification Services

4.10.1. Characteristics

Information about the status of certificates issued by CERTUM can be obtained on the Certificate Revocation List (CRL) published on the website CERTUM, via the LDAP directory service and OCSP services, unless that information is contained in the certificate or the certificate status verification services are the objects of an agreement between subscriber and Unizeto Technologies S.A.

4.10.2. Availability

Certificate status verification services are available in the regime 24/7 (continuously operating).

4.10.3. Optional features

The certificate status verification service on-line (OCSP) is not available for all types of certificates, and all relying parties.

The URL address of OCSP service is usually placed in the certificates issued to subscribers. It means that the OCSP service is available for this certificate.

The OCSP service is obligatory for all of EV SSL certificates issued by CERTUM.

4.11. End of subscription

The termination of the use of certification services by the subscriber occurs in the following cases:

- when validity period of the certificate has expired and the subscriber has not taken action to update its key, or modification,
- when subscriber certificate was revoked and has not been replaced by another certificate

4.12. Private Key Escrow

Private keys of certification authorities or of subscribers requesting generation of a key by CERTUM authorities or which are available to the public are not subjected to escrow.

Notwithstanding, copies of a subscriber's private key may be by the subscriber and restored to usage. A subscriber may generate a symmetric key, use it for private key encryption and submit to a certification authority the encrypted private key (symmetric key stored by the subscriber) or the symmetric key (encrypted private key is stored by the subscriber) in a safe manner.

5. Technical, organizational and operational security controls

This Chapter describes general requirements concerning control, physical and organizational security, as well as personnel activity, used in CERTUM mainly in the time of key generation, entity authenticity verification, certificate issuance and publication, certificate revocation, audit and backup copy creation.

5.1. Physical security controls

Network computer system, operator's terminals and information resources of CERTUM are located in the dedicated area, physically protected against unauthorized access, destruction or disruption to its operation. These locations are monitored. Every entry and exit is recorded in the event journal (system logs). Power stability, as well as the temperature and humidity are monitored.

Computers registering subscriber's requests and issuing their confirmations are located in specially designated area and operate in on-line mode (have to be connected to the network). Access to these computers is physically secured against unauthorized individuals. Computers may be operated solely by authorized individuals.

Subscriber has to protect their system access password and personal identification number and unlocking code (PIN and PUK). If selected password or PIN / PUK are complicated and hard to remember, it might be written down. In this situation, the subscriber has to remember about storage of the written password in the safe, accessible solely to the authorized personnel or encrypted with the algorithm known to the PIN / PUCK holder.

The password used for protection of the media containing a subscriber's private key should not be stored in the same place as the media itself.

5.1.1. Site location and construction

Centrum Certyfikacji CERTUM is located in the Unizeto Technologies S.A. seat, at the following address: Bajeczna 13, Szczecin, Poland .

Registration authorities of CERTUM are located in the following sites:

- Primary Registration Authority (PRA) is located in the operators and administrators area in CERTUM at the following address: Królowej Korony Polskiej 21, Szczecin, Poland
- addresses of other registration authorities are available in repository and by email at the following address: info@certum.pl.

5.1.2. Physical access

Physical access to the seat and CERTUM area is controlled and monitored by the integrated alarm system. Manned reception and outside security guards operate 24 hours a day. Fire and flood prevention system, intrusion detection system and emergency power system (securing against temporary and long-term power cuts) are employed.

Unizeto Technologies S.A. facility and is publicly available every working day within company's working hours. In the remaining time (including non-working days), the facility is

available only to persons authorized by the Management of Unizeto Technologies S.A. and known by name and surname by the security officers.

Visitors to areas occupied by CERTUM may access this area only if they are escorted by the authorized personnel of CERTUM.

Areas occupied by CERTUM are divided into:

- computer system area,
- operators and administrators areas,

The computer system area is equipped with monitored security system built on the basis of motion, fire and flood sensors. Access to this area is granted only to authorized personnel, i.e. the personnel of CERTUM and Unizeto Technologies S.A. Monitoring of the access rights is carried out on the basis of smart cards and access control system, whose terminals are mounted next to the area entry. Every entry and exit from the area is automatically recorded in the event journal. The presence of other individuals (e.g. auditors or service employees) requires presence of authorized personnel and the approval of Chief of CERTUM.

Access to the operators and administrators area is enforced through the use of an smart card and access control system. Since all sensitive information is protected by the use of safes, permanently secured to the ground, and to which access is controlled by two keys (two-eye principle), while access to operator's or administrator's terminal requires prior authorization, the employed physical security is assumed as adequate. Keys to the area are accessible only to authorized personnel. The area may be occupied solely by CERTUM personnel and authorized individuals. Additionally, the latter are not allowed to occupy the area unescorted. The only exception concerns the individuals occupying CERTUM positions who are classified as trusted.

Access to Primary Registration Authority has to be performed as described in this chapter. In the case of other registration authorities, there are no additional restrictions addressing physical access. It is recommended that offices of registration authorities should be separated and rigged with equipment allowing safe storage of data and documents. Access to such areas should be monitored and limited to authorized individuals associated with the activity of the registration authority (registration authority operators, system administrators) and their customers.

5.1.3. Power and air conditioning

In case of main power line failure the system switches to emergency power source (UPS and/or power generators).

Working environment in the computer system area is monitored continuously and independently from other areas.

Primary Registration Authority is connected with Unizeto's emergency power source system. Air conditioning is not required. In the case of other registration authorities, there are no restrictions addressing emergency power source and air conditioning.

5.1.4. Water exposure

In the computer system area humidity and water detecting sensors are installed. These sensors are integrated with the security system of Unizeto Technologies S.A. building. Reception personnel are notified of the hazards and is obligated to notify appropriate public services, security inspector and one of system administrator.

5.1.5. Fire prevention

Fire prevention and protection system installed in Unizeto Technologies S.A. seat complies with local standards and regulations for fire safety. Computer system area is also equipped with fire control system (neutral gas), activated automatically in the case of fire detection in monitored area.

5.1.6. Media storage

In accordance with the sensitivity of information held, media containing archives and current data backup are stored in fireproof safes, located in the operators and administrator area and the computer system area. Access to the safe is secured with two keys, being held by authorized individuals. Copies of suitable documents, backups and archives are also retained in emergency facility, within fireproof safes secured to the ground.

Media used for storage of archives and current information backup copies and paper documents are held in the safes located in the Primary Registration Authority area.

5.1.7. Waste disposal

Paper and electronic media containing information possibly significant for CERTUM security after expiration of the retention period (see Chapter 5.5.5 5.5) are destroyed in special shredding devices. In the case of cryptographic keys and PIN or PUK numbers, media used for their storage are shredded in DIN-3 class devices (this applies only to the media which do not allow definitive erasure of stored information and their re-usage). Hardware security modules are reset end erased according to manufacturer's recommendations. Such devices are erased and reset also prior to their transfer to service or repair.

5.1.8. Offsite backup storage

Copies of passwords, PIN numbers and cryptographic cards are stored in safe-deposit box outside CERTUM seat.

Offsite storage affects also archives, current copies of information processed by the system and full installation version of CERTUM applications. It enables emergency recovery of most substantial CERTUM function within 48 hours (in CERTUM seat or in the emergency facility).

Copies should be retained in safes providing two-factor access.

It is recommended to store archives and current information processed by the computer system backup copy outside location of the registration authority.

5.2. Organizational security controls

This Chapter presents a list of roles which can be defined for personnel, employed in CERTUM. This Chapter also describes responsibilities and duties associated with each defined role.

5.2.1. Trusted roles

5.2.1.1. Trusted roles in CERTUM

The following trusted roles which should be manned with one or more individuals are applied by CERTUM:

- **Chief of CERTUM** – responsible for correct management of CERTUM, determines directions of development of certification authority, responsible to manage Certification Policy and Certification Practice Statement
- **security inspector** – supervises implementing and handling information system security procedures; manages the administrators, initiates and supervises key and shared secret generation; assigns rights in the field of security and user's access privileges; reviews event logs; supervises service tasks,
- **system operator** – handles standard system operations, including backup copies and transfer of current copies and archives to offsite locations,
- **registration inspector** – verifies subscribers' identity and correctness of submitted certification application; authorizes certification request,
- **system administrator** – installs hardware and software for operating system; initially configures the system and network resources; manages folders of CERTUM available to the public; creates WWW page and manages links,
- **audit inspector** – responsible for review, archive and management of event logs (in particular verification of their integrity) and performance of internal audit for compliance of a certification authority operations with this Certification Practice Statement; this responsibility extends also on every registration authority, operating within CERTUM,

5.2.1.2. Trusted roles in registration authority

CERTUM has to be sure that the personnel of a registration authority recognize their responsibility, arising from necessity of credible identification and authorization of subscribers' information. Due to above, at least three following trusted roles have to be defined:

- **system administrator** – installs hardware and software of operating system; installs application software; configures system and applications; activates and configures security resources; creates operators' accounts and passwords; creates backup copies and archives information; reviews events journals (logs) and (together with registration authority operator) and by the order of the security inspector, erases excessive information;
- **registration inspector** – verifies subscriber's identity and correctness of provided request; authorizes requests and provides them to a certification authority; takes part in certificate generation, submitting information from a request to a certification authority; signs agreements with subscribers concerning services provided by the certification authority; archives (in paper form) requests and issued confirmation,
- **registration authority agent** – is responsible for efficient operation of a registration authority; his/her role is to provide financial support for the personnel, manage operators' and administrators' work, arbitrate disputes, make a decision arising from operations carried out by a registration authority,

5.2.1.3. Subscriber's trusted roles

This Certification Practice Statement does not state any conditions in this respect.

5.2.2. Numbers of persons required per task

Keys – for the needs of certificate and CRL signing – generation process is the operation requiring particular attention. The generation requires presence of persons, acting as:

- security inspector,
- hardware security module operator,
- shared secret holder,
- commentator,

Any other operation and role, described within CERTUM, may be performed by a single person, assigned for such an operation or role.

5.2.3. Identification and Authentication for Each Role

CERTUM personnel are subjected to identification and authentication procedure in the following situation:

- inclusion on the list of persons allowed to access CERTUM locations,
- inclusion on the list of persons allowed to physically access system and network resources of CERTUM,
- issuance of confirmation authorizing to perform the assigned role,
- assignation of an account and a password in CERTUM information system.

Every confirmation and assigned account:

- has to be unique and directly assigned to a specific person,
- cannot be shared with any other person,
- has to be restricted to function (arising from the role performed by a specific person) carried out solely by means of available CERTUM system software, operating system and controls.

Operations performed in CERTUM that require access through shared network resources are protected with implemented mechanisms of strong authentication and encryption of transmitted information.

5.2.4. The roles that can not be combined

Described in Chapter 5.2.1 duties segregation prevents abuses associated with CERTUM system usage. Every user is assigned only the rights arising from the user's role and related responsibility.

The presented roles may be combined in limited scope, modified or denied trusted clause. Duties and roles combination could not lead to combination of security inspector role with system administrator or operator, and audit inspector role with security inspector, registration inspector, system administrator or operator.

Access to software supervising operations performed by CERTUM is granted solely to the individuals whose responsibility and obligations arise from the acted role of the system administrator.

5.3. Personnel controls

CERTUM personnel performing trusted roles must have documented preparation and experience, which guarantees to meet requirements of trainings and provide certainty that they are

ready to perform its future obligations. In cases where a person employed for the operation of certification for the government should have a safety certificate issued by the security administrator Unizeto Technologies SA or by the Internal Security Agency (ABW).

Control of professional training each person who acts as trusted role is repeated at least once every 5 years.

5.3.1. Qualifications, experience and authority

CERTUM has to be sure that the person performing his/her job responsibilities, arising from the acted role in a certification authority or a registration authority system:

- has graduated from at least the secondary school,
- has signed a work contract or other civil agreement describing his/her role in the system and corresponding responsibilities,
- has been subjected to required training on the range of obligations and tasks, associated with his/her position,
- has been trained in the field of personal data protection,
- has signed an agreement containing clause concerning sensitive (from the point of view of CERTUM security) information protection and confidentiality and privacy of subscriber's data,
- does not perform tasks which may lead to a conflict of interests between a certification authority and a registration authority acting on behalf of it.

5.3.2. Personnel verification procedures

Each person who is a new employee and performing trusted role is verified by CERTUM which maintains controls to perform background checks of such person to:

- confirm previous employment,
- check personal references,
- confirm the highest or most relevant educational degree,
- obtained and search criminal records,
- search records of National Debt Register (Krajowy Rejester Długów) in the jurisdiction where the person will be employed,
- check ID (PESEL)

In the case when the required information is not available (eg, due to the current law), CERTUM may use other techniques that will allow to obtain information similar to the foregoing.

CERTUM may reject a candidacy associated with the performance of the trusted role, or take action against a person already employed in that position if it is found that:

- CERTUM was misled by candidate or employee regarding the above data
- CERTUM received highly unfavorable or not very reliable references from former employers
- CERTUM received information about candidate's or employee's criminal past and that he/she was convicted under a final and valid court judgement;

In case of any of the above, further steps are carried out in accordance with safety procedures Unizeto Technologies SA and applicable law.

5.3.3. Training requirements

Personnel performing roles and tasks arising from the employment in CERTUM or its registration authority have to complete following trainings:

- regulations of Certification Practice Statement,
- regulations of Certification Policy,
- regulations of procedures and documentation related with acted role,
- procedures and security controls employed by a certification authority and a registration authority,
- system software of a certification authority and a registration authority,
- responsibilities arising from roles and tasks performed in the system,
- procedures executed upon system malfunction or disruption of certification authority operations.

5.3.4. Retraining Frequency and Requirements

Trainings described in Chapter 5.3.3 have to be repeated or supplemented always in situation when significant modification to CERTUM or its registration authority operation is executed.

5.3.5. Job rotation

This Certification Practice Statement does not imply any requirements in this field.

5.3.6. Sanctions for Unauthorized Actions

In the case of a discovery or suspicion of unauthorized access, the system administrator together with the security inspector (in the case of CERTUM employees) or solely system administrator (in the case of registration authority employees) may suspend the perpetrator's access to CERTUM or the registration authority system. Further disciplinary actions are to be consulted with CERTUM management.

5.3.7. Contract Personnel

Contract personnel or consultants may perform trusted roles, listed in the chapter. 5.2.1. In such cases, they are subject to the same requirements applicable in the case of workers employed in CERTUM.

Contract personnel (external service, developers of subsystems or software, etc.) are subjected to the same verification procedure as employees of CERTUM and its registration authority (see Chapter 5.3.2), and Additionally, contract personnel, when performing their task at CERTUM seat or its registration authority have to be escorted by CERTUM or the registration authority employee.

5.3.8. Documentation Supplied to Personnel

Management of CERTUM and the registration authority agent have to provide their personnel with access to the following documents:

- Certification Policy,
- Certification Practice Statement,
- application forms and request templates,

- extracts from documentation corresponding to performed role, including emergency procedures,
- range of responsibilities and obligations associated with the acted role in the system.

5.4. Events recording and audit procedures

In order to manage efficient operation of CERTUM system and supervise CERTUM users and personnel, all events, having essential impact on CERTUM security, occurring in the system are recorded.

It is required that every party – associated in any way with providing certification services – should record information and manage it adequately to their work position and duties. Information records compose event logs and should be retained in a manner allowing authorized parties to access appropriate and required information when resolving disputes between parties or detecting attempts to breach security of CERTUM. Recorded events are subjected to backup procedures. Backup copies are retained outside CERTUM seat.

When applicable, event logs are created automatically. If records cannot be created automatically, paper event logs are used. Every log entry, electronic or handwritten, is retained and disclosed when undergoing an audit.

In CERTUM system, the security inspector is obligated to carry out regular checks of compliance of implemented mechanisms and procedures with regulations of this Certification Practice Statement, as well as to assess effectiveness of existing security procedures.

5.4.1. Types of events recorded

Every activity, critical from the point of CERTUM security, is recorded in event logs and archived. Archives might be encrypted and stored on unrewritable media type to prevent it from modification or forgery.

CERTUM event logs store records of every activity generated by any software component within the system. Such entries are divided into three separate categories:

- **system entries** – record contains information about client's request and server's response (or vice-versa) on the level of network protocol (for example http, https, tcp, etc); Subjects to recordings are: host or server IP address, executed operation (for example: search, edit, write, etc) and its output (for example, amount of entries to database),
- **errors** – record contains information about errors on the level of network protocols and on the level of application modules,
- **audits** – record contains information associated with certification services, for example: registration and certificate request, rekey request, certificate acceptance, certificate and CRL issuance etc.

The above event logs are common for every component installed on a applicable server or workstation and have a capacity set in advance. Upon exceeding this capacity, a new version of the event log is automatically created. The previous event log is archived and erased from the disk.

Every record, automatic or handwritten, includes the following information:

- event type,
- event identifier,
- date and time of the event,

- identifier or other data allowing determination of a person responsible for the event,
- decision whether the event is associated with an successful or erroneous operation,

Recorded entries include:

- alerts generated by firewalls and IDS,
- operations associated with registration, certification, rekey and renewal procedures, revocation, suspension or other services provided by an authority issuing certificates,
- every modification to hardware or software structure,
- modification to the network and network connections,
- physical entries to secured areas and their violations,
- changes of passwords, PINs rights and personnel roles,
- successful and unsuccessful attempts to access CERTUM databases and server applications,
- key generation for a certification authority, as well as for other parties, for example registration authorities,
- every received request and issued decisions in an electronic form, submitted by subscribers or delivered to them as an electronic file or electronic mail; the requirement to record such activities is imposed not only on the certification authorities, but also on the registration authorities,
- history of creating backup copies and informative records archives, as well as databases.

A detailed list of recorded events depends of the certification policy of certificates issued or confirmed by a specific certification authority or a registration authority.

Registered requests, associated with provided services, submitted by subscribers, apart from their usability in dispute resolving and abuse detection, allow calculation of a fee for issuance of a certificate.

Access to event entries (logs) is granted solely to security inspector, system administrators and audit inspector (see Chapter 5.2.1).

5.4.2. Frequency of event logs checking

Event log entries should be reviewed in details at least once a month. Every event of significant importance should be explained and described in an event log. Event log review process includes the check against its forgery or modification, and verification of every alert or anomalies disclosed in the logs. Every action executed as a result of detected malfunctions has to be recorded in the logs.

5.4.3. Event journals retention period.

Records of registered events are stored in files on system disk until they surpass allowed capacities. In this time they are available *on-line*, on every authorized person's or process demand. Upon surpassing allowed capacities logs are stored in archives, and may be accessed only *off-line*.

Archived journals are retained for at least 7 years.

5.4.4. Protection of event logs

Once a week every entry in event logs is subjected to copy to a magnetic tape. After surpassing accepted for specific log number of entries, log contents are archived. Archives may

be encrypted with Triple DES or AES algorithm. A key used to archive encryption is placed under the management of the security inspector.

An event log may be reviewed solely by the **security inspector**, **system administrator** or an **audit inspector**. Access to the event log is configured in such a way that:

- only authorised entities (i.e. auditors and personnel defined above) have the right to read log entries,
- only the security inspector may archive or erase files (after their archive) containing registered events,
- it is possible to detect every violation of integrity; it assures that the records do not contain gaps or forged entries,
- no entity has the right to modify the contents of the journal.

Additionally, procedures for event logs protection are implemented in a manner that even after the journal archival it is impossible to delete entries or erase the logs before surpassing an estimated period of logs retention (see Chapter 5.4.3).

5.4.5. Procedures for event logs backup

CERTUM security procedures require that the event logs and activity records - created when reviewing this journal by the security inspector, system administrator or an audit inspector – such as activities on the journals, collective statements, analysis, statistics, detected threats etc, should be subjected to monthly backup. These backups are retained in main and alternate site of CERTUM. Backup copies may be signed with a timestamp.

5.4.6. The data collection system for the audit (internal and external)

Applications, components and network software and operating systems used in the systems of CERTUM automatically generate the information about events. Information about these types of events are also entered manually by staff CERTUM.

5.4.7. Notification to event responsible entities

Module for analysis of the event logs implemented in the system allows examination of current events and automatically notifies about suspected or security violating activities. In the case of activities having influence on the system security, the security inspector and system administrator are automatically notified. In other cases, the notification is directed only to the system administrator.

Information transmission to authorized persons about critical – from the point of view of the system security – situations is carried out by other, appropriately secured, means of communication, for example pager, mobile phone, electronic mail.

Notified entities take appropriate actions to prevent the system from detected threat.

5.4.8. Vulnerability assessment

This Certification Practice Statement requires a certification authority issuing the certificates (including subordinate authorities of Certum Global Services CA) and affiliated registration authorities (in the case of delegation of rights to registered subscribers) to perform vulnerability assessment analysis of every internal procedures, applications and information system. Requirements for analysis may be also determined by an external institution, authorized to carry out CERTUM audit.

The security inspector is responsible for an internal audit which should control compliance of entries in the security logs, correctness of its backup copy retention, activities executed in the case of threats and compliance with this Certification Practice Statement.

5.5. Records archival

It is required that all data and files related to registration of information associated with the system security, requests submitted by subscribers, information about subscribers, issued certificates and CRLs, keys, used by certification and registration authorities, and whole correspondence within CERTUM and with the subscribers should be subjected to archive. Subjected to archival are also all the documents and data used in identity verification process. Some of the data (marital status, photo and description), not directly required in the authentication process, may be removed from the documents. Hard-copy documents are processed to electronic form and are also subjected to archival.

CERTUM manages two types of archives: archive available *on-line* (*on-line* archive) and available *off-line* (*off-line* archive).

Valid certificates (including inactive, issued no more than 15 years before the current date) are retained in the *on-line* archive of active certificate and may be used to perform some of external certification authority services, for example certificate validity verification, certificate publication for their owners (restoration of certificates) and authorized entities.

On-line archive might also contain the certificates issued 25 years (and more) in the past. On-line archive may replace off-line archive.

The *off-line* archive contains certificates (including revoked certificates) issued in the period of 15 to 25 years before a current date. Revoked certificate archive contains information about a certificate identifier, date of revocation, reason for revocation, whether and when the certificate was placed on CRL. The archive is used for dispute resolving, applying to old documents, electronically signed (in the past) by a subscriber.

On the basis of the archives, backup copies are created and retained outside CERTUM seat.

It is recommended to encrypt and timestamp the archive. A key used for archive encryption is managed by the certification authority security inspector or system administrator.

5.5.1. Types of data archived

The following data are subjected to archive:

- information from examination and evaluations (arising from an audit) of logical and physical protections of a certification and registration authority, and the repository,
- received requests and issued decisions in an electronic form, submitted by or to the subscriber as files or electronic messages,
- subscribers database,
- certificates database,
- issued Certificate Revocation Lists,
- history of a certification authority key, from its generation to erasure,
- history of the subscribers' keys, from their generation to erasure, if the keys are subjected to archive in certification authority databases,

- internal and external correspondence (paper and electronic) between CERTUM, its subscribers and relying parties in the operation of certificate suspension and unsuspension,
- documents and data used in identity verification process.

5.5.2. Archive retention period

Archived data (in paper and electronic form), described in Chapter 5.5.1, are retained for the period of minimum 25 years. After expiration of the declared retention period, archived data may be destroyed. In the case of key and certification erasure, an appropriate procedure is executed with particular attention.

5.5.3. Protection of archive

Access to the archive have only authorized persons performing trusted roles in CERTUM. Archive is stored in the system, which meets the requirements of CWA 14167-1 *Security Requirements for Trustworthy Systems Managing Certificates for Electronic Signatures - Part 1: System Security Requirements*. This system provides protection against unauthorized browsing the archives, modification, removal or tampering. The media on which the archives are stored for processing applications and archives must be maintained in the state to ensure the declared period of access to the archives (chapter 5.5.2).

5.5.4. Backup procedures

Backup copies allow full restoration (if necessary, for example after system destruction) of data essential to the proper activity of CERTUM. To accomplish the above goal, the following applications and files are subjected to backup:

- installation disks with system applications, for example operating systems,
- installation disks with certification and registration authority applications,
- WWW server and the repository installation disks,
- authorities' keys, certificates and CRL history,
- data from the repository,
- data concerning subscribers and personnel of CERTUM,
- event logs.

Method for backup copy creation has significant importance for quickness and cost of the certification authority restoration upon malfunction or destruction of the system. CERTUM utilizes the following two methods:

- **hot reserve** – database backup copies are created every day and may be, if necessary, used for recovery of the lost data
- **weekly backup copies** – created in the primary facility and (if necessary) used for recovery of destroyed hardware and software configuration; backup copy should cover entire and current status of the CERTUM system; the facility should perform full restoration of CERTUM system functionality within 48 hour.

Detailed backup copy creation procedures and system recovery after malfunction are disclosed in technical infrastructure documentation. The documentation has a “non-public” status and is available solely to authorized personnel and to auditors.

5.5.5. Requirements for time-stamping of the records

It is recommended that archived data should be signed with a timestamp, created by the authorized Timestamping Authority (TSA), having a certificate issued by the operational certification authority affiliated by **Certum CA**.

5.5.6. The archive data collection system

The archive data collection system is internal system of CERTUM. The exception to this rule are the archives kept by the registration authorities associated with CERTUM. The data in external files must be kept primarily for the purpose of the audits carried out by CERTUM or entity designated by CERTUM.

5.5.7. Access procedures and archived information verification

Only those persons who performing trusted roles in CERTUM have access to the archive and access is possible only after successful authentication (ie authentication and confirmation of a person's access rights).

To verify the integrity of archived information, data may be periodically tested and verified against original data (if still accessible in the system). This activity may be carried out solely overseen by the security inspector and should be recorded in the event logs.

If any damages or modifications to original data are detected, the damages are to be removed as promptly as possible.

5.6. Key changeover

Procedure for key changeover applies to the keys of certification authorities affiliated by the CERTUM and it describes procedure for key update (rekey) for a certificate and CRL signing which replaces a currently used key.

Rekey procedure is based on issuance of special certificates by a certification authority, facilitating a subscriber who has old certification authority certificate, a secure exchange for a new certificate, and allowing new subscribers who have a new certificate, for a secure way to obtain the old certificate and verification of current data (see RFC 4210, and Chapters 6.1.1.2 and 6.1.1.3).

Every key changeover is announced in advance by means of CERTUM WWW page, distribution on new keys in the application and broadcasted by electronic mail. Additionally, in the case of **Certum CA** key changeover, information about changeover might be published by means of mass media in the week preceding expiration of private key validity period.

Frequency of key changeover of a certification authority, affiliated by the CERTUM results from the validity period of corresponding certificates, shown in Tab. 6.5.

From the moment of key changeover, the certification authority uses only a new private key for signing issued certificates and Certificate Revocation List.

5.7. Key security violation and disaster recovery

This Chapter describes procedures carried out by CERTUM in abnormal situations (including natural disasters) to restore a guaranteed service level. Such procedures are executed in accordance with the accepted plan disclosed in Disaster Recovery Plan.

5.7.1. Threat Management Incident Handling

Backups of data containing information about the applications for the issue/revocation certificates, data for auditing and records in the databases of all issued certificates are stored off-site creation and must be available at the request of eligible persons.

Copies of private keys of certification authorities operating within CERTUM and other certification service providers are created and managed in accordance with the principles set out in Chapter 6.2.5

CERTUM maintain copies of the above information for their own certification authorities and certification service providers, as well as for the purpose of certification authorities and certification service providers accredited by CERTUM, and acting under the control of CERTUM Global Services CA authority.

5.7.2. Corruption of computing resources, software and/or data

All information about corruption of computing resources, software and/or data are communicated to the security inspector who assigns the performance of activities under the procedures developed.

These procedures are designed to analyze the intensity of an attack, investigate the incident, to minimize its effects and eliminating it in the future. If necessary, in the case of CERTUM private key compromise or other corruption events appropriate steps must be taken with the Disaster Recovery Plan including.

5.7.3. Key compromise or suspicion of entity affiliated by the CERTUM private key compromise

In the case of certification authorities or other entities affiliated by the CERTUM private key compromise or suspicion of such compromise, the following actions should be taken:

- the certification authority generates a new key pair and a new certificate,
- all certificate users are immediately informed about the compromise of the private key, by means of mass media system and electronic mail,
- a certificate corresponding to the compromised key is placed on Certificate Revocation List, along with a suitable reason for revocation ,
- all certificates in the certification path of the compromised certificate are revoked and a suitable reason for revocation is submitted,
- new certificates for subscribers are generated,
- new certificates for subscribers are submitted to them, without charging a fee for the operation

These operations are carried out in accordance with the plan developed by the security incident response team which includes Chief of CERTUM, security inspector, security administrators and other appropriate CERTUM personnel appointed by Chief of CERTUM . A plan must be approved by the member of the Unizeto Technologies S.A. Board.

5.7.4. Security coherence after disaster

Security policy, executed by CERTUM, takes into consideration the following threats influencing availability and continuity of the provided services:

- physical corruption to the computer system of CERTUM, including network resources corruption – this threat addresses corruptions originating from random situations,
- software and application malfunction, rendering data inaccessible – such corruptions address operating system, users' applications and execution of malicious software, for example viruses, worms, Trojan horses,
- loss of important network services, associated with CERTUM interests. It primary addresses power cuts and damages of the network connections,
- corruption of a part of the network, used by CERTUM to provide its services – the corruption may imply obstruction for the customers and denial (unintended) of services.

To prevent or limit results of the above threats, the security policy of CERTUM comprises:

- **Disaster Recovery Plan.** All subscribers and relying parties are informed, as soon as possible and in a manner most appropriate for the existing situation, about every significant malfunction or corruption, associated with any information system or network environment component. Disaster recovery plan includes number of procedures executed in the event any part of the system has been subjected to compromise (corruption, revelation, etc). The following actions are performed:
 - disk images of every server and workstation of CERTUM are created and archived; every backup copy is retained both in main seat and in emergency location outside CERTUM,
 - periodically, following the procedures disclosed in Chapter 5.5.4, a backup copy of the databases is created. The copy includes all submitted requests, issued, renewed and revoked certificates; latest copies are retained both in main seat and in emergency location outside CERTUM,
 - periodically, following the procedures disclosed in Chapter 5.5.4, every server full backup copy is created. This copy includes all submitted requests, entries to event logs, issued, renewed and revoked certificates; copies are retained in secure location outside CERTUM facility,
 - CERTUM keys, split according to procedures for secret sharing, are held by trusted individuals in the places known only to themselves,
 - computer replacement is carried out in a manner allowing disk image restoration, on the basis of most recent data and keys (applies to signing server),
 - system recovery procedures after disaster are tested on every system component, at least once a year. These tests are a part of an internal audit.
- **Modification monitoring.** Installation of updated software version in the production system is possible only after carrying out intensive tests in a testing environment, performed in strict accordance with disclosed procedures. Every modification in the system requires CERTUM security inspector's acceptance. If the newly implemented components, installed in accordance with the above procedures, cause target system corruption, accepted system recovery plans allow swift restoration of the system to the state before corruption occurred.
- **Emergency system.** In the case of corruption restraining CERTUM functionality, within 24 hours an emergency facility will be activated, which should substitute most substantial function of a certification authority until the primary facility is restored to service. Due to regular backup copy and archive creation, unprocessed requests

accumulation and hardware-software redundancy, in the case of corruption restraining CERTUM activity, it is possible to:

- activate emergency facility allowing provision of CERTUM services,
 - process all accumulated and unprocessed revocation requests,
 - process in real-time requests submitted by subscribers until restoration and recovery of the prime facility.
- **Backup copy creation system.** CERTUM system utilizes application, creating backup copy from data, allowing system recovery at any moment and performance of an audit. Backup copies and archives are created from every data having significant importance on security and normal activity of CERTUM. Copies are created periodically and stored on magnetic tapes, while archives are stored on CD-ROM disks. Backup copies may be protected by a password, while CD-ROM disks are encrypted and may be additionally timestamped. Backup copies and their archives are retained outside primary facility.
 - **Additional services.** To prevent the system from power cuts and to secure service continuity, emergency power sources (UPS) are employed. UPS devices are tested every six (6) months.

Upon every system recovery after disaster, the security inspector or system administrator executes the following:

- changes all previously used passwords,
- removes and resets all the access rights to the system resources,
- changes all codes and PIN numbers associated with physical access to facilities and the system components,
- if recovery from the accident involves reinstallation of operating system and utility software, all IP addresses of system elements and its subnetworks are changed,
- reviews analysis of the disaster cause, updates to the plan and network security policy of CERTUM and physical access to locations and the system components,
- informs every system user about restoration of the system activity.

5.8. Certification authority termination or service transition

Obligations described below are developed to minimize disruption to subscribers and relying parties, arising from the decision of a certification authority to cease operation, and include obligations to notify in advance all subscribers of the authority that certified the certification authority subjected to termination (if such exists) about the termination, and transition of responsibilities – on the basis of regulations with other certification authorities – for service of its subscribers, database and other resources management.

5.8.1. Requirements associated with duty transition

Before a certification authority ceases its services, it is obligated to:

- notify the certification authority that issued its certificate about their intention to terminate services as the authorized certification authority; the notification should be made 90 days before the agreed date of the termination,
- notify (at least 90 days in advance) its subscribers who hold active (unexpired and unrevoked) certificates issued by this authority about decision to terminate its services,

- revoke all certificates which remain active (unexpired and unrevoked) in the declared moment of service termination, regardless of the fact that a subscriber has submitted or has not submitted a suitable request,
- notify all subscribers associated with the certification authority about service cessation,
- make commercially reasonable effort to minimize disruptions to interests of subscribers and legal entities engaged in an ongoing process of electronic signature (remaining in usage) verification with public keys certified with the digital ID, issued by the certification authority being terminated,
- pay compensations of issuance fees to the subscriber or his/her/its sponsor; compensations should be proportional to remaining validity period of the certificate.

If the decision to terminate services applies only to the registration authority, the registration authority is obligated to:

- notify the certification authority or certification authorities they work with about their intention to terminate services as the authorized registration authority; the notification should be made 90 days before the agreed date of the termination,
- provide certification authorities with subscribers documentation, including archive and data for the audit.

5.8.2. Certificate issuance by the successor of terminated certification authority

To provide continuity of the certificate issuance services to subscribers, a terminating certification authority may sign up an agreement with another certification authority offering similar services, related to issuance of replacement certificates for certificates of the terminated certification authority remaining in usage.

Issuing a replacement certificate, the successor of the terminated certification authority takes over the rights and obligations of the terminated certification authority related to the management of the certificates which remain in usage.

Archive of the certification authority ceasing its service has to be turned over to the prime certification authority – **Certum CA** (in the case of termination of services of **Certum Level I CA**, **Certum Level II CA**, **Certum Level III CA**, **Certum Level IV CA** or **Certum Global Services CA**), **Certum Trusted Network CA** (in the case of termination of services of **Certum Extended Validation CA**, **Certum Code Signing CA** or **Certum Class 1 CA**) or to the institution which the suitable agreement was signed up with (in the case of termination of services of **Certum CA** or **Certum Trusted Network CA**).

6. Technical Security Controls

This Chapter describes procedures for generation and management of a cryptographic key pair of a certification authority, a registration authority and a subscriber, including associated technical requirements. Information below that applies to Certum Trusted Network CA root certificates applies also to another root certificate from the same domain: Certum Trusted Network CA 2.

6.1. Key Pair Generation and Installation

6.1.1. Key Pair Generation

Procedures for key management apply to secure storage and usage of the keys being held by their owner. Particular attention is required for generation and protection of private keys of root certification authorities (i.e. **Certum CA** and **Certum Trusted Network CA**), influencing secure operation of the whole public key certification system.

Certum CA and **Certum Trusted Network CA** certification authorities own at least one self-certificate. A private key corresponding to a public key contained in a self-certificate is used solely for signing of public keys of intermediate certification authorities and issuing of Certificate Revocation List and operational certificates of a certification authority, necessary for the operation of the authority issuing the certificates. A similar purpose is intended for private keys being held by each authority and corresponding to public keys included in certificates issued by **Certum CA** oraz **Certum Trusted Network CA** for each of these authorities.

Key pairs owned by each certification authority should allow:

- certificate and CRL signing; a public key associated with a private key authenticated with a self-certificate (in the case of **Certum CA** and **Certum Trusted Network CA**) or certificate (in the case of **Certum Level I CA**, **Certum Level II CA**, **Certum Level III CA**, **Certum Level IV CA**, **Certum Global Services CA**, **Certum Extended Validation CA**, **Certum Code Signing CA** and **Certum Class 1 CA**),
- signing messages, transmitted to subscribers and registration authorities (the operational key),
- negotiation of keys used for confidential information exchange between the authority and its environment (the operational key).

Certum CA and **Certum Trusted Network CA** certification authorities keys and intermediate certification authorities and non-repudiation authorities keys are generated within CERTUM seat, in the presence of selected, trusted group of persons (comprising additionally security inspector and system administrator). The group is required only in the case of certificate and CRL signing key generation.

Key pairs of certification authorities operating within CERTUM are generated on designated, authenticated workstation and connected to hardware security module, complying with the FIPS 140-2 Level 3 or superior requirements.

Certification authorities key pair are generated in accordance with the accepted by CERTUM procedure for key pair generation. Actions executed while performing key pair generation are recorded, dated and signed by each person present during the generation. The records are retained for the needs of audits and common system reviews.

Registration authority operators possess only keys for signing (confirming) a subscriber's request and messages submitted to a certification authority. These keys are generated by the

operator (in the presence of the security inspector) by means of authenticated software supplied by a certification authority and connected with certified hardware security module complying with FIPS 140-2 Level 2 requirements.

Generally, every subscriber generates his/her/its key pair by himself/herself/itself. The generation may also be delegated to a certification authority (applicable only for keys generated on cryptographic cards).

CERTUM may, on subscriber's demand or on certification authority operator's demand, generate a key pair and submit it securely to the subscriber. In such cases hardware security module complying with the regulations of at least FIPS 140-2 Level 2 (see Chapter 6.1.1.5) is employed.

6.1.1.1. Procedures of generation of Certum CA initial keys

Procedures of generation of initial **Certum CA** keys are always deployed during CERTUM system initiation or in the case of suspicion that a subsequent private certification authority key has been compromised. The procedure comprises:

- secure generation of a main key pair for certificate and CRL signing – the main key pair has a form $\mathbf{GPK}_{(l, CA)} = \{\mathbf{K}_{\mathbf{GPK}(l, CA)}^{-1}, \mathbf{K}_{\mathbf{GPK}(l, CA)}\}$, where $\mathbf{K}_{\mathbf{GPK}(l, CA)}^{-1}$ – private key, and $\mathbf{K}_{\mathbf{GPK}(l, CA)}$ – public key, distribution of private key (according to accepted threshold method), and CA – keys of **Certum CA** or **Certum Trusted Network CA**
- issuance of a public key ($\mathbf{K}_{\mathbf{GPK}(l, CA)}$) self-certificate.

Upon generation of key pair for certificate and CRL signing, private key distribution and its activation in hardware security module, the keys can be used in cryptographic operations until the validity period has expired or the keys have been revealed .

6.1.1.2. Certum CA rekey procedure

Certum CA and **Certum Trusted Network CA** cryptographic keys have a limited lifetime period; if the period has expired, the keys should be updated.

A particular procedure is applied for update of key pair used for certificate and CRL signing. It is based on the issuance of special certificates by **Certum CA** or **Certum Trusted Network CA**. The certificates enable subscribers who have already installed an expired self-certificate of **Certum CA** or **Certum Trusted Network CA** to securely migrate to work with a new self-certificate; new subscribers already possessing a new self-certificate are enabled to securely retrieve expired self-certificate, which may be needed for verification of the data signed in the past (see RFC 4210).

To achieve effect described above, **CERTUM** deploys a procedure, owing to which new key pair generation will secure (authenticate) a new public key with the use of the former (previously used) private key and vice-versa (an old public key is secured with a new private key). It means that as a result of update of the self-certificate of certification authority **Certum CA** or **Certum Trusted Network CA** apart from a new self-certificate, two additional certificates are created. After the key update four certificates are created for certificates and CRL signing: the former **self-certificate OldWithOld** (old public key signed with old private key), the new **self-certificate NewWithNew** (new public key signed with new private key), **self-certificate OldWithNew** (old public key signed with new private key) and **self-certificate NewWithOld** (new public key signed with old private key).

Procedure for **Certum CA** or **Certum Trusted Network CA** key pair – designated to certificate and CRL signing – update (rekey), is executed as follows:

- generation of a new, succeeding main key pair $\mathbf{GPK}_{(i,CA)} = \{\mathbf{K}_{\mathbf{GPK}(i,CA)}^{-1}, \mathbf{K}_{\mathbf{GPK}(i,CA)}\}$, where $\mathbf{K}_{\mathbf{GPK}(i,CA)}^{-1}$ – private key, while $\mathbf{K}_{\mathbf{GPK}(i,CA)}$ – public key, distribution of the private key (according to accepted threshold method),
- creation of a self-certificate, containing new public key of **CA-Certum**, signed with old private key $\mathbf{K}_{\mathbf{GPK}(i-1,CA)}^{-1}$ (**self-certificate NewWithOld**),
- deactivation of old private key $\mathbf{K}_{\mathbf{GPK}(i-1,CA)}^{-1}$ and activation of new private key $\mathbf{K}_{\mathbf{GPK}(i,CA)}^{-1}$ – within hardware security module a new private key for certificate and CRL signing is loaded,
- creation of a self-certificate, containing old public key **Certum CA**, signed with new private key $\mathbf{K}_{\mathbf{GPK}(i,CA)}^{-1}$ (**self-certificate OldWithNew**),
- creation of a self-certificate containing new public key of **Certum CA**, signed with new private key $\mathbf{K}_{\mathbf{GPK}(i,CA)}^{-1}$ (**self-certificate NewWithNew**),
- publication of created certificates in the repository, submission of the information about new available certificates.

After generation and activation of a new private key (it may be executed in any moment within the validity period of the old self-certificate), **Certum CA** or **Certum Trusted Network CA** authority signs new intermediate certificates solely by means of the new private key.

The old public key (old self-certificate) is available to the public until all subscribers obtain the new self-certificate (new public key) of **Certum CA** or **Certum Trusted Network CA** (it should be achieved before the expiry date of the old self-certificate).

Beginning and expiration of the validity period of **self-certificate OldWithNew** should be the same as beginning and expiration date of the old self-certificate.

Validity period of **self-certificate NewWithOld** starts in the moment of a new key pair generation and expires in the moment when all the subscribers will obtain new self-certificates (certificate of the new public key) of **Certum CA** or **Certum Trusted Network CA**. Its expiration date should not be later than the expiry date of the old self-certificate.

Validity period of **self-certificate NewWithNew** begins in the moment of a new key pair generation and expires at least 180 days after the next anticipated date of succeeding key pair generation. This requirement means the certification authority **Certum CA** or **Certum Trusted Network CA** terminates usage of the private key for signing certificates and CRL at least 180 days before the expiry date of the self-certificate corresponding to this private key.

6.1.1.3. Subordinate certification authorities rekey procedure

Procedures for intermediate certification authorities keys update are executed similarly as for **Certum CA** and **Certum Trusted Network CA** (see Chapter 6.1.1.2) except one step: **certificate NewWithNew** is issued by **Certum CA** or **Certum Trusted Network CA** authority.

6.1.1.4. Certum CA and subordinate authorities certificate recertification procedure

Certificates belonging to **Certum CA** and **Certum Trusted Network CA** authorities and other authorities may be subjected to recertification. This operation is performed only upon occurrence of the situation presented in Chapter 3.3.1.2. Prior to issuance of a new certificate, the authority assess, whether the key size guarantees its further security during the period of extended certificate value.

6.1.1.5. Hardware and/or Software Key Generation

In the case of certification authorities, keys are generated by means of hardware security modules complying with requirements presented in Chapter 6.2.1.

In the case of key generation by a subscriber, a certification authority allows hardware and software key generation method (Chapter 6.2.1).

Tab.6.1 Subscriber’s key generation method

Certification Policy	Key generation method
Certum Level I CA	Hardware or software
Certum Level II CA	Hardware or software
Certum Level III CA	Hardware or software
Certum Level IV CA	Hardware or software
Certum Class 1 CA	Hardware only
Certum Code Signing CA	Hardware only
Certum Extended Validation CA	Hardware only
Certum Global Services CA	Hardware only

6.1.2. Private Key Delivery to Entity

Subscriber’s key pair is generated by himself/herself/itself or may be generated centrally by a certification authority inside a token (e.g. an electronic identity card) In the case of keys generation by CERTUM keys are delivered (together with a token) to the subscriber personally or by means of registered mail; data for the card activation (including PIN/PUK) or key decryption (password) are submitted separately from the media containing the key pair; the issued cards are personalized and registered by the certification authority.

CERTUM guarantees that it employs procedures assuring that in any moment after generation of a key pair on subscriber’s demand there will be a possibility to use keys for creating an electronic signature by certification authority personnel and that the certification authority will not create conditions for making the signature by any unauthorized entity, except for the owner of the private key.

6.1.3. Public Key Delivery to certification authority

Subscribers and registration authority operators submit their generated public keys as an electronic request whose format has to comply with protocols of PKCS#10 Certification Request Syntax²⁷ (CRS) supported by a certification authority, a registration authority and a subscriber.

²⁷ RFC 2314 (CRS): B. Kaliski PKCS #10: Certification Request Syntax, Version 1.5, March 1998

Currently, CERTUM supports only requests submitted in the format PKCS#10 Certification Request Syntax (CRS) and Netscape SPKAC (Signed Public Key and Challenge).

Requests submitted to a certification authority may, in particular cases, require confirmation issued by a registration authority (see Chapter 3 and 4).

Submission of a public key is expendable in the case when a key pair is generated on demand by a certification authority, which simultaneously issues a certificate for the generated key pair.

6.1.4. Certification authority public key delivery to relying parties

Public keys of a certification authority issuing certificates to subscribers are distributed solely in a form of certificates complying with ITU-T X.509 v.3 recommendations. In the case of **Certum CA** or **Certum Trusted Network CA** certification authority, certificates have a form of self-certificates.

CERTUM certification authorities distribute their certificates in two different methods:

- placement in the publicly available web repository of CERTUM at <http://www.certum.pl>,
- distribution together with a dedicated software (e.g. web browsers, email clients, etc.), which allows usage of services offered by CERTUM.

In the case of CERTUM certification authority key update (rekey), the repository should contain all additional self-certificates or certificates issued as a result of execution of the procedure described in Chapter 6.1.1

6.1.5. Keys Sizes

Sizes of keys deployed in CERTUM by registration authority operators and subscribers are presented in Table 6.1.

Tab.6.2 Size of keys used

Type of key owner	Prime key usage	
	RSA for certificate and CRL signing	RSA for authentication, message signing, and key exchange
Certum CA	2048 bit	–
Certum Trusted Network CA	2048 bit	–
Certum Trusted Network CA 2	4096	--
Certum Level II CA	2048 bit	–
Certum Level III CA	2048 bit	–
Certum Level IV CA	2048 bit	–
Certum Code Signing CA	2048	--
Certum Extended Validation CA	2048 bit	–
Certum Class 1 CA	2048 bit	–
Certum Partners	2048 bit	–
Certum Time-Stamping Authority	–	2048 bit
Private and legal entities and their hardware	–	Defined by the user (2048 bit or more)

6.1.6. Public Key Generation Parameters and Quality Checking

This Certification Practice Statement does not imply any requirements in this field, although it is recommended that in the case of RSA key generation minimal requirements, described in “*Algorithms and Parameters for Secure Electronic Signatures*” [25] and NIST SP 800-57 recommendation [27] should be fulfilled.

The creator of a key is responsible for checking parameter quality of the generated key. He/she/it is required to verify:

- ability to execute encryption and decryption operation, including electronic signature creation and its verification,
- key generation process, which should be based on strong random cryptographic number generators – physical sources of white noise, if possible,
- immunity to known attacks (applies to RSA cryptographic algorithm).

Additionally, every certification authority, upon reception or generation (on subscriber’s demand) of a public key, subjects it to appropriate verification test on compliance with restrictions enforced by the Certification Practice Statement (e.g. module length and exponent).

Parameter quality checking, covering for example checks of primness of the prime numbers, should be obligatory in the case of centralized key generation and should be executed

according to recommendations listed in “*Algorithms and Parameters for Secure Electronic Signatures*” [25] and NIST SP 800-57 [27]

6.1.7. Key Usage Purposes

Allowed key usage purposes are described in **KeyUsage** field (see Chapter 7.1.2.1) of standard extension of a certificate complying with X.509 v3. This field has not to be obligatorily verified by the subscribers’ application managing the certificates.

Usage of every bit of **KeyUsage** field has to comply with the RFC 5280.

In the case of certificates issued according to **Certum Level I CA**, **Certum Level II CA**, **Certum Level III CA** and **Certum Level IV CA** policies, it is allowed to use one key for both electronic signature creation operation (**digitalSignature** bit) and data encryption (**dataEncipherment** bit). Due to this, it is possible to use a certificate of this profile in applications based on Secure Multipurpose Internet Mail Extensions (S/MIME) protocol and SSL/TLS protocols

Certificates used for both signature creation and encryption may be issued solely to subscribers.

6.2. Private Key Protection

Every subscriber, certification authority operator and certification authority generates and stores his/her/its private key employing a credible system preventing from private key loss, revelation, modification or unauthorized access. Certification authority (see Chapter 6.1.1) generating a key pair on authorized subscriber’s demand, has to deliver it securely to the subscriber and notifies the subscriber on rules regarding protection of his/her/its private key (see Chapter 6.1.2).

6.2.1. Standards for Cryptographic Modules

Hardware security modules employed by a certification authority and a registration authority comply with the requirements of FIPS 140-2 Level 3 or higher standard. In the case of subscriber’s using hardware key protection, it is also recommended to comply with FIPS 140-2.

6.2.2. Private Key Multi-Person Control

Multi-person control of a private key applies to private keys of all certification authorities of CERTUM used for certificate and CRL signing, as well as other cryptographic operations, e.g. message encryption.

CERTUM allows direct and indirect method for private key distribution into multi-person control. In the case of direct method usage, the very private key is subjected to multi-person control, while in indirect method the control applies to a symmetric key used for encryption of private key of certification authority.

In both methods, keys (symmetric or asymmetric) are distributed according to accepted threshold method (so called shadows) and transferred to authorized **shared secret holders**. Accepted number of a shared secret and required number of secrets allowing private key restoration are disclosed in Table 6.4.

Shared secrets are stored on cryptographic cards, protected by a PIN number and transferred in an authenticated manner to their holders.

Tab.6.4 distribution of shared secrets

Authority providing certification services	Number of shared secrets, required for private key restoration	Total number of distributed secrets
Certum CA	3	5
Certum Trusted Network CA	3	5
Certum Trusted Network CA 2	3	5
Certum Level I CA	2	3
Certum Level II CA	2	3
Certum Level III CA	2	3
Certum Level IV CA	2	3
Certum Extended Validation CA	2	3
Certum Code Signing CA	2	3
Certum Class 1 CA	2	3
Certum Global Services CA	2	3
Certum Time-Stamping Authority	2	3

Shared secret transfer procedure has to include secret holder presence during key generation and distribution process, acceptance of a delivered secret and resulting responsibilities for its storage, and it should state conditions and requirements for shared secret retransmission to authorized personnel.

6.2.2.1. Acceptance of secret shares by its holders

Every shared secrets holder, before receiving his/her secret, should personally observe secret shares creation, verify the correctness of a created secret and its distribution. Each part of the shared secret has to be transferred to its holder on a cryptographic card protected by a PIN number assigned by the holder and known only to him/her. The reception of the shared secret and its appropriate creation in accordance with this document is confirmed by a hand-written signature on an appropriate form whose copy is retained in certification authority archives.

6.2.2.2. Protection of secret shares

Holders of shared secret have to protect their share from revelation. With the exceptions described below, the holder of the share declares that he/she:

- will not reveal, copy or share the secret with any other party and that he/she will not use the share in an unauthorized manner,
- will not reveal (directly or indirectly) that he/she is the holder of the secret,
- will not store the share in a place rendering emergency usage of the share impossible when the holder is inaccessible.

6.2.2.3. Availability and erasure (transfer) of shared secret

The holder of a shared secret should allow access to his/her share to authorized entities (specified in an appropriate form, signed by the holder upon delivery of the share) only after authorization of secret transmission. This situation should be recorded in the security system as an appropriate transaction log.

In the case of natural disasters (declared by the shared secret issuer) the holder of the secret should attend himself/herself in the emergency recovery site of CERTUM, according to

instructions submitted by the share issuer. Before the shared secret holder attends himself/herself in the emergency recovery, site he/she should receive confirmation of a required presence from shares issuer. The shared secret should be delivered by the holder to the emergency recovery site personally by the holder in a manner allowing share usage for restoration of CERTUM activity to its normal state.

6.2.2.4. Responsibilities of shared secret holder

Shared secret holder should perform his/her duties and obligations according to the requirements of this document and in a deliberate and responsible manner in any possible situation. A shared secret holder should notify the issuer of the share in the case of the secret theft, loss, unauthorized revelation or security violation immediately after the incident occurrence. A shared secret holder is not responsible for neglecting his/her duties because of the reasons that are impossible to control by the holder, but is responsible for inappropriate revelation of the secret or neglecting the obligation to notify the issuer of the secret about inappropriate revelation or security violation of the secret, resulting from the holder mistake, neglect or irresponsibility..

6.2.3. Private Key Escrow

See Chapter 4.12

6.2.4. Private Key Backup

Certification authorities operating within CERTUM create a backup copy of their private key. The copies are used in the case of execution of standard or emergency (e.g. after disaster) key recovery procedure.

Depending on applicable key distribution method (appropriately direct or indirect, see Chapter 6.2.2), copies of private keys are retained in secret shares or in one piece (after encryption with a symmetric key). Copied keys are stored in hardware security modules. Security module, used for private key storage, complies with requirements disclosed in Chapter 6.2.1. The copy of a private key is entered into module in accordance with procedures described in Chapter 6.2.6

Shared secrets, copies of secret encryption key, as well as PIN numbers protecting the keys are retained in various, physically protected locations. None of these locations holds a set of cards and PIN number allowing restoration of certification authority key solely with the usage of this cards or PINs.

CERTUM does not retain copies of registration authority operator's private keys. Copies of a subscriber's private keys are created solely on subscriber's demand and in accordance with the methods presented in Chapter 4.12

6.2.5. Private Key Archival

Private keys of certification authorities used for electronic signature creation are archived for at least 5 years after their usage termination in cryptographic operation. The same requirement applies to public key certificate corresponding to private key after its expiration or revocation.

Private keys of certification authorities used in key agreement operations have to be archived after expiry of the validity date of the associated certificate or upon its revocation for the period at least 5 years. Archived keys have to be available for 25 years; for the first 15 years they must be accessible *on-line*.

CERTUM does not archives copies of registration authority's and subscriber's private keys.

6.2.6. Private Key Entry into Cryptographic Module

Operation of entering of a private key into a cryptographic module is carried out in the following cases:

- in the case of creation of backup copies of private keys stored in a cryptographic module, it may be occasionally necessary (e.g. in the case of the module corruption or malfunction) to enter a key pair into a different security module,
- it is necessary to transfer a private key from the operational module used for standard operations by the entity to another module; the situation may occur in the case of the module defection or necessity of its destruction.

Entry of a private key into the security module is a critical operation, therefore measures and procedures, preventing key revelation, modification or forgery are implemented during execution of the operation.

CERTUM applies two methods of securing key – subjected to entry into the cryptographic module – integrity:

- if the key is provided in one piece than outside the module it is not available in plain form, i.e. upon key generation in the module and its export to another cryptographic device, the key is encrypted with a secret key; the secret key is stored in a manner preventing unauthorized access to both parts of the secret (private key and secret key used for its encryption) simultaneously,
- if a key, or its password is stored as secret shares, then the very module is able to verify, on shares loading, a potential attack or forgery attempts.

Entry of a private key into hardware security module of each certification authorities requires restoration of the key from the cards in the presence of appropriate number of share holders or administrator's card protecting the module containing these private keys (see Chapter 6.2.2). Since every certification authority may possess an encrypted copy of its private key (see Chapter 6.2.4), the keys may be also transferred between the security modules.

A private key of a registration authority is always available in one instance (no copies), therefore there is no need to enter it into the memory of the cryptographic module.

Installation of a private key in the cryptographic module of a subscriber may require loading it from obtained media, e.g. a file protected with a password located on a floppy disc (this operation may be carried out only by the subscriber).

6.2.7. Storing Private Key in Cryptographic Module

Depending on applicable cryptographic module, the private keys of certification authority or registration authority are retained in module in an encrypted or non-encrypted form. Regardless of the form of the private key's storage, the key is not accessible from outside the cryptographic module for unauthorized entities.

6.2.8. Method of Activating Private Key

Methods of activation of a private key, possessed by various users and subscribers of CERTUM system, apply to the method of key activation before every use of them or beginning of a session (e.g. the internet connection) employing these keys. A once activated key is ready for usage until the moment of the key deactivation.

Activation (and deactivation) of private key procedure execution depends on the type of the entity holding the key (subscriber, registration authority, certification authority, device, etc.),

on sensitivity of the data protected by the key, and on, the fact whether the key remains active for the time of one operation, session or for unlimited time.

All private keys of certification authorities, entered into the module after their generation, import in an encrypted form from another module or restoration from shared secrets by the authorized person, remain in the active state until their physical erasure from the module or removal from CERTUM services.

Signing private keys of registration authority operators, used for information signing, are activated after authentication of the operator (PIN number provision) and only for the time of a single cryptographic operation requiring usage of this key. Upon the completion of this operation the private key is automatically deactivated and has to be activated again before execution of another cryptographic operation. Other private keys, e.g. used for authentication of registration authority applications or creation of encrypted network channel are automatically activated for a period of a single session, immediately after authentication of the operator. The completion of a session deactivates all previously activated private keys.

Activation of a subscriber's private key is carried out similarly to private keys of certification authority operators, regardless whether they are stored on an electronic card or in an encrypted form as a file on a floppy disc or any other media.

6.2.9. Method of Deactivating Private Key

Private key deactivation method applies to key deactivation methods after their usage or upon completion of every session (e.g. network connection) during which the key were used.

In the case of a subscriber or a registration authority operator, private signing key deactivation is carried out immediately after creation of an electronic signature or session completion (e.g. application logout). If during execution of this cryptographic operation the private key was stored in the operational memory of the application, the application has to prevent unauthorized restoration of the private key.

In the case of CERTUM, deactivation of a private key is carried out by the security inspector only in the situation when the validity period of the private key has expired, the key has been revoked or there is immediate requirement to temporary suspend the activity of the system. Deactivation of a private key is carried out by resetting the memory of cryptographic module.

Every private key deactivation is recorded in the event journal.

6.2.10. Method of Destroying Private Key

Erasure of private keys of subscriber or registration authority operators involve respectively their erasure from the media (floppy disc, electronic card, operational memory, hardware security module, etc), destruction of the media (electronic card) or at least taking over the control of the key in the case of the card preventing definite private key erasure from this card.

Destruction of certification authority private key means physical destruction of the electronic cards and/or other media used for storage of copies or archives of shared secrets. Every private key destruction is recorded in the event journal.

6.2.11. Cryptographic Module Rating

See Chapter 6.2.1

6.3. Other Aspects of Key Pair Management

Remaining requirements of this Chapter apply to public key archive procedure and validity period of public and private keys of every subscriber, including a certification authority.

6.3.1. Public Key Archive

The purpose of public key archive is to create possibility of electronic signature verification after removal of a certificate from the repository (see Chapter 2). It is extremely important in the case of providing of non-repudiation services, such as timestamp service or certificate status verification service.

Archive of public keys involves archive of the certificates containing these keys.

Every authority issuing certificates archives public keys of subscribers whom certificates were issued to. Certification authority public keys are archived together with private keys, in the manner described in Chapter 6.2.5.

Certificates may also be archived locally by subscribers, especially when is required by used application (e.g. electronic mail systems).

Public key archives should be protected in a manner preventing unauthorized addition, insertion, modification or removal of the key to or from the archive. The protection is enforced with authentication of the archiving entity and authorization of their requests.

Within CERTUM, only the keys used for electronic signature verification are subjected to archival. Any other types of public keys (e.g. keys used for encrypting messages) are destroyed immediately after their removal from the repository.

The security inspector performs review of public key archive, verifying its integrity. The purpose of this verification is to make sure that there are no gaps in the archive, and certificates stored in the archive have not been modified. Mechanisms verifying integrity of the archive take into consideration the fact that the retention period of the archives may be longer than the security means used to creation of the archive.

Public keys are retained in the public key archive for the period of 25 years (see Chapter 5.5).

Every archive of a public key or a public key destruction is recorded in the event journal.

6.3.2. Usage Periods of Public and Private Keys

Usage period of public keys is defined by the value of the field **validity** of every public key certificate (see Chapter 7.1). Validity period of a private key may be shorter, which results from the possibility to cease private key usage at any time.

Standard values of maximal usage period of certification authority certificates are described in Table 6.5, while subscriber's certificates are presented in Table 6.6.

Usage periods of certificates and the corresponding private keys may be shortened in the case of suspension or revocation of a certificate or a key.

Starting date of the certificate validity period complies with the date of its issuance. It is not allowed to set this date in the future or in the past.

Tab.6.5 Maximal usage periods of certification authority certificates

Owner and key type	Main key usage	
	RSA for certificate and CRL signing	RSA for token signing

Certum CA	public key	25 years	–
	private key	15 years	–
Certum Trusted Network CA	public key	25 years	–
	private key	15 years	–
Certum Trusted Network CA 2	public key	35 years	--
	private key	25 years	--
Certum Level I CA	public key	15 years	–
	private key	12 years	–
Certum Level II CA	public key	15 years	–
	private key	12 years	–
Certum Level III CA	public key	15 years	–
	private key	12 years	–
Certum Level IV CA	public key	15 years	–
	private key	12 years	–
Certum Extended Validation CA	public key	15 years	–
	private key	12 years	–
Certum Class 1 CA	public key	15 years	–
	private key	14 years	–
Certum Global Services CA	public key	15 years	–
	private key	10 years	–
Certum Time-Stamping Authority	public key	–	10 years
	private key	–	10 years

Every user, including a certification authority, can terminate private key usage for electronic signature creation at any time, although the certificate remains currently valid. Notwithstanding, a certification authority is obligated to notify its subscribers of this situation (related for example to key changeover).

The rules mentioned above do not applies to the keys used for validation service, signed by intermediate roots.

Tab.6.6 Maximal usage periods of the subscriber’s certificates

Certification policy	Main key usage	
	RSA for message signing	RSA for key exchange
Certum Level I CA	90 days	90 days
Certum Level II CA	1095 days	1095 days
Certum Level III CA	1095 days	1095 days
Certum Level IV CA	1095 days	1095 days
Certum Class 1CA	90 days	90 days
Certum Code Signing CA	1095 days	1095 days
Certum Extended Validation CA	820 days	820 days
Certum Global Services CA	–	10 years

The rules mentioned above do not apply to the keys used for validation service, signed by intermediate roots.

6.4. Activation Data

Activation data are used for activation of a private key used by a registration authority, a certification authority or by subscribers. They are usually used on the stage of entity authentication and control of the access to a private key.

6.4.1. Activation Data Generation and Installation

Activation data are used in two basic cases:

- as an element of one- or multi-factor authentication procedure (so called authentication phrase, e.g. password, PIN number, etc),
- as a part of the shared secret, which upon installation allows cryptographic key(s) restoration.

Registration authority and certification authority operators, as well as other persons performing the roles described in Chapter 5.2.1 should operate passwords immune for brute force attacks (also called exhaustive attacks). It is recommended to create a subscriber's password in a similar manner.

In the case of private key activation, it is recommended to use multi-factor authentication procedures, for example a cryptographic token (including an electronic cryptographic card) and an authentication phrase or a cryptographic token and biometric (e.g. fingerprint of the subscriber).

The above authentication phrase should be generated in accordance with the requirements of NIST SP 800-63 [28] and FIPS 180-3 [29]

Shared secrets used for certification authority private key protection are generated in accordance with the requirements presented in Chapter 6.2 and retained inside cryptographic tokens. The tokens are protected by a PIN number, created in accordance with the requirements of FIPS 12. Shared secrets become activation data after their activation, i.e. providing the correct PIN number protecting the token.

6.4.2. Activation Data Protection

Activation data protection includes activation data control methods preventing from their revelation. Activation data protection control methods depend on the fact whether they are authentication phrases and whether control is enforced on the basis of private key or its activation data distribution into shares (shared secrets).

In the case of the authentication phrase protection, the recommendations described in FIPS 112 should be enforced, while protection of shared secrets requires implementation of FIPS 140.

It is recommended that activation data used for private key activation should be protected by means of cryptographic controls and physical access controls. Activation data should be biometric data or should be remembered (not written down) by the entity being authenticated. If the authentication data are written down, the level of their protection should be the same as data protected by the usage of a cryptographic token. Several unsuccessful attempts to access this module should result in token lock. Stored activation data should never be retained together with the token.

6.4.3. Other Aspects of Activation Data

Activation data are stored always as a single copy. A sole exception from this rule are PIN numbers, protecting access to shared secrets – every shared secret holder can create a copy of the PIN number and retain it in the location different than the shared secret

Activation data protecting access to private keys stored on cryptographic tokens can be periodically changed.

Activation data may be subjected to archive.

6.5. Computer Security Controls

Tasks of registration authorities and certification authorities operating within CERTUM are carried out by means of credible hardware and software, being a part of the system which complies with the requirements described in the document CWA 14167-1 *Security Requirements for Trustworthy Systems Managing Certificates for Electronic Signatures - Part 1: System Security Requirements* [30], at least EAL3 according to ISO/IEC 15408-3:1999 *Information technology - Security techniques -- Evaluation criteria for IT security -- Part 3: Security assurance requirements*.

6.5.1. Specific Computer Security Technical Requirements

Technical requirements, presented in this Chapter, apply to single computer security control and installed software control, used for CERTUM system operation. Security means protecting computer systems are executed on the level of operating system, application and physical protections.

Computers operated in certification authorities and in their associated components (e.g. registration authorities) are equipped with the following security controls:

- mandatory authenticated registration on the level of operating system and application (in the case of significant importance, e.g. due to the role performed in the system),
- discretionary access control,
- possibility of conducting security audit,
- computers are accessible only by personnel, performing trusted roles in CERTUM,
- enforcement of duty segregation, arising from the role performed in the system,
- identification and authentication of roles and personnel performing these roles,
- cryptographic protection of information exchange session and protection of databases,
- archive of history of operation carried out on the computer and data required by audits,
- a secure path allowing credible identification and authentication of roles and personnel performing these roles,
- key restoration methods (only in the case of hardware security modules) and application and operating system,
- monitoring and alerting means in the case of unauthorized computer resources access.

Access to the CERTUM's databases supporting activity of the certification authorities is granted solely to the authorized persons performing trusted roles in CERTUM and only if such access results from the significant business reasons.

6.5.2. Computer Security Rating

CERTUM computer system complies with requirements described in CWA 14167-1 *Security Requirements for Trustworthy Systems Managing Certificates for Electronic Signatures - Part 1: System Security Requirements..* The above has been confirmed by an independent auditor, performing functionality assessment of CERTUM on the basis of the criteria described in WebTrust Principles and Criteria for Certification Authorities.

6.6. Technical Security Life Cycle

6.6.1. System Development Controls

Applications used by CERTUM system are developed and implemented by Unizeto Sp. z o. o. specialists. Every application is developed and updated with Concurrent Versions System (CVS) usage. Within CVS, the system documentation is also created.

Hardware changes are also monitored and registered. In particular the monitoring guarantees:

- hardware is supplied in a manner allowing its tracing and evaluation of the route of the component to the place of its installation,
- replacement hardware delivery is carried out in a manner similar to delivery of original hardware; replacement is carried out by trusted and trained personnel.

6.6.2. Security Management Controls

The purpose of security management control is to supervise CERTUM system functionality providing assurance that the system operates correctly and in accordance with the accepted and implemented configuration.

Current configuration of CERTUM system, as well as any modifications and updates to its system are recorded and controlled. Controls applied to CERTUM system allow continuous verification of application integrity, their version and authentication and verification of hardware origin.

6.6.3. Life Cycle Security Ratings

This Certification Practice Statement does not imply any requirements in this field.

6.7. Network Security Controls

Servers and trusted workstations of CERTUM system are connected by the designated and separated two-level internal LAN network. Access from the internet to any segment is protected by means of intelligent firewall of the E3 class (according to ITSEC) and by means of intrusion detection systems (IDS).

Within the first subnetwork, the first segment contains WWW server and SMTP server (altogether – system repository) while the second segment comprises a designated, logically separated internal part maintaining proper certification process (it contains e.g. certification server and database server).

CERTUM's second subnetwork performs the role of a model system, used in development and test operations.

CERTUM computer system is protected against denial of services type attacks and secured by the intrusion detection system. Security controls are developed on the basis of firewall and traffic filtering on the routers and Proxy services.

Network firewall's controls accept only messages submitted with the usage of http, https, NTP, POP3 and SMTP protocols. Event records (logs) are recorded in the system logs and allow supervision of correctness of the usage of services provided by CERTUM.

Detailed configuration of CERTUM network and its protection means is presented in technical infrastructure documentation. Such documentation has a "non-public" status and is available only to authorised individuals.

6.8. Time stamps as a security control

Request created within CMP and CRS protocol (Chapter 6.1.3) do not require signing with trusted time. In the case of any other messages exchanged between a certification authority, a registration authority and a subscriber, it is recommended to apply time stamps.

Time stamps are created within CERTUM system in accordance with the recommendation RFC 3161 and Microsoft Authenticode™ technology. Timestamps are issued in accordance with Timestamping Authority Policy (document is available *on-line* in the repository).

7. Certificate, CRL, timestamp token and OCSP profile

Certificate profiles and Certificate Revocation List profile comply with the format described in ITU-T X.509 v.3 standard, the profile of OCSP token complies with the requirements of RFC 2560, while the profile of timestamp token complies with RFC 3161 (see also *ETSI Time stamping profile, TS 101 861 v1.2.1*). Information stated below describes the meaning of respective certificate fields, CRL, timestamp and OCSP token, applied standard and private extensions employed for the needs of CERTUM.

7.1. Certificate Profile

Following the X.509 v.3 standard, a certificate is the sequence of the following fields: the first one contains the body of certificate (**tbsCertificate**), the second one – information about algorithm used for certificate signing (**signatureAlgorithm**), while the third one – an electronic signature created on the certificate by a certification authority (**signatureValue**).

The contents of a certificate include values of **basic fields** and **extensions** (standard, described by the norm, and private, defined by the certification authority).

CERTUM supports the following certificate basic fields:

- **Version:** third version (X.509 v.3) of certificate format,
- **SerialNumber:** certificate serial number, unique within certification authority domain,
- **SignatureAlgorithm:** identifier of the algorithm applied by a certification authority issuing certificates,
- **Issuer:** distinguished name (DN) of a certification authority,
- **Validity:** validity period, described by the beginning date (**notBefore**) and the ending date (**notAfter**) of the certificate validity period,
- **Subject:** distinguished name (DN) of the subscriber that is the subject of the certificate,
- **SubjectPublicKeyInfo:** value of a public key along with the identifier of the algorithm associated with the key,
- **Signature:** the sign generated and encoded according to RFC 5280.

In certificates issued by CERTUM values of the above fields are set in accordance with the rules described in Table 7.1.

Tab.7.1 Profile of the basic fields of certificates

Field name	Value or value constraint	
Version	Version 3	
Serial Number	Unique value for all certificate issued by certification authorities within CERTUM	
Signature Algorithm	sha1WithRSAEncryption (OID: 1.2.840.113549.1.1.5)	
Issuer (Distinguished Name)	Common Name (CN) =	Proper root certificate name
	Organization (O) =	Unizeto Sp. z o.o. (within certum) or Unizeto Technologies S.A. (within ctnDomena)
	Organization Unit (OU) =	Certum Certification Authority (only within ctnDomena)
	Country (C) =	PL
Not before (validity period beginning date)	Universal Time Coordinated based. CERTUM owns satellite clock controlled by Atomic Frequency Standard. CERTUM clock is known as valid world Stratum I service	
Not after (validity period ending date)	Universal Time Coordinated based. CERTUM owns satellite clock controlled by Atomic Frequency Standard. CERTUM clock is known as valid world Stratum I service	
Subject (Distinguished Name)	Distinguished names comply with the X.501 requirements. Values of all attributes of these fields are optional, except for the following fields: emailAddress (in the case of individual's certificates), organizationName (in the case of non-Repudiation and CA certificates), commonName (in the case of server certificates), unstructured {Address or Name} (in the case of VPN certificates) which are mandatory. In the case of EV SSL certificates distinguished names comply with the <i>Guidelines for the issuance and Management of Extended Validation Certificates</i> (patrz [31], also Appendix 3), that contains the following attributes: organizationName, commonName, serialNumber, businessCategory, jurisdictionOfIncorporationCountryName.	
Subject Public Key Info	Encoded in accordance with RFC 5280, may contain information about RSA, DSA or ECDSA public keys (key identifier, key size in bits and value of the public key).	
Signature	Certificate signature, generated and encoded in accordance with the requirements described in RFC 5280	

Extensions defined in a certificate according to the X.509 v.3 recommendation allow assignation of additional attributes to the subscriber and his/her/its public key and simplify management of hierarchical certificate structure. Certificates issued in accordance with X.509 v.3 recommendation allow definition of proprietary extensions, unique for implementation of the system.

7.1.1. Version

All certificates belonging to CERTUM are issued in accordance with Version 3 (X.509 v.3).

7.1.2. Standard extensions fields

Function of every extension is defined by the standard value of the corresponding object identifier (**OBJECT IDENTIFIER**). Extension, depending of the choice of issuing authority, may be **critical** or **non-critical**. If an extension is defined as critical, the application supporting certificate usage must reject every certificate containing an unrecognized critical extension. On the other hand, extensions defined as non-critical may be omitted.

Requirements imposed on the extensions of EV SSL certificates are described in Appendix 3, paragraph. 6.

7.1.2.1. Key Usage

KeyUsage: allowed key usage – this extension may be critical. This extension describes the usage of the key, e.g. key for data encryption, key for electronic signature, etc (see below):

digitalSignature	(0), -- key for electronic signature creation
nonRepudiation	(1), -- key associated with the non-repudiation services
keyEncipherment	(2), -- key for key exchange
dataEncipherment	(3), -- key for data encryption
keyAgreement	(4), -- key for key agreement
keyCertSign	(5), -- key for certificate signing
cRLSign	(6), -- key for CRL signing
encipherOnly	(7), -- key only for encryption
decipherOnly	(8) -- key only for decryption

Usage of every bit of **KeyUsage** field has to comply with the following rules (every bit meaning appropriately):

- digitalSignature**: certificate intended for verification of electronic signature created for purposes different than the purposes mentioned in b), f) and g),
- nonRepudiation**: certificate intended to provide a non repudiation service by private individuals, although for other purposes than described in f) and g). **NonRepudiation** bit may be set only in a public key certificate intended to verify electronic signatures and should not be combined with any other purposes, especially described in points c)-e) and connected with providing confidentiality,
- keyEncipherment**: intended to encrypt symmetric algorithm keys, providing data confidentiality,
- dataEncipherment**: intended to encryption of subscriber's data, other than described in c) and e),
- keyAgreement**: intended for protocols of key agreement,
- keyCertSign**: public key is used for electronic signature verification in certificates issued by entities providing certification services,
- cRLSign**: public key is used for verification of electronic signatures on revoked and suspended certificates lists issued by the entities providing certification services,
- encipherOnly**: may be used solely with **keyAgreement** bit to indicate its purpose of data encryption in key agreement protocols,
- decipherOnly**: may be used solely with **keyAgreement** bit to indicate its purpose of data decryption in key agreement protocols,

7.1.2.2. Extended Key Usage

ExtKeyUsage: definition (constraint) of the key usage – **this extension may be critical.** This field defines one or more areas, in addition to standard key usage, defined by **keyUsage** field, of the possible usage of a certificate. This field should be interpreted as constraint of allowed key usage purpose defined in field **keyUsage**. CERTUM issues certificates which may contain one of the following value or combination of such values:

serverAuth	- authentication of TLS web server; keyUsage field bits which comply with the fields: digitalSignature , keyEncipherment or keyAgreement
clientAuth	- authentication of TLS Web client; keyUsage field bits which comply with the fields: digitalSignature and/or keyAgreement
codeSigning	- signature of executable code; keyUsage field bits which comply with the field: digitalSignature
emailProtection	- E-mail protection; keyUsage field bits which comply with the fields: digitalSignature , nonRepudiation and/or (keyEncipherment or keyAgreement)
ipsecEndSystem	- IPSEC protocol protection
ipsecTunnel	- IPSEC protocol tunnelling mode
ipsecUser	- IP protocol protection in user application
timeStamping	- binding of the digest value with the time provided by previously accepted trusted time source; keyUsage field bits which comply with the fields: digitalSignature and/or nonRepudiation
OCSPSigning	- assigns the right to issue certificate status confirmations on behalf of CA; keyUsage field bits which comply with the fields: digitalSignature , nonRepudiation
dvcs	- issuance of confirmation by a notary authority, on the basis of DVCS protocol; keyUsage field bits which comply with the fields: digitalSignature , nonRepudiation , keyCertSign , cRLSign

7.1.2.3. Certificate Policies

CertificatePolicies: information of the PolicyInformation type (identifier, electronic address) about a certification policy, applied by the issuing authority – this extension is not critical. This extension describes the identifiers and qualifiers placed in the certificates in accordance with the requirements specified in Chapters . 7.1.6 and 7.1.8.

7.1.2.4. Authority Key Identifier

AuthorityKeyIdentifier: identifier of a certification authority public key certificate complimentary with a private key, used for signing of issued certificate – **this extension in not critical,**

When the certificate of issuer contains the extension SubjectKeyIdentifier (see Chap. 7.1.2.5), the extension AuthorityKeyIdentifier includes 160-bit SHA-1 of the public key belonging to the certification authority issuing a certificate, in which an extension is placed. If this condition is not fulfilled, the extension AuthorityKeyIdentifier contains a DN and serial number of certificate belonging to the certificate issuer.

7.1.2.5. Subject Key Identifier

SubjectKeyIdentifier: this extension in not critical, the value of this field is provided in accordance with RFC 5280

7.1.2.6. Issuer Alternative Name

IssuerAlternativeName: this extension in not critical, the value of this field is provided in accordance with RFC 5280

7.1.2.7. Subject Alternative Name

SubjectAlternativeName: this extension is not critical, the value of this field is provided in accordance with RFC 5280

7.1.2.8. Basic Constraints

BasicConstraints: this field is critical in the certification authority and may be not critical in the subscriber's certificate. The extension allows definition whether the subject of the certificate is a certification authority (cA field) and what is the maximum (assuming certification authorities are ordered hierarchically) number of certification authorities on the certification path from the considered authority to the subscriber (**pathLength** field),

PathLength value 0 means that the certificate belongs to the certification authority which limits its trust to end users only. There is no PathLength in the self-certificate of Certum Trusted Network CA root certification authority

7.1.2.9. CRL Distribution Points

CRLDistributionPoints: point of distribution of Certificate Revocation List – this field is not critical; the extension defines network addresses hosting current CLR, issued by the **cRLIssuer**,

7.1.2.10. Subject Directory Attributes

SubjectDirectoryAttributes: attributes concerning subject directory – this field is not critical; The extension contains additional attributes associated with the subscriber and supplementing information described in the field subject and subjectAlternativeName; this extension contains attributes not included within subject's Distinguished Name,

7.1.2.11. Authority Information Access Syntax

AuthorityInfoAccessSyntax: access to certification authority information – this field is not critical; the field indicates the method of information and service provision by the issuer of the certificate. This extension contains URL address of certificate of certification authority and URL address of OCSP status verification service refers to this certificate.

7.1.2.12. Certificate Extensions and issued certificates types

Certificates issued by CERTUM may contain various combinations of extensions defined in Chapter 0. Choice of the desired certificate depends mainly on the intended purpose of the certificate and the subscriber whom the certificate is issued.

Intermediate CA Certificates

A self-certificates of **Certum CA**, **Certum Trusted Network CA** and certificates of subordinate authorities, **Certum Level I CA**, **Certum Level II CA**, **Certum Level III CA**, **Certum Level IV CA**, **Certum Extended Validation CA**, **Certum Code Signing CA**, **Certum Class 1 CA** and **Certum Global Services CA** may contain extension described in Table 7.2.

Tab.7.2 Extensions of the CA certificates

Extension	Value or Value constraint	Extension status
Basic Constraints	Subject type=CA Path length constraints = {none,1,2,...}; in the Certum Trusted Network CA the pathLenConstraint field is not present.	Critical
keyUsage	Value: keyCertSign i cRLSign	Critical
certificatePolicies	In the certificates of certification authorities the certificatePolicies field is not present If present, contains POID which is equal to anyPolicy or other identifier in accordance with Chapter 7.1.6.	Non-critical

Server authentication certificates

Certificates issued by certification authorities for server authentication (including certificates used for wireless communication and OFX servers) and network domain (including Wildcard) may contain extensions presented in Table 7.3

Tab.7.3 Server authentication certificate extensions

Extension	Value or Value constraint	Extension status
Basic Constraints	Subject type = empty (end entity) Path length constraint=none	Non-critical or critical
Key Usage	Digital signature, bit 0 Key encipherment, bit 2	Non-critical
Extended Key Usage	Server Authentication (serverAuth) Client Authentication Netscape SGC Microsoft SGC	Non-critical
Certificate Template Name	(1.3.6.14.1.311.20.2): Domain Controller	Non-critical

Netscape Cert Type	SSL Server (bit 1)	Non-critical
Subject Alternative Name	OtherName: 1.3.6.1.4.1.311.25.1=Unique Domain Controller ID DNS.1: Full DNS service name (FQDN) DNS.2: Alternative service name (optionally)	Non-critical
CRL Distribution Points	URI: http://crl.certum.pl/crl_list_name	Non-critical
Authority Info Access	OCSP: address in domain http://ocsp.certum.pl	Non-critical
Certificate Policies	Policies: see chapter 7.1.6 CPS: http://www.certum.pl/CPS Notice number: depends on certificate type Organization: Unizeto Technologies S.A. Explicit text: depends on policy identifier (plain text)	Non-critical

Server authentication EV SSL certificates

Certificates EV SSL issued by certification authorities for server authentication (including certificates used for wireless communication and OFX servers) and network domain (including Wildcard) may contain extensions presented in Table 7.4

Tab.7.4 Server authentication EV SSL certificate extensions

Extension	Value or Value constraint	Extension status
Basic Constraints	Subject type = empty (end entity) Path length constraint=none	Non-critical
Key Usage	Digital signature, bit 0 Key encipherment, bit 2	Non-critical
Extended Key Usage	Server Authentication (serverAuth) Client Authentication	Non-critical
Certificate Template Name	(1.3.6.14.1.311.20.2): Domain Controller	Non-critical

Netscape Cert Type	SSL Server (bit 1)	Non-critical
Subject Alternative Name	DNS.1: Full DNS service name (FQDN) DNS.2: Alternative service name (optionally)	Non-critical
CRL Distribution Points	URI: http://crl.certum.pl/evca.crl	Non-critical
Authority Info Access	OCSP: address in domain http://ocsp.certum.pl Certificate: http://repository.certum.pl/evca.cer	Non-critical
Certificate Policies	Policies: 1.2.616.1.113527.2.5.1.1 CPS: http://www.certum.pl/CPS Notice number: 1 Organization: Certum Extended Validation SSL Server Explicit text: Usage of this certificate is strictly subjected to the CERTUM CPS accessible in the repository at https://www.certum.pl/repository . Copyright (C) 2002-2009 Unizeto Technologies S.A.	Non-critical

Code Signing Certificates

Certificates issued by certification authorities for the purposes of code signing (including form and cryptographic channel signing) may contain extensions specified in

Tab.7.5 Code signing certificates extension

Extension	Value or Value constraint	Extension status
Basic Constraints	Subject type = empty (end entity) Path length constraint=none	Non-critical
Key Usage	digital signature, bit 0 non-repudiation, bit 1	Non-critical
Extended Key Usage	Code Signing	Non-critical
Netscape Cert Type	Object Signing (bit 3)	Non-critical
Subject Alternative Name	URI: http://www.customer-site.somewhere.pl	Non-critical
CRL Distribution Points	URI: http://crl.certum.pl/crl_list_name	Non-critical
Authority Info Access	OCSP: address in domain http://ocsp.certum.pl	Non-critical
Certificate Policies	Policies: see chapter 7.1.6 CPS: http://www.certum.pl/CPS Notice number: depends on certificate type Organization: Unizeto Technologies S.A. Explicit text: depends on policy identifier (plain text)	Non-critical

Private entities certificates

Certificates issued to private subscribers (including encryption file system (EFS) certificates, electronic data interchange (EDI) certificates, certificates qualified in the meaning of RFC 3039 standard, containing biometric data and strong authentication certificates, so called Strong Internet ID's) may contain extensions specified in Table 7.6.

Tab.7.6 Private entities certificates extension

Extension	Value or Value constraint	Extension status
Basic Constraints	Subject type = empty (end entity) Path length constraint=none	Non-critical
Key Usage	digital signature, bit 0 non-repudiation, bit 1 key encipherment, bit 2 dataEncipherment, bit 3	Non-critical
Extended Key Usage	Encrypted File System TLS Client Authentication Email Protection Smart Card Logon (1.3.6.1.4.1.311.20.2.2)	Non-critical
Certificate Template Name	(1.3.6.14.1.311.20.2): Smart Card User Smart Card Logon	Non-critical
Netscape Cert Type	SSL Client (bit 0) S/MIME, bit 2	Non-critical
Subject Alternative Name	OtherName: UPN: customer@somewhere.pl (OID: 1.3.6.1.4.1.311.20.2.3) Email: customer@somewhere-in-world.com	Non-critical
CRL Distribution Points	URI: http://crl.certum.pl/crl_list_name	Non-critical
Authority Info Access	OCSP: address in domain http://ocsp.certum.pl	Non-critical
Biometric Info	Biometric data: Subscriber's photo, DNA, retinal scan, fingerprint (bit 0) Hand-written signature (bit 1) URI: biometric data location	Non-critical
Certificate Policies	Policies: see chapter 7.1.6 CPS: http://www.certum.pl/CPS Notice number: depends on certificate type Organisation: Unizeto Technologies S.A. Explicit text: depends on policy identifier (plain text)	Non-critical

Virtual Private Network (VPN) certificates

Certificates for creation of Virtual Private Network (VPN) may contain extensions specified in Table 7.7.

Tab.7.7 VPN certificates extension

Extension	Value or Value constraint	Extension status
Basic Constraints	Subject type = empty (end entity) Path length constraint=none	Non-critical
Key Usage	digital signature, bit 0 keyEncipherment, bit 2	Non-critical
Extended Key Usage	IPsec Client IPsec Tunnel IPsec End System	Non-critical
Subject Alternative Name	DNS: full VPN router domain name (FQDN) IP: VPN router IP address	Non-critical
CRL Distribution Points	URI: http://crl.certum.pl/crl_list_name	Non-critical
Authority Info Access	OCSP: address in domain http://ocsp.certum.pl	Non-critical
Certificate Policies	Policies: see chapter 7.1.6 CPS: http://www.certum.pl/CPS Notice number: depends on certificate type Organisation: Unizeto Technologies S.A. Explicit text: depends on policy identifier (plain text)	Non-critical

Cross-certification and non-repudiation certificates

Cross-certification and non-repudiation certificates may contain extension specified in Table 7.8.

Tab.7.8 Cross-certification and non-repudiation certificates extensions

Extension	Value or Value constraint	Extension status
Basic Constraints	Subject type=CA Path length constraint={none,1,2,...}	Non-critical
Key Usage	digital signature, bit 0 non-repudiation, bit 1	Non-critical
Extended Key Usage	Validation Authority (OCSP) Time-Stamp Authority (TSA)	Non-critical
CRL Distribution Points	URI: http://crl.certum.pl/crl_list_name	Non-critical
Subject Alternative Name	URI: http://www.customer-service.somewhere Client service location	Non-critical
Certificate Policies	Policies: 1.2.616.1.113527.2.2.{1,8} CPS: http://www.certum.pl/CPS Notice number: depends on certificate type Organization: Unizeto Technologies S.A. Explicit text: depends on policy identifier (plain text)	Non-critical

7.1.3. Electronic signature algorithm identifier

The field of **signatureAlgorithm** contains a cryptographic algorithm identifier describing the algorithm applied for an electronic signature created by a certification authority on the certificate. In the case of CERTUM, RSA algorithm, in combination with SHA-1, SHA-256 or SHA-512 cryptographic hash is used.

```

sha-1WithRSAEncryption OBJECT IDENTIFIER ::= { iso(1) member-body(2)
                                     us(840) rsadsi(113549) pkcs(1) pkcs-1(1) 5}
sha256withRSAEncryption OBJECT IDENTIFIER ::= { iso(1) member-body(2)
                                     us(840) rsadsi(113549) pkcs(1) pkcs-1(1) 11}
sha512withRSAEncryption OBJECT IDENTIFIER ::= { iso(1) member-body(2)
                                     us(840) rsadsi(113549) pkcs(1) pkcs-1(1) 13 }
    
```

7.1.4. Name forms

Certificates issued by CERTUM contain the name of the issuer and name of the subject, which are developed in accordance with the principles described in the chapter 3.1.1 (see also 7.1.2.12)

7.1.5. Name constraints

The present Certification Practice Statement does not state any conditions in this respect.

7.1.6. Certificate Policy Object Identifiers

Certification Policy contains information of the PolicyInformation type (identifier, electronic address) about a certification policy, applied by the issuing authority – this extension is not critical,

Tab.7.9 Policies identifiers and their description

Policy identifier	Certificate policy description
iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-certum(2) id-certum-level-I(1)) ²⁸	Identifies certification policy of the name of Certum Level I CA
iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-certum(2) id-certum-level-II(2))	Identifies certification policy of the name of Certum Level II CA
iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-certum(2) id-certum-level-III(3))	Identifies certification policy of the name of Certum Level III CA
iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-certum(2) id-certum-level-IV(4))	Identifies certification policy of the name of Certum Level IV CA
iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-certum(2) id-certum-tsa(5))	Identifies timestamping policy of the name of Certum Time-Stamping Authority.
iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-certum(2) id-certum-dvcs(6))	Identifies notary policy of the name of Certum Notary Authority.
iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2)	Identifies electronic signature policy, complying with RFC 3125/RFC 3126 of the name of Certum Electronic

²⁸ CERTUM was assigned the object identifier of {iso(1) member-body(2) pl(616) organization(1) unizeto(113527) ccert(2) certum(2)}.

Policy identifier	Certificate policy description
id-certum(2) id-certum-rfc-3125-signature(7)	Signature Policy.
iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-certum(2) id-certum-dstamp(8)	Identifies service policy of the name of Certum Digital Stamp.
iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-certum(2) id-certum-partners(9)	Identifies certification authority policy of the name of Certum Global Services CA
iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-ctnca(5) id-ctn-certPolicy (1) id-certum-ev (1)-partners(10)	Identifies certification authority policy of the name of Certum Extended Validation CA.
iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-ctnca(5) id-ctn-certPolicy (1) id-certum- class-1(4)	Identifies certification authority policy of the name of Certum Code Signing CA.
iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-ctnca(5) id-ctn-certPolicy (1) id-certum- class-1(5)	Identifies certification authority policy of the name of Certum Class 1 CA

Certificates issued by certification authorities include both qualifiers, recommended by the RFC 5280.

7.1.7. Usage of Policy Constraints Extensions

The present Certification Practice Statement does not state any conditions in this respect.

7.1.8. Policy qualifier syntax and semantics

In most cases, certificates issued by CERTUM contain two qualifiers of certification policy, placed in the PolicyInformation extension. The first qualifier contains a reference to the Certification Practice Statement. The second qualifier – note address qualifier - contains a number of note and its content. Number of note describe the type of certificate issued under a policy of certification, and the content of note contains the commercial name of certificate (see Table 1.4).

7.1.9. Processing Semantics for Critical Certificate Extensions

The present Certification Practice Statement does not state any conditions in this respect.

7.2. CRL profile

Certificate Revocation List (CRL) consists of three fields. The first field (**tbsCertList**) contains information about revoked certificates, the second and the third field - **signatureAlgorithm** and **signatureValue** contain information about respectively: the identifier of the algorithm used for list signing, and electronic signature created on the certificate by a certification authority. The meaning of the last two fields is the same as for the certificates.

The field of **tbsCertList** is the sequence of mandatory and optional fields. Mandatory fields identify CRL issuer, while optional fields contain information about revoked certificates and CRL extensions.

Tab 7.10. The following fields are the contents of mandatory and optional fields of CRL:

Nazwa pola	Wartość lub ograniczenie wartości	
Version (wersja)	Version 3	
Signature Algorithm (algorytm podpisu)	sha1WithRSAEncryption (OID: 1.2.840.113549.1.1.5)	
Issuer (wystawca, nazwa DN)	Common Name (CN) =	Proper root name
	Organization (O) =	Unizeto Sp. z o.o. (within certum) or Unizeto Technologies S.A. (within ctnDomena)
	Organization Unit (OU) =	Certum Certification Authority (only for certificates within ctnDomena)
	Country (C) =	PL
thisUpdate	CRL publication date,	
nextUpdate	the next CRL publication date,	
revokedCertificates:	<p>the list of revoked certificates, the information consist of four sub-fields:</p> <ul style="list-style-type: none"> • userCertificate - serial number of a revoked certificate, • revocationDate - date of the certificate revocation, • crlEntryExtensions - extended access to CRL (contains additional information about revoked certificates – optional), • CRLReason (contains information about a reason for the revocation of a certificate – optional) <p>Information about fields mentioned above are described below:.</p>	
userCertificate	Serial number of a revoked certificate	
revocationDate	Date of the certificate revocation	
CRLReason	Returns the reason the certificate was revoked or suspended. Values of this field are set in accordance with the rules described in Chapter 7.2.2	
Extensions	Extended information about certificate. (See Chapter 7.2.1)	
Signature (podpis)	An identifier of the algorithm used by a certification authority to sign CRL in accordance with requirements described in RFC 5280.	

7.2.1. Version Number

CERTUM supports both X.509 Version1 and Version 2 CRLs. Version 1 CRLs (is used in the root certification authorities Certum CA and the Certum Trusted Network CA, as well as intermediate certification authorities that will no longer issue certificates (Certum Level I, Certum Level II, Certum Level III and Certum Level IV). CRLs for intermediate certification authorities that issue certificates (Certum Level I CA, Certum Level II CA, Certum Level III CA, Certum Level IV CA) are published in version 2.

7.2.2. Supported CRL entry extension

Among numerous extensions, the most important are the following ones: AuthorityKeyIdentifier (see also Chapter 7.1.2.4) allowing identification of a public key corresponding to a private key used for list signing, and cRLNumber, containing monotonically increased serial number of the lists issued by a certification authority (by means of this extension, a subscriber is able to define when a specific CRL replaced another list) .

Function and meaning of extensions are the same as for certificate extensions (see Chapter 7.1.2). CRL entry extensions (**crlEntryExtensions**) supported by CERTUM contain the following fields:

- **ReasonCode**: code of the reason for revocation. This field in **non-critical CRL entry extension**, allowing determination of the revocation reason. The following reasons of certificate revocation are allowed:

unspecified	- not specified;
keyCompromise	- key revelation or compromise;
cACompromise	- certification authority key revelation;
affiliationChanged	- subscriber's data modification (affiliation);
superseded	- certificate renewal;
cessationOfOperation	- cessation of certificate usage;
certificateHold	- suspension of certificate;
removeFromCRL	- certificate removal from CRL;
privilegeWithdrawn	- certificate was revoked due to change of the certificate data, concerning subjects role; this reason might also mean that the data used for creating electronic signature were compromised
aaCompromise	- applies to attributes certificates; meaning is the same as for withdrawal of privileges;
- **HoldInstructionCode**: code of the operation on certificate suspension. This field is **non-critical CRL entry extension** which defines a registered identifier of the instruction determining the operation to be executed upon certificate discovery on Certificate Revocation List with a note (reason for revocation): certificate suspended (**certificateHold**). If the application discovers the code **id-holdinstruction-callissuer**, it should notify the user of necessity to contact CERTUM to verify the reason of the certificate suspension or reject the certificate (assume it is revoked). If the application discovers **id-holdinstruction-reject** code, it should obligatorily reject the respective certificate. The code **id-holdinstruction-none** is semantically equal to omission of **holdInstructionCode** extension; usage of the code in CRL issued by CERTUM is prohibited,
- **InvalidityDate**: date of revocation. This field is **non-critical CRL entry extension** allowing assessment of the confirmed or suspended date of a private key compromise or occurrence of other reason for certificate revocation.

7.3. OCSP response token profile

The protocol of on-line certificate status verification (OCSP) is used by certification authorities and allows certificate status evaluation.

Certificate status verification service is provided by CERTUM on behalf of all affiliated certification authorities (see tab. 1.1). OCSP server, which issues certificate status confirmations, employs a special key pair, developed solely for this purpose.

Certificate status verification server certificate has to contain in its body the extension of **extKeyUsage**, described in RFC 5280. This extension should be set as **critical**, and means that a certification authority issuing the certificate to the OCSP server, confirms with its signature delegation of the authorization to issue certificate status conformation (of this authority subscriber's certificates).

Certificate may also contain information about the means of contact with the server of certificate status verification authority. This information is included in the extension **AuthorityInfoAccessSyntax** (see Chapter 7.1.2.11).

Information about certificate status is provided in the field **certStatus** of the structure **SingleResponse**. It may have one of the three accepted values, defined in Chapter 4.9.9. In the case of server response **good**, the entity requesting the certificate status should additionally check the extension **CertHash** contained within the response (see Chapter 7.3.2.2) to make sure that

the verified certificate was published by this very issuer, and the extension **ArchiveCutoff**, whose value is the begging date of the certificate status verification (the ending date is defined by the moment of certificate status verification, provided in the field **producedAt**). Positive result of those verifications allows so called **positive confirmation** of the certificate status.

In accordance with RFC 2560 (*X.509 Internet Public Key Infrastructure: Online Certificate Status Protocol – OCSP*, June 1999), CERTUM's certificate status verification may be issued in three modes:

- in the Local mode, where certification authority issued the revised certificate and the certificate status verification shall be signed by the same private key of certification authority that was used to sign the verified certificate,
- in the Trusted Responder mode, where requestors trust the public key certificate of the responder;
- In the Authorized Responder mode, where certification authority provides a primary source of certificate status information.

When certification authority provides OCSP service in the Local or Authorized Responder mode, **AuthorityInfoAccess** extension must be placed in the form of:

```
id-pe-authorityInfoAccess OBJECT IDENTIFIER ::= { id-pe 1 }
AuthorityInfoAccessSyntax ::=
    SEQUENCE SIZE (1..MAX) OF AccessDescription
AccessDescription ::= SEQUENCE {
    accessMethod      OBJECT IDENTIFIER,
    accessLocation    GeneralName
}
```

and the CA must include (in the issued certificates) URI address of OCSP service in the **accessLocation** field and *id-ad-ocsp* OID value in the **accessMethod** field.

AuthorityInfoAccess extension is required in public key certificate depending on the mode of certificate status verification.

Tab.7.11 Certification Policies and profiles of the certificates issued by OCSP authorities.

Mode	AuthorityInfoAccess extension
Local	yes
Authorized Responder	yes
Trusted Responder	yes/no

When certification authority provides OCSP service in the Authorized Responder mode, **extendedKeyUsage** extension must be entered with the value: id-kp-OCSPSigning.

Tab.7.12 shows the various requirements imposed on the authorities within the framework of CERTUM.

Nazwa urzędu OCSP	Tryb pracy urzędu OCSP	Źródło wiedzy o unieważnieniach
Certum OCSP Level I CA	Authorized Responder	CRL
Certum OCSP Level II CA	Authorized Responder	CRL
Certum OCSP Level III CA	Authorized Responder	CRL
Certum OCSP Level IV CA	Authorized Responder	CRL
Certum OCSP Level IV	Authorized Responder	CRL
Certum OCSP EVCA	Authorized Responder	CRL

Certum OCSF Code Signing CA	Authorized Responder	CRL
Certum OCSF Class 1 CA	Authorized Responder	CRL

Certum CA and Certum Trusted Network CA does not include the **AuthorityInfoAccess** extension in the public key certificates.

AuthorityInfoAccess extension is included in the public key certificates issued by **Certum Level I CA, Certum Level II CA, Certum Level III CA, Certum Level IV CA, Certum Extended Validation CA, Certum Code Signing CA, Certum Class 1 CA**. This extension is not included in the certificates issued to OCSF authorities.

7.3.1. Version Number

Certificate status verification server operating within CERTUM issues certificate status tokens in accordance with the RFC 2560. The only allowable value of the version number is 0 (it is an equivalent of v1 version).

7.3.2. Certificate status verification token issuer statement

*The current version of CERTUM certificate status verification server does not include extensions **CertHash** and **ArchiveCutOff** in its OCSF response. Notwithstanding, CERTUM declares that the certificate status **good**, received in OCSF response, means the certificate was issued by (any) certification authority and that it has not been revoked prior to its expiration date*

7.3.2.1. Supported standard extension

In accordance with RFC 2560, CERTUM's certificate status verification server supports the following extensions:

- Nonce – binding a request and a response to prevent reply attacks. Nonce value is included in **requestExtension** of the **OCSFRequest** and repeated in the field **responseExtension** of the **OCSFResponse**.
- If the verified certificate is included on CRL, the response should contain identification data of the list. Information about CRL should contain CRL's URL address, its serial number and time of the list issuance. These information is provided in the field **singleExtensions** of the **SingleResponse**.
- If the verified certificate is included on CRL, the response should additionally contain three extensions of the CRL, described in Chapter 7.2.2. This information are included in the field **singleExtensions** of **SingleResponse** structure.
- Types of responses accepted by a subscriber (i.e. his/her/its application) submitting a request to OCSF server. This extension describes the declared type of responses which can be interpreted by the application (**id-pkix-ocsp-basic** among others) and is supplied in the request as the extension **AcceptableResponses**.

Every recipient of token issued by OCSF server has to be able to support the standard type of a response with the **id-pkix-ocsp-basic** identifier.

7.3.2.2. Supported private extensions

If as a response to a request submitted to certificate status verification server, the subscriber receives confirmation containing status **good**, he/she/it is not able to state – having no further information – whether the certificate has or has not ever been issued or whether the moment of the response is within the validity period of the certificate. The latter problem may be resolved with placement of **boundary archive date** (**ArchiveCutOff**).

The former problem, described above, may be resolved by the implementation of the private extension **CertHash** within a response submitted by CERTUM certificate status verification server.

The **CertHash** extension is marked as **non-critical**. Describing data syntax and its identifier has the following form:

```

id-ccert-CertHash          OBJECT IDENTIFIER ::= { id-ccert-ext 4}
CertHash ::= SEQUENCE {
    hashAlgorithm    DigestAlgorithmIdentifier,
    hashedCert       OCTET STRING
}

id-unizeto                 OBJECT IDENTIFIER ::= { iso(1) member-body(2) pl(616)
                           organization(1) id-unizeto(113527)}
id-ccert-ext               OBJECT IDENTIFIER ::= { id-unizeto ccert(2) 0}

DigestAlgorithmIdentifier ::= AlgorithmIdentifier
AlgorithmIdentifier ::= SEQUENCE {
    algorithm         OBJECT IDENTIFIER,
    parameters       ANY DEFINED BY algorithm OPTIONAL
}
    
```

The field **hashAlgorithm** defines the identifier of a strong cryptographic digest. It means the hash function should be one-way, immune to collision (e.g. SHA-1).

The field **hashedCert** contains a digest of a certificate whose current state is located in OCSP response. The size of this field depends of the applied hash function.

Another private extension, supported by CERTUM is **CertumDigitalStamp** extension, marked as **non-critical**. Describing data syntax and its identifier has the following form

```

CertumDigitalStamp ::= SEQUENCE {
    type             CDStampType,
    issuerInfo       GeneralNames,
    stampInfo        UTF8String (SIZE (128)),
    currency         Iso4217AlphaCurrencyCode,
    amount           INTEGER,
    exponent         INTEGER} -- value = amount * 10^exponent
    
```

This extension is employed by electronic fee stamps.

7.4. Other profiles

7.4.1. Timestamp token profile

Certum Time-Stamping Authority (TSA) electronically signs issued timestamp tokens with one or more private keys reserved solely for this purpose. According to RFC 3280 recommendation certificates of their complimentary public keys contain field constraining allowed key usage (**ExtKeyUsageSyntax**), marked as **critical**. This means the certificate may be used by the timestamping authority solely for the purposes of signing timestamp tokens issued by this authority.

Tab. 7.13 shows the various requirements imposed on the Certum Time Stamping Authority:

Policy name	Policy identifier	Compliance	Time source
Certum Time Stamping Authority	iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-certum(2) id-certum-tsa(5)	RFC 3161	External Time Source STRATUM 1 + NTP

iso(1) member-body(2) pl(616) organization(1) id-unizeto(113527) id-ccert(2) id-certum(2) id-certum-tsa(5) 1	ETSI TS 101 861
--	-----------------

Time-stamping authority certificate contains information on possible contacts with the authority. Such information is presented in private extension – **AuthorityInfoAccessSyntax** – which is set as non-critical.

Time-stamping authority certificate basic fields profile is described in table 7.14

Tab 7.14 TSA certificate basic fields profile

Field name	Value or its constraint	
Version	Version 3	
Serial Number	Unique value for each certificate issued by certification authority	
Signature Algorithm	sha1WithRSAEncryption (OID: 1.2.840.113549.1.1.5)	
Issuer (Distinguished Name)	Common Name (CN) =	Certum CA
	Organization (O) =	Unizeto Technologies S.A.
	Country (C) =	PL
Not before (validity period beginning date)	Universal Time Coordinated based. CERTUM owns satellite clock controlled by Atomic Frequency Standard (PPS). CERTUM clock is known as valid world Stratum I service	
Not after (validity period ending date)	Universal Time Coordinated based. CERTUM owns satellite clock controlled by Atomic Frequency Standard (PPS). CERTUM clock is known as valid world Stratum I service	
Subject (Distinguished Name)	Common Name (CN) =	Certum Time-Stamping Authority
	Organization (O) =	Unizeto Technologies S.A.
	Country (C) =	PL
Subject Public Key Info	Encoded in accordance with RFC 5280, contains information about RSA public key (key identifier and value of the public key).	
Signature	Certificate signature, generated and encoded in accordance with the requirements described in RFC 5280.	
Basic Constraints	Subject type = empty (end entity) Path length constraint=none	Non-critical
Key Usage	digital signature, bit 0 non-repudiation, bit 1	Non-critical
Extended Key Usage	Time Stamping Authority (TSA)	Non-critical
Subject Alternative Name	URI: http://time.certum.pl Client service location	Non-critical

Timestamp token, issued by Certum Time-Stamping Authority contains information on timestamp (**TSTInfo** structure), located in **SignedData** structure (see RFC 2630), signed by timestamping authority and embedded in **ContentInfo** structure (see RFC 2630).

TSA authority response (in ASN.1 notation) on timestamp token request has a form:

```

TimeStampResp ::= SEQUENCE {
    status PKIStatusInfo,
    timeStampToken TimeStampToken OPTIONAL

```



```
| }
```

Response status filed (**PKIStatusInfo**) allows submission – to an entity requesting timestamp – of information on occurrence or lack of occurrence of errors in the request. If the error code is equal 0 or 1, it means the response contains timestamp. Any other value means the response does not contain a valid timestamp. The reason of authority not issuing the token is described in **failInfo** field of **PKIStatusInfo** structure.

PKIStatusInfo structure has a following form:

```
PKIStatusInfo ::= SEQUENCE {
    status          PKIStatus,
    statusString    PKIFreeText OPTIONAL,
    failInfo        PKIFailureInfo OPTIONAL
}
```

Meaning of the fields:

- **status** contains information on response status; basing on RFC 3161 following values were specified:

```
PKIStatus ::= INTEGER {
    granted          (0),
    -- you received what you asked for, i.e. TimeStampToken
    grantedWithMode (1),
    -- response is similar to what you asked for (TimeStampToken);
    -- the verifier should check the differences
    rejection       (2),
    -- no response was granted, more information in attached message
    waiting         (3),
    -- the request was not yet proceeded, expect the response later
    revocationWarning (4),
    -- the message contain warning on approaching revocation
    revocationNotification (5),
    -- confirmation of revocation
}
```

- **statusString** may be used for submitting plain test message (in any language) to the requester. Code of the language used for message construction is described by appropriate tag, described in RFC 1766.

```
PKIFreeText ::= SEQUENCE SIZE (1..512) OF UTF8String
    -- message is encoded as UTF-8 string (warning: each UTF-8 string
    -- should contain tag of the language of the text, complying with RFC
    -- 1766/2044
```

- **failInfo** used for more precise description of terror (timestamp token being not issued)

```
PKIFailureInfo ::= BIT STRING (
    badAlg          (0),
    -- unknown or unsupported algorithm identifier
    badMessageCheck (1),
    -- data integrity error (e.g. signature verification error)
    badRequest      (2),
    -- prohibited or unsupported transaction (request)
    badCertId       (4),
    -- appropriate certificate(s) was not attached to the request
    badDataFormat   (5),
    -- data provided in bad format
    wrongAuthority  (6),
    -- authority selected in the request for issuing the certificate
    -- is not the authority, which received the request
    incorrectData   (7),
    -- data provided in the request are not appropriate for issuing the
    -- response
    missingTimeStamp (8),
    -- lack of timestamp required in the request
    timeNotAvailable (14),
    -- TSA time source unavailable
    unacceptedPolicy (15),
    -- requested TSA policy is not supported by TSA
    unacceptedExtension (16),
    -- extension provided in the request is not supported by TSA
    addInfoNotAvailable (17),
    -- request for additional information is not recognized or is not
    -- available
    systemFailure   (25),
    -- request could not be proceeded due to system malfunction
}
```

Timestamp token general format complies with ContentInfo format:

| **TimeStampToken ::= ContentInfo**

Timestamp token cannot contain any other electronic certificates, beside timestamping authority certificate. TSA certificate identifier must be recognized as signed attribute and located in area of the field **signedAttributes** of **SignedData** structure.

Informative part of the timestamp token is included in **TSTInfo** structure, located in **eContent** field of **EncapsulatedContentInfo** structure (see RFC 2630). **eContent** field type, specified by the value of **eContentType** field for **TSTInfo** is defined as follows:

```
| id-ct-TSTInfo OBJECT IDENTIFIER ::= { iso(1) member-body(2) us(840)
| rsadsi(113549) pkcs(1) pkcs-9(9) smime(16) ct(1) 4 }
```

Timestamp informative content has the form:

```
-- OBJECT IDENTIFIER (id-ct-TSTInfo)
TSTInfo ::= SEQUENCE {
  version          INTEGER { v1(1) },
  policy           TSAPolicyId,
  messageImprint  MessageImprint,
  serialNumber    INTEGER,
  genTime         GeneralizedTime,
  accuracy        Accuracy OPTIONAL,
  ordering        BOOLEAN DEFAULT FALSE,
  nonce          INTEGER OPTIONAL,
  tsa             [0] GeneralName OPTIONAL,
  extensions      [1] IMPLICIT Extensions OPTIONAL
}
```

The meaning of most important fields of **TSRInfo** is as follows:

- **policy** – must occur and specify the policy which is used for issuing timestamps by the timestamping authority; in the case of **Certum Time-Stamping Authority** the policy identifier has the value specified in Table 7.13. Depending on policy the timestamps may comply with RFC 3161 or ETSI TS 101 861;
- **messageImprint** contains information submitted by the requester, signed with the timestamp;
- **serialNumber** contains serial number of timestamp token, issued by timestamping authority. Serial number must contain continuously increasing integers;
- **genTime** field includes date and time of timestamp issued by the authority (with the accuracy of 1 second);
- **accuracy** field specifies the accuracy of time used by the timestamping authority (**Certum Time-Stamping Authority** generates time with the accuracy of at least 1 second). If the field is omitted, the default accuracy value is set at 1 second;
- if the field **ordering** is omitted, or its value is set to FALSE, then the field **genTime** discloses only the time of timestamp issuance by the TSA. In this case, ordering of two timestamps issued by this authority or different authorities is possible only, when the difference between **genTime** field value of the first and second token is greater than the cumulative value of the accuracy field of each token; if the field **ordering** is present and its value is set to TRUE, then each token issued by this authority may be ordered solely by the value of the field **genTime**, irrespective of time accuracy. **Certum Time-Stamping Authority always set the value of the field to FALSE;**
- **nonce** field must occur if it was included in the request submitted by the requester and must have the same value;
- **tsa** field identifies the name of the timestamping authority. If it occurs, it must comply with subject distinguished name included in the certificate, issued to the TSA by Certum CA and used in token verification

TimeStampToken structure is connected with the set of signed attributes. Timestamp token include at least the following attributes:

1. Content type attribute

```
Name:      id-contentType
OID:       { iso(1) member-body(2)
            us(840) rsadsi(113549) pkcs(1) pkcs9(9) 3 }
Syntax:    id-ct-TSTInfo
values:    id-ct-TSTInfo value is recalled only once
```

2. Message digest attribute

```
Name:      id-messageDigest
OID:       { iso(1) member-body(2)
            us(840) rsadsi(113549) pkcs(1) pkcs9(9) 4 }
Syntax:    MessageDigest
values:    value of the MessageDigest type is recalled only once

-- hash of the eContent field of EncapsulatedContentInfo structure
MessageDigest ::= Digest
Digest ::= OCTET STRING (SIZE(1..20))
```

3. Signing certificate attribute

```
Name:      id-aa-signingCertificate
OID:       { iso(1)
            member-body(2) us(840) rsadsi(113549) pkcs(1) pkcs9(9)
            smime(16) id-aa(2) 12 }
Syntax:    SigningCertificate
values:    value of the SigningCertificate type is recalled only once

-- Signed attribute of the certificate
SigningCertificate ::= SEQUENCE {
    certs      SEQUENCE OF ESSCertID,
    policies   SEQUENCE OF PolicyInformation OPTIONAL
}

ESSCertID ::= SEQUENCE{
    CertHash   Hash,
    IssuerSerial IssuerSerial OPTIONAL
}

Hash ::= OCTET STRING -- SHA1 hash of the whole certificate

IssuerSerial ::= SEQUENCE {
    Issuer      GeneralNames,
    SerialNumber CertificateSerialNumber
}

GeneralNames ::= SEQUENCE SIZE (1..MAX) OF GeneralName
```

7.4.1.1. Version number

Certum Time-Stamping Authority operating within CERTUM issues timestamp tokens in accordance with the RFC 3161 or ETSI TS 101 861. The only allowable value of the version number is 1 (it is an equivalent of v1 version).

7.4.1.2. Timestamp extensions

Timestamp tokens issued by Certum Time-Stamping Authority do not contain any extensions.

7.4.1.3. Electronic signature algorithm identifier

The following algorithms shall apply to the stamping profile which is consistent with ETSI TS 101 86:

- hash function SHA-1:

```
sha-1 OBJECT IDENTIFIER ::= { iso(1) identified-organization(3)
                                oiw(14) secsig(3) algorithm(2) 26 }
```

- digital signature SHA1 with RSA:

```
sha1WithRSAEncryption OBJECT IDENTIFIER ::= { iso(1)
            member-body(2) US(840) rsadsi(113549) pkcs(1) pkcs-1(1) 5 }
```

On the other hand, the following algorithms shall apply to the stamping profile which is consistent with RFC 3161:

8. Audit

Audits intend to control the consistency of the actions of CERTUM service unit or subjects delegated by the unit, with their declarations and procedures (including Certification Policy and Certification Practice Statement).

CERTUM audit mainly regards a data processing centre and key management procedures. It also concerns all certification authorities belonging to the certification path of primary certification authority **Certum CA**, registration authorities, and other elements of public key infrastructure, e.g. OCSP server.

CERTUM audit may be carried out by internal units of Unizeto Technologies S.A. (internal audit) and organizational units independent from Unizeto Technologies S.A. (external audit). In both cases, an audit is carried out on request of and under supervision of a **security inspector** (see Chapter 5.2.1). In addition During the period in which CERTUM issues EV Certificates, it undergoes an annual WebTrust EV Program²⁹ audit

8.1. Topics Covered by Audit

External and internal audits are carried out in accordance with the rules specified by American Institute of Certified Public Accountants/Canadian Institute of Chartered Accountants (AICPA/CICA) *Web Trust Principles and Criteria for Certification Authorities*, further referred to as Web Trust.

The scope of Web Trust audit includes:

- physical security of CERTUM,
- procedures of subscribers' identity verification,
- certification services and procedures of the services delivery,
- security of software and network access,
- security of CERTUM personnel,
- system journals and system monitoring procedures,
- backup copy creation and their recovery,
- archive procedures,
- records of configuration parameters changes of CERTUM ,
- records of software and devices inspection and service.

8.2. Audit Frequency

An audit (external and internal) checking the consistency with procedural and legal regulations (particularly the consistency with Certification Practice Statement and Certification Policy) is carried out at least once a year.

²⁹ More information about the audits regarding EV certificates issued by Certum Trusted Network CA can be found in Appendix 3 of this Certification Practice Statement

8.3. Identity/Qualifications of Auditor

An external audit is carried out by an authorized and independent from CERTUM domestic institution or the institution with a representation in Poland. Such an institution should:

- hire employees who possess appropriate technical knowledge (with supplied documents proving it) concerning public key infrastructure, information security techniques and devices, and security auditing,
- be a registered, well-known and respected organization or society.

An internal audit is carried out by designated unit, operating within Unizeto Technologies S.A. structure.

8.4. Auditor's Relation to Audited Party

See Chapter 8.3

8.5. Actions Taken as a Result of Deficiency

Records of internal and external audits are submitted to CERTUM **security inspector**. Within 14 days of the record submission, the inspector is committed to prepare an opinion concerning the deficiencies specified in the records. Information about deficiencies removal is submitted to the auditing organization.

*In deficiencies posing an immediate threat to the security of certification procedures of **Certum Level III CA**, **Certum Level IV CA** and **Certum Extended Validation CA** certification authorities, a security inspector might make a decision of a temporary suspension of their activities. All customers of CERTUM shall be notified of the suspension and an expected time of the resumption of the authorities activity. The notice shall be placed in the repository, sent by e-mail and – in well-founded cases – published in the press.*

8.6. Notifying of Audit Results

Audit records (as detailed as possible) and the auditor's general opinion on the consistency of the functioning of CERTUM with the requirements stated in WebTrust and the security administrator's opinion are published in the repository upon every audit.

9. Other business and legal issues

9.1. Fees

CERTUM charges fees for its services. The extent of fees and categories of chargeable services are published in a price list available in the repository at:

<http://www.certum.pl>

CERTUM applies four models of charging for its services:

- **retail sale** – fees are charged separately for every service unit, e.g. every single certificate or a small package of certificates,
- **wholesale** – fees are charged for a package of certificates, a number of certificates sold once,
- **subscription sale** – fees are charged once a month; the extent of this charge depends on a type and number of service units and is particularly used in timestamp services and certificate status verification by means of OCSP protocol,
- **indirect sale** – fees are charged for every service unit from a customer who renders services established on the basis of CERTUM infrastructure, e.g. if a new commercial certification authority receives a certificate from CERTUM, CERTUM charges a fee for every certificate issued by this authority.

Fees can be paid by money transfer or direct payment in Unizeto' branches on the basis of an invoice or an order.

9.1.1. Certificate Issuance or Renewal Fees

CERTUM charges a fee for issuance or renewal³⁰ of a certificate.

Considering the dissimilarity of the procedures of certificate issuance and renewal, the charges paid on the basis of the above mentioned models can be divided into three components:(1) identification and authentication costs or costs of service in a registration authority, (2) the costs of certificate issuance and (3) the costs of personalisation and electronic cryptographic card issuance. These components can be individual items in a price-list and be useful in cases of certificate renewal (identification costs, subscriber's authentication costs, and smart card issuance costs can be omitted).

9.1.2. Certificate Access Fees

Certificate access fees are only applicable to particular cases of relying parties. In charging fees, models of subscription sale and indirect sale are employed. In the latter case, fees are charged depending on the number of applications (e.g. points of sale) owned by a relying party.

Certificate access fees are not fixed by means of agreements with relying parties. The extent of these fees is dependant on the certificates credibility.

CERTUM does not charge a fee for making the certificates of Certum Level I CA credibility level accessible to relying parties.

³⁰

See **Glossary**

9.1.3. Revocation and Status Information Access Fees

CERTUM does not charge a fee for certificate revocation, publishing certificates in CRLs and making CRLs published in the repository (or elsewhere) accessible to relying parties.

CERTUM can charge fees for certificate status verification service, rendered on the basis of OCSP protocol or other accessible devices from third parties. In charging fees, the model of retail sale or subscription is employed.

Without CERTUM written approval, the access to CRLs or the information about certificate status is prohibited for third parties delivering the services of certificate status verification. The access might be provided only upon a prior agreement with CERTUM. In this instance, the indirect sale model is employed (i.e. a fee is charged for every confirmation of the status of the certificate issued by a third party) for charging fees.

9.1.4. Other Fees

CERTUM can charge fees for other services (see 9.1.) The services might concern:

- generating keys to certification authorities or subscribers,
- testing of applications and including them in the recommended applications list,
- sale of license,
- execution of design, implementation and installation tasks,
- sale of Certification Practice Statement, Certification Policy, handbooks, guides, etc, published in print,
- auditing registration authority or subsidiary authorities,
- trainings.

9.1.5. Fees Refund

CERTUM makes efforts to secure the highest level of its services. If a subscriber or a relying party are not satisfied with the services, they may request certificate revocation and fee refund within 30 days of the certificate issuance. Following that period, a subscriber is entitled to claim the certificate revocation and the fees refund only if CERTUM does not fulfil its obligations and duties specified in the present Certification Practice Statement.

Fees refund claims should be submitted to the addresses stated in Chapter 1.5.2

9.2. Financial Liability

The liability of CERTUM service unit and the parties connected by the services rendered by this unit results from routine activities performed by these entities or from third parties' activities. The liability of every entity is stated in mutual agreements or arises from statements of will.

CERTUM is responsible for the events defined in Chapter 9.9 of this Certification Practice Statement.

CERTUM is financially responsible to the subscribers of CERTUM's certification services and **the relying parties being the beneficiaries of the warranty**. These entities are hereinafter referred to as **the entities being the beneficiaries of the warranty**.

CERTUM does not take any responsibility for the actions of other third parties not specified in Chapter 9.2 of this Certification Practice Statement.

CERTUM's financial responsibility applies to the entities being the beneficiaries of the warranty only if damages are the fault of CERTUM or of the parties that Unizeto Technologies S.A. made an agreement with in such a way that the fault is transferred to CERTUM.

The entity being the beneficiaries of the warranty must submit all claims to CERTUM within 30 days of the occurrence of the event that gave rise to the warranty claim.

CERTUM's financial responsibility applies to the entities being the beneficiaries of the warranty only if damages have occurred within the validity period of the certificate of the certificate.

If CERTUM confirms and agrees that damages have occurred, Unizeto Technologies SA undertakes with the entities being the beneficiaries of the warranty to pay the damages. The maximum amount an entities being the beneficiaries of the warranty is entitled to recover under the one warranty claim per specific type of certificate issued on the basis of given certification policy doesn't exceed the maximum payment limit for one covered incident defined in the Table 9.1. The maximum payment limit doesn't exceed the amount of damage.

The entities being the beneficiaries of the warranty, in relation to the one certificate within its validity period, are collectively eligible to receive a maximum amount of the financial liability up to aggregate maximum payment limit defined in the Table 9.1

In the event the damages sustained by the use or reliance on a CERTUM certificate exceed the financial liability for such certificate , payment of damages shall be apportioned first to the earliest warranty claims asserted by the entities being the beneficiaries of the warranty.

9.2.1. Scope of insurance

CERTUM maintains actual errors and omissions insurance coverage. Also, it is recommended to subscribers, and the relying parties to (especially legal persons) have a risk insurance policy, if they want to have a higher level of security than that guaranteed by CERTUM.

Additional information regarding insurance in respect of EV certificates are available in Appendix 3 of this Certification Practice Statement.

Certification authorities and other entities affiliated by CERTUM are obligated to maintain a commercially reasonable level of insurance coverage for errors and omissions.

9.2.2. Other assets

CERTUM and each authority or other entity affiliated by CERTUM have sufficient financial resources to maintain their operations and perform their duties, and their obligations and guarantees provided to subscribers and relying parties.

9.2.3. Extended Warranty Coverage

The present Certification Practice Statement does not state any conditions in this respect.

9.3. Confidentiality of business information

Unizeto Technologies S.A. ensures that the whole information it possesses is gathered, stored and processed in accordance with the law in force, particularly with *Personal Data Protection Law of 29th of August, 1997* including its later changes and execution acts.

Unizeto Technologies S.A. ensures that third parties are given the access only to the information that are publicly accessible in a certificate. The other data provided in applications submitted to CERTUM shall never be voluntarily or deliberately revealed to a third party in any circumstances (besides court and national authorities request, based on force in law).

CERTUM does not copy or store subscribers private keys, used for signature creation, nor any data which could be used for keys reconstruction.

9.3.1. Scope of Confidential Information

Unizeto Technologies S.A., its employees and entities that perform actual certification activities are committed to keep secret understood as a company secret, during and after the employment. Information regarded as company secret³¹ are managed and governed by internal company regulations and in particularly concerns:

- information supplied by subscribers, besides the information that needs to be revealed for appropriate certification services; in other cases the revelation of received information requires a prior written approval of the information beholder or a legally valid court writ,
- information supplied by/to subscribers (e.g. the contents of agreements with subscribers and relying parties, accounts, applications for registration, issuance, renewal, revocation of certificates (except for information included in certificates or the repository, in accordance with the present Certification Practice Statement); a part of the information mentioned above can be made accessible solely upon approval of and in the scope specified by its owner (i.e. subscriber),
- record of system transactions (the whole of the transactions, as well as **data for control inspection** of transaction, the so called system transactions logs),
- record of information about events (logs) connected with certification services, stored by CERTUM and registration authorities,
- records of an internal and external control, if it might cause a threat to CERTUM security (in accordance with Chapter 9.3.2 the majority of this information should be accessible for the public),
- emergency plans,
- information about steps taken in order to protect hardware devices and software, information about administering of certification services and planned registration rules.

Unizeto Technologies S.A. is not obligated to keep secret in relation to a party of the agreement about the delivery of certification services. Persons responsible for keeping secret and obeying the rules concerning information practice bear criminal liability in accordance with the law regulations.

9.3.2. Information Not Within the Scope of Confidential Information

The whole information indispensable for the process of appropriate functioning of certification services is not considered confidential and private. It particularly concerns the information included in a certificate by certificate issuing authorities, in accordance with the description in Chapter 7.17. It is assumed that a subscriber applying for certificate issuance is aware of what information is included in the certificate and approves of the publication of that information.

A part of information supplied by/to subscribers might be made available to other entities, solely upon the subscriber's approval and within the scope specified in the subscriber's written statement.

³¹ A company secret means publicly inaccessible technical, technological, trade, organizational information that an entrepreneur, taking all indispensable action, keeps confident.

The following information, submitted to certification authorities and registration authorities, is accessible for the public in the repository:

- Certification Policy and Certification Practice Statement,
- templates of agreements of CERTUM with subscribers,
- the price list of services,
- guides for users,
- registration authorities and certification authorities certificates,
- certificates belonging to subscribers (upon their prior approval),
- Certificates Revocation List,
- extracts from post-control reports (as detailed as possible) prepared by an authorized institution.

The extracts from post-control reports, published by CERTUM, concern:

- the scope of audits,
- a general assessment by an auditing institution,
- the extent of the implementation of the recommendations.

If certificate revocation is performed upon request of an authorized party (not the party whose certificate is being revoked), information about revocation and the reasons of it are disclosed to both parties.

9.3.3. Responsibility to Protect Private Information

CERTUM receiving private information shall secure it from compromise and disclosure to third parties.

9.4. Privacy of Personal Information

9.4.1. Privacy Policy

Personal data submitted to CERTUM are stored and processed in accordance with the law in force, particularly with *Personal Data Protection Law of 29th of August, 1997* including its later changes and execution acts. CERTUM collects information as proportional to its intended use. Consent of subscriber or representative for the processing of personal data is contained in the Subscriber/Applicant Agreement, and is mandatory.

Personal data are used only in connection with the provision of certification services.

Personal data are protected in accordance with privacy policies contained in the security policy Unizeto Technologies SA

9.4.2. Information Treated as Private

Any information about Subscribers that is not publicly available through the content of the issued certificate, repository and online CRLs is treated as private

9.4.3. Information Not Deemed Private

All information made public in a certificate is deemed not private, unless specifically provided otherwise in the *Data Protection Law of 29th of August, 1997* including its later changes and execution acts.

9.4.4. Responsibility to Protect Private Information

CERTUM and registration authorities receiving private information shall secure it from compromise and disclosure to third parties. Regardless of the above, granting access to private information must be consistent with the requirements of the *Data Protection Law of 29th of August, 1997* including its later changes and execution acts.

9.4.5. Notice and Consent to Use Private Information

Unless where otherwise stated in this Certificate Practice Statement, the applicable privacy policy or by agreement, private information will not be used without the consent of the party to whom that information applies.

Reservations and permits shall not violate the provisions of the *Data Protection Law* act.

9.4.6. Other information disclosure circumstances

The present Certification Practice Statement does not state any conditions in this respect.

9.5. Intellectual Property Rights

All trademarks, patents, brand marks, licenses, graphic marks, etc., used by Unizeto Technologies S.A. are intellectual property of their legal owners. CERTUM commits itself to place appropriate remarks (required by the owners) in accordance with the requirements of the *Act of 4 February 1994 On Copyright and Related Rights*.

Detailed rules for the protection of intellectual property rights of subscribers and the relying parties are described below:

CERTUM has exclusive rights to any product or information being designed and implemented on the basis of or in compliance with the present Certification Practice Statement. Trademarks, brand names, symbols and emblems company which belong to CERTUM may not be used in any manner without the prior written permission of CERTUM.

9.5.1. Property Rights in Certificates and Revocation Information

Certification authorities forming CERTUM Certification Authority retain all intellectual property rights in and to the certificates and revocation information that they issue. CERTUM shall grant permission to reproduce and distribute certificates without any reservations and charges. Using the information might be payable and limited if so required by provisions of agreements or this Certification Practice Statement.

9.5.2. Property Rights in the Certificate Practice Statement

CERTUM retains all intellectual property rights in and to this Certificate Practice Statement.

9.5.3. Property Rights in the Names and Trademarks

Unizeto Technologies S.A. owns registered trade mark, consisting of graphic mark and inscription, which constitute the following logo:



Fig. 9.1 CERTUM Logo

The mark and inscription constitute CERTUM logo. The logo is a registered trade mark of Unizeto Technologies S.A. and cannot be used by any other parties without prior written approval of Unizeto Technologies S.A.

CERTUM mark is an additional element of logo of every registration authority, operating on behalf of CERTUM. The approval of the use of CERTUM logo is automatically issued when a new registration authority is registered by certification authority.

All subscribers retain all rights it has (if any) in any trademark, service mark, or trade name contained in any certificate application and distinguished name (DN) within any Certificate issued to such subscriber.

9.5.4. Property Rights in Keys

Every key pair associated with a public key certificate issued by CERTUM is the property of the subject of the certificate, described in the field subject of the certificate (see Chapter 7.1) regardless of the physical medium within which the keys are stored and protected.

Certum CA and Certum Trusted Network CA certificates are the property of CERUM. CERUM licenses software and hardware manufacturers to reproduce such root certificates to place copies in trustworthy hardware devices or software.

Finally, Secret Shares (so called shadows) of private keys of Certum CA, Certum Trusted Network CA, intermediate certification authorities and other entities operating within **certum** and **ctnDomena** domains are the property of the CERTUM, and the CERTUM retains all intellectual property right in and to such Secret Shares.

9.6. General Provisions

This Chapter describes obligations/guarantees and liability of CERTUM, registration authorities, subscribers and relying parties. The obligations and liability are governed by mutual agreements made by the parties mentioned above (see Fig. 9.2).

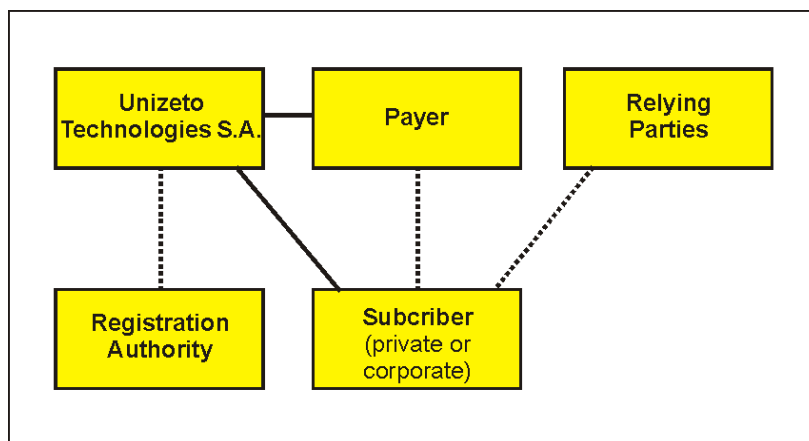


Fig. 2 Agreements between parties

CERTUM agreements with relying parties and subscribers describe types of services provided by CERTUM, mutual obligations and liabilities (including financial ones) of Unizeto Technologies S.A.

Agreements between CERTUM and registration authorities are made when this authority plays a role of an agent of any certification authority operating within CERTUM domain. On the grounds of such an agreement, a registration authority can make agreements with subscribers on behalf of CERTUM. In well-founded cases, registration authorities can make separate agreements with subscribers for the services delivered by registration authorities and describing their mutual relations.

CERTUM can register and issue a certificate to any external entity that plays a role of a subordinate certification authority, provided that the registration and issuance are based on the agreement made between the two parties.

9.6.1. Certification Authority Obligations

CERTUM ensures that:

- its commercial activity is based on reliable devices and software creating a system that fulfils requirements stated in CWA 14167-1 Security Requirements for Trustworthy Systems Managing Certificates for Electronic Signatures - Part 1: System Security Requirements and FIPS PUB 140 norm *Security Requirements for Cryptographic Modules*,
- its activity and services are in accordance with the law; in particular they do not violate copyrights and licensed third parties rights,
- its services are in accordance with broadly accepted norms:
 - certification services - with X.509, PKCS#10, PKCS#7, PKCS#12,
 - timestamp services – with the recommendation RFC 3161,
 - certificate status verification (OSCP) – with the recommendation RFC 2560,
- it complies with and exacts the procedures described in the present Certification Practice Statement, particularly concerning:
 - verification of the subscriber's identity, whom a certificate within CERTUM domain is issued to; procedures verifying subscriber's identity depend on the information included in a certificate and vary according to certificate fees, nature and identity of the subscriber of the certificate and

- applicability range in which the certificate is credible (see Chapters 3.3 and 4.4),
- certificates which are revoked in the case of existing supposition or certainty that the certificate contents are not up-to-date or that a private key connected with the certificate was compromised (revealed, lost, etc.),
 - informing a subscriber and other entities interested in issuing, revoking or suspending the certificate,
 - publication of the lists of revoked or suspended certificates,
 - generating and using private keys only for the purposes defined in the present CPS and securing keys in a way not permitting the application of the keys not in accordance with their purposes,
 - personalization and issuance of electronic cryptographic cards where certificates and a key pairs are stored (in the cases when the card was generated by a certification authority),
 - periodical and punctual publication of the information indispensable for correct reception, management and revocation of certificates,
- issued certificates do not contain any falsified data, neither known nor coming from the people confirming the applications for certificate issuance or issuing certificates,
 - issued certificates do not contain any mistakes resulting from negligence or procedure violence by the people confirming applications for certificate issuance or issuing certificates,
 - subscribers' Distinguished Names (DN) listed in certificates are unique within CERTUM domain,
 - it secures personal data protection in accordance with *Personal Data Protection Law of 29th August, 1997* including its later changes and accomplishing regulations,
 - if a key pair is generated with the subscriber's authorization, the key pair is confidentially delivered to the subscriber.

Additionally, CERTUM commits itself to:

- register and issue certificates only to certification authorities whose certification practices guarantee security level no lower than guaranteed by CERTUM and whose CP and CPS are approved by CERTUM,
- make agreements with subscribers, certification authorities and registration authorities; certification services are delivered only on the basis of the agreements and always on request of a subscriber, a certification authority or a registration authority,
- manage a list of registered registration authorities with which CERTUM has cooperation agreements and agreements about recommending the devices and software used by these authorities,
- manage a list of recommended software and devices used for generating asymmetric key pairs,
- carry out scheduled audits in certification authorities and registration authorities belonging to or connected with CERTUM domain,
- charge independent auditors with intended audits of CERTUM domain, make all necessary documents and information accessible to auditors, comply with auditors' post-audit recommendations.

9.6.2. Registration Authority Obligations

Every registration authority operating within CERTUM domain or bound by an agreement with CERTUM ensures that:

- its commercial activity is based on reliable devices and software, recommended by CERTUM,
- its activity and services are in accordance with the law and do not violate copyrights and licensed third parties rights,
- it makes reasonable efforts to secure that subscribers' identification data set in CERTUM database are correct, and this information is updated in the moment of the data confirmation,
- confirmed subscriber's information, later sent to a certification authority for including it to a certificate, is precise,
- it does not contribute intentionally to mistakes or inaccuracy in information contained in a certificate,
- its services are in accordance with broadly accepted norms (de jure and de facto): X.509, PKCS#10, PKCS#7, PKCS#12,
- its services are delivered on the basis of procedures which are adjusted to the recommendations of the present Certification Practice Statement; this concerns in particular:
 - procedures of subscribers' identity verification,
 - procedure of performance of the check to **prove a private key possession**³², associated with a public key requested for certification,
 - procedures of reception, processing and confirmation or rejection of customers' requests for the issuance, renewal, revocation, suspension or unsuspension of the certificate,
 - procedures of requesting a certification authority, on the basis of already accepted subscriber's application, for the issuance, renewal, revocation, suspension or unsuspension of a certificate; these procedures also state the circumstances in which a certification authority can apply for the above services itself,
 - procedures of the registration of other registration authorities that already made agreements with CERTUM (these procedures does not apply to Primary Registration Authority),
 - procedures of archive of applications and information received from subscribers, issued decisions and information submitted to certification authorities,
 - procedures of generating keys for subscribers, provided that the agreement with a certification authority and a subscriber permits that,
 - procedures of personalization and issuance of electronic cryptographic cards which stores certificates and key pairs (if a registration authority generated the key pair),
- it submits to scheduled external and internal audits, particularly to those carried out by CERTUM service unit or to the ones commissioned by this unit.

³²

See **Glossary**

Beside above, registration authority commits itself to:

- submit to CERTUM recommendations, particularly to those resulting from audits,
- to secure personal data protection in accordance with *Personal Data Protection Law of 29th August, 1997* including its later changes and accomplishing regulations,
- protect operators' private keys in accordance with the security requirements specified in Certification Practice Statement,
- not to use operators' private keys for purposes different from those stated in the present Certification Practice Statement, unless it is approved by CERTUM,
- obtain from reliable sources and thoroughly verify public key **active certificates**³³ and CRL's of CERTUM certification authorities.

9.6.3. Subscriber Obligations

By applying for registration to a registration authority and signing confirmation of registration (see Chapter 4.3 and 4.44.3), a subscriber agrees to enter the certification system on the conditions stated in this CPS.

Depending on relations between CERTUM and a subscriber and on credibility level of the certificate that a subscriber applies for, the obligations can be formulated as an official agreement or an informal agreement between a subscriber and CERTUM.

Irrespective of the character of an agreement an end subscriber is committed to:

- approve the terms stated in an official or informal agreement between a subscriber and CERTUM; this approval should consist of a hand-written signature (official agreement) or an electronic statement of will (informal agreement) at the moment of approval of data to be included in requested certificate; the contents of the subscriber's statement of will are published in the repository,
- approve (see Chapter 4.44.4) certificate issued to him/her/it; warranties and CERTUM liability connected with a particular certificate are valid from the date of the approval of a certificate,
- take precautions allowing to generate appropriately (by itself, by a registration authority or a certification authority) and safely store a private key of a key pair (prevent it from loss, compromise, modification and unauthorized usage),
- state true data in applications submitted to a registration authority or a certification authority and then stored in CERTUM service unit database and in public key certificates issued by this unit; a subscriber must be aware of the liability for the direct or indirect damages that are a consequence of falsifying of data,
- check or guarantee that every electronic signature made by means of a private key belonging to the end subscriber and associated with an approved public key certificate is the subscriber's signature, and acknowledge that this certificate was neither invalid (beyond the expiry date) nor revoked nor suspended when the signature was made,
- get to know in general the notions concerning certificates, electronic signatures and public key infrastructure (PKI).

End subscriber is also committed to:

- comply with the rules of the present Certification Practice Statement and Certification Policy,

³³

See **Glossary**.

- submit or present copies of required documents confirming the information included in a submitted application and the identity of the requester or the entity acting on behalf of the subscriber,
- in the case of security violation (or security violation suspicion) of their private keys, notify the issuer of the certificate or any registration authority affiliated by CERTUM,
- apply public key certificates and the corresponding private keys only for the purpose stated in the certificate and in accordance with the aims and restrictions stated in Certification Practice Statement (see Chapter 1.4 1.4),
- generate cryptographic keys, manage passwords, public and private keys, exchange information with registration and certification authorities only by means of the software recommended by CERTUM; the access to this software, media, and devices on which the keys or passwords are stored should be appropriately controlled,
- regard the loss or revelation of the password (revealing it to an unauthorized person) as the loss or revelation of the private key (revealing it to an unauthorized person),
- not to make his/her/its private keys accessible to other persons,
- not to use as a subscriber a private key, associated with the certificate issued by CERTUM, for signing any CRLs or certificates,
- submit the proof of a private key possession to a registration authority or certification authority, or prove the possession of the key in another way,
- obtain public key certificates of certification authorities and registration authorities and other CERTUM service units.

9.6.4. Relying Party Obligations

The object of an agreement between relying party and:

- Unizeto Technologies S.A. may be the delivery of repository services, timestamp services and certificate status verification services (OCSP) by this authority ,
- subscriber is specification of the conditions that an electronic signature must fulfil to be considered valid by a relying party or the certification services regulations.

Depending on relations between a relying party and CERTUM or a subscriber and on the levels of the certificates approved by a relying party, relying party obligations might be formulated as an official or informal agreement between CERTUM and a subscriber.

Disregarding of the character of an agreement, a relying party is committed to:

- approve the terms stated in this CPS, CP, Timestamping Authority Policy etc. Relying party approves above terms at the time of the first usage of any service delivered by CERTUM or the first approval of the subscriber's signature. Warranties and liabilities of subscriber's or CERTUM are valid from the date of the acceptance of the certificate issued to the subscriber,
- thoroughly verify³⁴ every electronic signature made on a certificate or document submitted to him/her/it. In order to verify the signature a relying party should:

³⁴ Electronic signature verification aims at stating whether: (1) an electronic signature was created by means of a private key corresponding to a public key set in a subscriber's certificate issued by CERTUM, and (2) a signed message (document) was not modified after signing it.

- specify a **certification path**³⁵ containing all certificates belonging to other certification authorities that make it possible to verify the signature on the certificate of a signature issuer,
 - check whether neither of certificates creating a certification path are placed on the list of revoked or suspended certificates; revocation or suspension of any certificate from certification path influences the earlier expiry of the validity date up to which the verified signature could have been created,
 - check if all certificates belonging to a certification path belong to certification authorities and if they are authorized to sign other certificates,
 - (optionally) specify the date and time of signing a document or a message. It is possible only when the document or message were signed (prior to signing them) with a timestamp issued by a timestamp authority, or a timestamp was associated with an electronic signature just after the creation of the electronic signature on the document; such a verification allows for delivering of non-repudiation services or resolve possible disputes,
 - using a defined certification path, verify credibility of the certificate of a signature issuer on a message or a document, and the signature validity on the document or the message,
- carry out cryptographic operations accurately and correctly, using the software and devices whose security level complies with the sensitivity level of a certificate being processed and the credibility level of applied certificates,
 - consider an electronic signature to be invalid if by means of applied software and devices it is not possible to state if the electronic signature is valid or if the verification result is negative,
 - trust only these public certificate keys that:
 - are used in accordance with the declared purpose and are appropriate for applicability ranges that were specified by a relying party, e.g. in a signature policy (see Chapter 1.41.4),
 - whose status was verified on the basis of the valid Certificate Revocation Lists or OCSP service, available at CERTUM,
 - specify the conditions that a public certificate key and a electronic signature must fulfil in order to be deemed valid by this party; the conditions can be formulated e.g. as an appropriate certification policy, and published.

Every document with a defective or questionable electronic signature should be rejected or possibly subjected to other procedures that allow for stating its validity. Any person approving of such a document bears responsibility for any consequences following it, disregarding of broadly accepted features of an electronic signature, which describe it as an effective means of verification of the identity of a subscriber who makes a signature.

9.6.5. Obligations of Other Parties

The present Certification Practice Statement does not state any conditions in this respect.

³⁵

See **Glossary**

9.7. Disclaimers of Warranties

Warranties of CERTUM are based on the general rules stated in the present Certification Practice Statement and it is in accordance with the superior legal acts in force in the Republic of Poland. Disclaimer of warranties should be specified in an agreements with subscribers and CERTUM

9.8. Limitations of Liability

If damages are the fault of CERTUM or of the parties that Unizeto Technologies S.A. made agreement with in such a way that the fault is transferred to CERTUM, collective financial warranties of CERTUM in relation to all parties (including relying parties) cannot exceed (in a single case) the total amount of sums for credibility level specified in Table 9.1.

Table 9.1 Financial liability

Certificate type	Collective CERTUM's liability limit in relation to a particular policy	CERTUM's liability limit per covered damage
All certificates issued by: Certum Level I CA or Certum Class 1 CA	0 PLN	0 PLN
Personal certificate with email address validation	30 000 PLN	3 000 PLN
Personal certificates with DN data validation ³⁶	300 000 PLN (optional 750 000 PLN)	30 000 PLN (optional 75 000 PLN)
SSL certificates with domain validation only (DV)	30 000 PLN	3 000 PLN
SSL certificates with organization validation (OV)	750 000 PLN	75 000 PLN
Extended Validation SSL certificates (EV)	750 000 PLN	75 000 PLN
Code signing certificates	300 000 PLN	30 000 PLN
IPSec Client certificates	30 000 PLN	3 000 PLN
VPN certificates	750 000 PLN	75 000 PLN
Certificates issued by Certum Global Services CA	Specified in agreement	Specified in agreement

Total collective CERTUM liability in relation to a particular entity or all entities (private and legal) or the devices owned by the entity / entities, resulting from the usage of a certificate of a particular type for creating of an electronic signature or for other cryptographic operations, is limited to amounts not exceeding the amounts stated in Table 9.1.

9.9. Liability

9.9.1. Subscriber Liability

Subscriber liability results from the obligations and warranties stated in Chapter 9.6.3. The liability conditions are governed by an agreement with CERTUM and with a registration authority.

³⁶ Maximum liability value for dedicated agreement

9.9.2. Relying Party Liability

Relying party liability results from the obligations and warranties stated in Chapter 9.6.4. The liability conditions may be governed by an agreement with CERTUM and a subscriber.

Agreements with subscribers and CERTUM require that relying parties have a sufficient amount of information to make a decision about the approval or rejection of an electronic signature while verifying it.

The parties should state the financial value of transaction that will be approved by them solely on the basis of the information set in a certificate, and familiarize with information specified in Chapter 9.6.4 of this document.

9.10. Term and termination of Certification Practice Statement

9.10.1. Term

This CPS becomes effective up to the moment of marked with the status valid and publication in the CERTUM repository. Appendices to this CPS become effective upon publication in the CERTUM repository.

9.10.2. Termination

Certification Practice Statement is in force (has a current status) up to the moment of marked with the status **valid** and publication and approval of its new version.

9.10.3. Effect of Termination and Survival

Upon termination of this CPS, subscribers and relying parties are nevertheless bound by its terms for all certificates issued for the remainder of the validity periods of such certificates.

9.11. Individual Notices and Communications with Participants

The parties mentioned in the present Certification Practice Statement can state, by means of agreements, the methods of notifying one another. If they did not, the present document allows for information exchange by means of regular mail, electronic mail, fax, telephone, and network protocols (e.g. TCP/IP, HTTP), etc.

The choice of the means can be extorted by the type of information. For instance, most services delivered by CERTUM require the application of one or more permitted network protocols.

Some information and announcements must be supplied to parties in accordance with an established schedule or deviation from this schedule. This particularly concerns publishing of CRLs, new certificates belonging to registration authorities and certification authorities, in the way rendering them available by all interested parties (including relying party) at any time. Information on each security breach of private key owned by any certification authority must be published, rendering them available by all interested parties.

9.12. Amendments to the Certification Practice Statement

Modification to Certification Practice Statement may be a result of observed errors, CPS update and suggestions from the affected parties.

9.12.1. Changes introduction procedure

Modification proposals may be submitted by regular mail or electronic mail for the contract addresses of CERTUM. Suggestions propositions should describe modifications, their scope and justifications and means of contact the person requesting modification.

Suggestions concerning the current Certification Practice Statement may be submitted by the following authorized entities:

- requester / payer,
- auditing entities,
- legal entities, especially when Certification Practice Statement was observed to not to obey laws and regulations in force in the Republic of Poland and may affect subscribers' interests,
- security inspector, system administrator and other CERTUM personnel,
- CERTUM subscribers,
- professionals from the area of information system security.

After introduction of every modification, Certification Practice Statement or Certification Policy date of issuance is updated as well as their identifier, version or build.

Introduced modification may be generally divided into two categories:

- the one that does not require notification of subscribers, and
- the one that requires (usually in advance) notification of subscribers.

Decision on acceptance of the changes in Certificate Practice Statement version or build number is made by Chief of CERTUM.

9.12.2. Notification Mechanism and Period

After notification in advance, each and every item of the Certification Practice Statement may be subjected to amendment. Information about every significant modification in question by CERTUM is submitted to every affected party in the form of indication of a storage point of a new version of Certification Practice Statement with the status requested for comment. Suggested modification may be published in the CERTUM repository and transmitted by the means of electronic mail. Information about implemented modifications is also attached to the new CPS.

The only items not requiring, according to Certification Practice Statement, notification in advance apply to amendments resulting from implementation of editorial modifications, amendments to the contact information of the person responsible for CPS management and changes not having a real impact on considerable group of individuals. Implemented changes do not require approval procedure execution, thus only build number of the document is changed.

Comments on modifications suggested by CERTUM may be submitted by the affected parties within 10 working days of their announcement. If as a result of the submitted comments, CERTUM administered **significant modification** to the suggested changes, the changes have to be published once more and subjected to assessment. In other cases, a new version of Certification Practice Statement receives the status **under approval** and is subjected to approval procedure (see Chapter 1.5.4).

CERTUM may fully accept suggested changes accept with amendments or reject suggested changes after expiration of the allowable period for resubmission of published and posted acceptance questionnaire.

9.12.3. Changes requiring new identifier

In the case of amendments which may have influence on extensive group of certification service users, Chief of CERTUM may assign a new identifier (Object Identifier) for a modified document of Certification Practice Statement. Identifiers of the certification polices applied by authorities issuing certificates may also be subjected to modification. Such is the case upon implementation of changes to:

- extension of a certificate user group for areas associated with e.g. electronic payment system, information interchange within banking environment and between banks, etc.,
- introduction of new types of certificates,
- allowance within the system of the cross-certification between authorities issuing certificates,
- significant modification to content and interpretation of certificate and CRL fields, e.g. modification of fields meaning from non-critical to critical and vice-versa,
- implementation of the service of suspension and unsuspension of a certificate , within the CERTUM.

9.13. Disputes Resolution

The subject of disputes resolution can only be discrepancies or conflicts between the parties bound with one another by mutual official or informal agreements referring to the present Certification Practice Statement.

Disputes or complaints following the usage of certificate, timestamping or certificate status services delivered by CERTUM will be resolved by mediation on the basis of written information. Complaint handling is reserved for Chairman of Unizeto Technologies S.A. Board. Complaints are proceeded within 10 days of their delivery.

If the complaint is not settled within 30 days of the commencement of conciliatory process, the parties can hand over the dispute to appropriate court. The court, appropriate for case handling, will be the Public Court of the defendant.

In the instance of the occurrence of arguments or complaints following the usage of an issued certificate or services delivered by CERTUM, complainers commit themselves to notify CERTUM (by means of a registered letter) of the reason for the argument or complaint.

CERTUM resolves only the disputes with its customers (subscribers, registration authorities, certification authorities, relying parties, etc.) resulting from agreements already made.

9.14. The Law

9.14.1. Resolution Survival

The resolutions of the present Certification Practice Statement are valid of the date of the approval by Chief of CERTUM up to the invalidation or substitution of the resolutions. Modifications of the resolutions or introduction of new resolutions are carried out in accordance with the procedures presented in Chapter 9.12. If new resolutions do not significantly violate former resolutions, the agreements in force should be regarded as valid, unless the agreement parties or the court to which one of the parties appeals state differently.

If the agreement made on the grounds of the present Certification Practice Statement contains contents confidentiality clause or a clause concerning the confidentiality of the information that the parties possessed when the agreement was in force, copyrights clause or intellectual rights clause, these clauses are assumed in force also after the validity period expires, for a period that should be an integral part of this agreement or Certification Practice Statement.

Agreements resolutions or Certification Practice Statement resolutions cannot be transferred to third parties.

9.14.2. Resolution Merger

The present Certification Practice Statement and agreements being made can contain references to other resolutions, provided that:

- this fact was stated as a clause in this document or in the agreement,
- the resolutions to which this document or the agreement refer are stated in writing.

9.15. Compliance with Applicable Law

CERTUM obeys the law in force in the Republic of Poland

9.16. Miscellaneous Provisions

The present Certification Practice Statement does not state any conditions in this respect.

9.16.1. Entire Agreement

The present Certification Practice Statement does not state any conditions in this respect.

9.16.2. Assignment

The present Certification Practice Statement does not state any conditions in this respect.

9.16.3. Resolution Severability

If particular parts of the present document or the agreements made on the grounds of it are regarded as violating the law in force or against the law, a court can order to respect the remaining (i.e. in accordance with the law) part of Certification Practice Statement or agreements already made, unless questioned parts are not significant from the point of view of exchange (e.g. commercial transaction) that the parties agreed on.

Resolution severability is particularly crucial in the agreements mentioned in Chapter 9.6. If a severability clause is not included in an agreement, the whole agreement can be against the law even if this is not the parties' intention.

9.16.4. Enforcement

Any delay or lack in the exercise of any of the rights arising from this CPS shall not be construed as a permanent waiver of this rights.

9.16.5. Force Majeure

CERTUM is excused party from not performing its contractual obligations due to unforeseen events beyond its reasonable control and occurring without its fault or negligence. This type of claim should be specified in an agreement between a subscriber and a relying party.

9.17. Other Provisions

The present Certification Practice Statement does not state any conditions in this respect.

Appendix 1: Abbreviations

CA Certification Authority

CMP Certificate Management Protocol

CRL Certificate Revocation List, published usually by the very certificate issuer

DN Distinguished Name

PRA Primary Registration Authority

CPS Certification Practice Statement

KRIO Krajowy Rejestr Identyfikatorów Obiektów (National Object Identifiers Registry)

OCSP On-line Certificate Status Protocol

CP Certification Policy

PKI Public Key Infrastructure

RA Registration Authority

PSE personal security environment

QGIS Qualified Government Information Source

QGTIS Qualified Government Tax Information Source

QIIS Qualified Independent Information Source

RSA asymmetric cryptographic algorithm (name originates from first letters of its developers names: Rivesta, Shamira i Adlemana), in which single private transformation allows signing or decrypting a message, while single public transformation allows verification and encryption of the message

TSA Time Stamping Authority

TTP trusted third party; institution or its representative bearing other entities trust in the area of protection and authentication controls; bears the trust of both the entity being verified and/or verifying (after PN 2000)

Appendix 2: Glossary

Access – ability to use and employ any information system resource.

Access control – the process of granting access to information system resources only to authorized users, applications, processes and other systems.

Audit – execution of an independent system review and assessment with the aim to test adequacy of implemented system management controls, to verify whether an operation of the system is performed in accordance with accepted Certification Policy and CPS and the resulting operational regulations, to discover possible security gaps, and to recommend suitable modification to control measures, the certification policy and procedures.

Audit data – chronological records of the system activities, allowing reconstruction and analysis of the event sequence and modification to the system, associated with the recorded event.

Authenticate – to confirm the declared identity of an entity.

Authentication – security controls aimed at providing reliability of transferred data, messages or their sender, or controls of authenticity verification of a person, prior to delivery of a classified type of information to the person.

Certificate and Certificate Revocation Lists publication – procedures of distribution of issued certificates and revoked certificates. Certificate distribution involves the submission of a certificate to the subscriber and may involve publication in the repository. Certificate revocation list distribution means publication of the list in the repository, submission to end entities or transferral to entities providing on-line certificate status verification service. In both cases the distribution should be performed with the usage of appropriate means (e.g. LDAP, FTP, etc.).

Certificate Revocation List (CRL) – list, signed electronically by a certification authority, containing serial numbers of revoked or suspended certificates and dates and reasons for their revocation or suspension, the name of the CRL issuer, date of publication and date of the next update. Above data are electronically signed by a certification authority.

Certificate Status Token – electronic data, containing information on current certificate status, certification path, which this certificate belongs to and other information useful for certificate verification, electronically signed by the certificate status verification authority

Certificate Status Verification Authority – trusted third party, providing relaying parties with the mechanisms for certificate credibility verification, as well as providing additional information on certificate attributes.

Certificate Suspension – special form of certificate (and corresponding key pair) revocation, which results in temporary lack of certificate acceptance in cryptographic operations (irrespective of the status of such operation); suspended certificate is listed on the Certificate Revocation List (CRL).

Certificate update – prior to the certificate validity period expiration the certification authority may refresh the certificate (update it), confirming validity of the same key pair for another, defined in certification policy, validity period.

Certificates revocation – procedures concerning revocation of a key pair (certificate revocation) in the case when an access to the key pair has to be restricted for the subscriber to prevent possible usage in encryption or signature creation. A revoked certificate is placed on Certificate Revocation List (CRL).

Certification Authority – entity providing certification services, being a part of trusted third party, able to create, sign and create certificates and timestamp and certificate status tokens.

Certification path – ordered path of certificates, leading from a certificate being a **point of trust** chosen by a verifier up to a certificate subjected to verification. A certification path fulfils the following conditions:

- for all certificates Cert(x) included in the certification path {Cert(1), Cert(2), ..., Cert(n-1)} the subject of the certificate Cert(x) is the issuer of the certificate Cert(x+1),
- the certificate Cert(1) is issued by a certification authority (**point of trust**) trusted by the verifier,
- Cert(n) is a certificate being verified.

Every certification path may be bounded with one or more certification policies or such a policy may not exist. Policies ascribed to a certification path are the intersection of policies set whose identifiers are included in every certificate, incorporated in the certification path and defined in the extension **certificatePolicies**.

Certification Policy – document which specifies general rules applied by certification authority in public key certification process, defines parties, their obligations and responsibilities, types of the certificates, identity verification procedures and area of usage.

Certification Practice Statement – the document describing in details public key certification process, its parties and defining scopes of usage of issued certificates.

Cross-certificate – public key certificate (1) issued to a certification authority, (2) containing different name of the issuer and the subject, (3) a public key of this certificate may be used solely for electronic signature verification, and (4) it is clearly indicated that the certificate belongs to the certification authority.

Cross-certification – procedure of issuance of a certificate by a certification authority to another authority, not directly or indirectly affiliated with the issuing authority. Usually a cross-certificate is issued to simplify the building and verification of certification paths containing certificates issued by various CA's. Issuance of a cross-certification may be (but not necessarily) performed on the basis of a mutual agreement, i.e. two certification authorities issue cross-certification to each other.

Cryptographic module – (a) set comprising hardware, software, microcode or their combination, performing cryptographic operations, including encryption and decryption, executed within the area of this cryptographic module or (b) reliable implementation of cryptosystem, which securely performs operations of encryption and decryption

Digital signature – cryptographic transformation of data allowing the data recipient to verify the origin and the integrity of the data, as well as protection of the sender and recipient against forgery by the recipient; asymmetric electronic signatures may be generated by an entity by means of a private key and an asymmetric algorithm, e.g. RSA.

Distinguished name (DN) – set of attributes forming a distinguished name of a legal entity and distinguishing it from another entities of the same type, e.g. C=PL/OU=Unizeto Technologies S.A., etc.

Electronic signature – electronic data, which together with other data they are appended to or logically connected to, are used for identifying the person who created the signature.

End entity – authorized entity using the certificate as a subscriber or a relying party (not applicable to a certification authority).

Hardware Security Module – see **cryptographic module**.

Information system – entire infrastructure, organization, personnel and components used for assembly, processing, storage, transmission, publication, distribution and management of information.

Object – object with controlled access, e.g. a file, an application, the area of the main memory, assembled and retained personal data (PN-2000:2002).

Object Identifier (OID) – alphanumeric / numeric identifier registered in accordance with the ISO/IEC 9834 standard and uniquely describing a specified object or its class.

Personal Identification Number (PIN) – code securing cryptographic card against unauthorised usage

Personal Unlocking Key (PUK) – code used for cryptographic card unlocking and changing of the PIN

Point of trust – the most trusted certification authority, which a subscriber or a relying party trusts. A certificate of this authority is the first certificate in each certification path created by a subscriber or a relying party. The choice of point of trust is usually enforced by the certification policy governing the operation of the entity issuing a given certificate.

Primary Registration Authority (PRA) – registration authority whose additional duty is to approve the rest of the RA's and is allowed to generate – on behalf of a certification authority – key pairs, successively subjected to certification process.

Private key – one of asymmetric keys belonging to a subscriber, used only by this subscriber. In the case of asymmetric key system, a private key describes transformation of a signature. In the case of asymmetric encryption system, a private key describes decrypting transformation.

Notices: (1) In cryptography employing a public key – the key whose purpose is decryption or signature creation, for the sole usage of the owner. (2) In the cryptographic system with a public key – the one of the key from key pair which is known only to the owner.

Procedure for emergency situation operations – procedure being the alternative of a standard procedure path and executed upon the occurrence of emergency situation.

Proof of possession of private key (POP) – information submitted by a subscriber to a receiver in a manner allowing the recipient to verify validity of the binding between the sender and the private key, accessible by the sender; the method to prove possession of private key usually depends on the type of employed keys, e.g. in the case of signing keys it is enough to present signed text (successful verification of the signature is the proof of private key possession), while in the case of encrypting keys, the subscriber has to be able to decrypt information encrypted with a public key belonging to him/her/it. CERTUM carries out verification of associations between key pairs used for signing and encrypting only on the level of registration and certification authority.

Public key – one of the keys from a subscriber's asymmetric key pair which may be accessible to the public. In the case of the asymmetric cryptography system, a public key defines verification transformation. In the case of asymmetric encryption, a public key defines encryption transformation.

Public key certificate – electronic confirmation containing at least the name or identifier of a certification authority, a subscriber's identifier, his/her/its public key, the validity period, serial number, and is signed by the certification authority.

Notice: a certificate may be in one of the three basic states (see Cryptographic key states): waiting for activation, active and inactive.

Public Key Infrastructure (PKI) – consists of elements of hardware and software infrastructure, databases, network resources, security procedures and legal obligation, bonded together, which collaborate to provide and implement certificate services, as well as other services e.g. timestamping.

Registration authority – authority providing services of identity verification and confirmation of the certificate requesters; they provide complex subscriber handling in the area of certification services

Relying party – the recipient who has received information containing a certificate or an associated electronic signature verified with a public key included in the certificate and who has to decide whether to accept or reject the signature on the basis of the trust for the certificate.

Relying party being a beneficiary of the warranty – the subscriber of CERTUM's certification services who has received information containing a certificate or an associated electronic signature verified with a public key included in the certificate and who has to decide whether to accept or reject the signature on the basis of the trust for the certificate.

Repository – a set of publicly available electronic directories, containing issued certificates and documents related to operation of certification authority

Requester – subscriber in the period between submission of a request (application) to a certification authority and the completion of certificate issuance procedure.

Requester / payer – individual or institution which on behalf of the subscriber pays for certification services, provided by the authority issuing the certificate. The requester / payer is the owner of the certificate and has a right to request its revocation in the cases described in Certification Practice Statement.

Revoked certificate – public key certificate placed on Certificate Revocation List, without cancellation of the reason for revocation (e.g. after unsuspension).

Secret key – key applied in symmetric cryptography techniques and used only by a group of authorized subscribers.

Notice: A secret key is intended for usage by very small group of persons for data encryption and decryption.

Self-signed certificate – any public key certificate, designed to verification of signature upon certificate, whose signature may be verified by public key included in the field **subjectKeyInfo**, whose content of the fields **issuer** and **subject** are the same, and whose **CA** field of **BasicConstraints** extension is set to true.

Shared secret – part of a cryptographic secret, e.g. a key distributed among n trusted individuals (cryptographic tokens, e.g. electronic cards) in a manner, requiring m parts of the secret (where $m < n$) to restore the distributed key.

Shared secret holder – authorized holder of an electronic card, used for storing shared secret.

Signature policy – detailed solutions, including technical and organizational solutions, defining the method, scope and requirements of confirmation and verification of an electronic signature, whose execution allows verification of signature validity.

Subscriber – entity (private person, legal entity, organizational unit not having a legal identity, hardware device owned by these entities or persons) that: (1) is the subject identified by the certificate issued to this entity, (2) posses a private key associated with the certificate issued to the entity and (3) does not issue certificates to other parties.

Timestamp token – electronic data, binding any action or fact with precise moment of time, creating a confirmation that action or fact happened preceding specific moment in time.

Timestamping – service basing on attaching time signature to electronic data, logically bounded with signed data or electronic signature; timestamp is certified by authority providing appropriate services.

Time-Stamping Authority (TSA) – entity issuing timestamp tokens.

Token – element of data used for exchange between parties and containing information transformed by means of cryptographic techniques. Token may be signed by a registration authority operator and may be used for authentication of its holder in the contact with a certification authority.

Trusted path – connection allowing exchange of information associated with authentication of a user, an application or a device (e.g. an electronic cryptographic card) , protected in a manner preventing violation of the integrity of transmitted data by any malicious application.

Trusted Third Party (TTP) – institution or its representative trusted by an authenticated entity and/or entity performing verification and other entities in the area of operations associated with security and authentication.

CERTUM – Unizeto Technologies S.A.'s service unit, providing certification and qualified certification services (certification authority).

CERTUM Operational Team – personnel responsible for proper operation of CERTUM. This responsibility applies to financial support, dispute resolution, decision making and creation of Certum development policy. Personnel employed in Operational Team do not have access to workstation and the computer system of CERTUM.

Valid Certificate – public key certificate is valid only when (a) it has been issued by a certification authority, (b) has been accepted by the subscriber (subject of the certificate) and (c) it has not been revoked .

Validation of public key certificates –allowing validation whether the certificate is revoked. This problem may be solved by the interested entity on the basis of CRL or by the issuer of the certificate or an authorized representative on entity's request, directed to OCSP server.

Validation of Signature – aims at (1) verification of the signature being created by private key corresponding to public key, included in the certificate signed by certification authority, and (2) verification whether signed message (document) has not been modified since the time of signature creation.

Violation (e.g. data breach) – revelation of information to an unauthorized person, or interference that violate security system policy, resulting in unauthorized (intended or unintended) revelation, modification, destruction or compromise of any object.

X.500 – international norm, specifying Directory Access Protocol and Directory Service Protocol.

Appendix 3: Supplemental Validation Procedures for Extended Validation SSL Certificates

The Appendix 3 is a separate document: **“Certification Practice Statement of CERTUM’s Non-qualified Certification Services – Appendix 3: Guidelines for the issuance and management of Extended validation certificates”** available in the CERTUM repository. This appendix is an integral part of this Certificate Practice Statement.

Appendix 4: Minimum Required for Cryptographic Algorithm and Key Sizes

1. Root CA Certificates

L.p.	Cryptographic algorithm	Certificate issued on or before 31 Dec 2010	Certificate issued after 31 Dec 2010
1.	Digest algorithm	MD5 (not recommended), SHA-1	SHA-1 ³⁷ , SHA-256, SHA-384 or SHA-512
2.	RSA	1024	2048
3.	ECC	NIST P-256	NIST P-256

2. Subordinate CA Certificates

L.p.	Cryptographic algorithm	Certificate issued on or before 31 Dec 2010	Certificate issued after 31 Dec 2010
1.	Digest algorithm	SHA-1	SHA-1 ³⁷ , SHA-256, SHA-384 lub SHA-512
2.	RSA	1024	2048
3.	ECC	NIST P-256	NIST P-256

3. Subscriber Certificates

L.p.	Cryptographic algorithm	Certificate issued on or before 31 Dec 2010	Certificate issued after 31 Dec 2010
1.	Digest algorithm	SHA-1	SHA-1 ³⁷ , SHA-256, SHA-384 lub SHA-512
2.	RSA	1024 lub 2048 (Note: subscriber certificates containing a 1024 bit RSA key MUST expire on or before 31 Dec 2010)	2048
3.	ECC	NIST P-256	NIST P-256

³⁷ SHA-1 should be used until SHA-256 is supported widely by browsers used by a majority of relying parties worldwide.

Appendix 5: EV Certificates Required Certificate Extensions

1. Root CA Certificates

Root certificates generated after October 2006 MUST be X.509 v3.

(a) **basicConstraints**

If the certificate is v3 and is created after October 2006, this extension MUST appear as a critical extension in all CA certificates that contain Public Keys used to validate digital signatures on certificates. The CA field MUST be set true. The pathLenConstraint field SHOULD NOT be present.

(b) **keUsage**

If the certificate is v3 and is created after October 2006, this extension MUST be present and MUST be marked critical. Bit positions for CertSign and cRLSign MUST be set. All other bit positions SHOULD NOT be set.

All other fields and extensions set in accordance to RFC 5280.

2. Subordinate CA Certificates

(c) **certificatePolicies**

This extension MUST be present and SHOULD NOT be marked critical. The set of policy identifiers MUST include the identifier for CERTUM's extended validation policy if the certificate is issued to a subordinate CA that is not controlled by CERTUM.

certificatePolicies:policyIdentifier (required)

- **anyPolicy**, if subordinate CA is controlled by Root CA³⁸;
- explicit EV policy OID(s) if subordinate CA is not controlled by Root CA;

The following fields MUST be present if the Subordinate CA is not controlled by CERTUM:

certificatePolicies:policyQualifiers:policyQualifierId

- id-qt 2 [RFC 5280]

certificatePolicies:policyQualifiers:qualifier

- URL to the Certification Practice Statement

(d) **cRLDistributionPoint**

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

(e) **authorityInformationAccess**

This extension SHOULD be present and MUST NOT be marked critical. SHALL contain the HTTP URL of CERTUM's OCSP service provided in the **authorized responder** mode (accessMethod = 1.3.6.1.5.5.7.48.1). An HTTP accessMethod MAY be included for CERTUM's certificate (accessMethod = 1.3.6.1.5.5.7.48.2).

³⁸ In the case of CERTUM the intermediate certification authority **Certum Extended Validation SSL CA** is under control of the root **Certum Trusted Network CA**. For this reason, in the certificate of CERTUM Extended Validation SSL CA certification policy identifier is anyPolicy.

(f) **basicConstraints**

This extension **MUST** appear as a critical extension in all CA certificates that contain Public Keys used to validate digital signatures on certificates. The CA field **MUST** be set **true**. The **pathLenConstraint** field **MAY** be present.

(g) **keyUsage**

This extension **MUST** be present and **MUST** be marked critical. Bit positions for **CertSign** and **cRLSign** **MUST** be set. All other bit positions **MUST NOT** be set.

All other fields and extensions set in accordance to RFC 5280.

3. Subscriber Certificates

(a) **certificatePolicies**

This extension **MUST** be present and **SHOULD NOT** be marked critical. The set of policyIdentifiers **MUST** include the identifier for CERTUM's extended validation policy.

certificatePolicies:policyIdentifier (required)

- EV policy OID

certificatePolicies:policyQualifiers:policyQualifierId (required)

- id-qt 2 [RFC 5280]

certificatePolicies:policyQualifiers:qualifier (required)

- URL to the Certification Practice Statement

(b) **cRLDistributionPoint**

This extension **SHOULD** be present and **MUST NOT** be marked critical. If present, it will contain the HTTP URL of CERTUM's CRL service. This extension **MUST** be present if the certificate does not specify OCSP responder locations in an authorityInformationAccess extension. See section 26(b) of Appendix 3 for details.

(c) **authorityInformationAccess**

This extension **SHOULD** be present and **MUST NOT** be marked critical. **SHALL** contain the HTTP URL of CERTUM's OCSP service provided in the **authorized responder** mode (accessMethod = 1.3.6.1.5.5.7.48.1). An HTTP accessMethod **MAY** be included for CERTUM's certificate (accessMethod = 1.3.6.1.5.5.7.48.2). This extension **MUST** be present if the certificate does not contain a cRLDistributionPoint extension. See section 26(b) of Appendix 3 for details.

(d) **basicConstraints** (optional)

If present, the CA field **MUST** be set false.

(e) **keyUsage** (optional)

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

All other fields and extensions set in accordance to RFC 5280.

Appendix 6: Foreign Organization Name Guidelines

1. Non-Latin Organization Name

Where an EV Applicant's organization name is not registered with a QGIS in *Latin* characters and the applicant's foreign character organization name and registration have been verified with a QGIS in accordance with *Guidelines for the issuance and Management of Extended Validation Certificates* (see [31]), CERTUM may include a Latin character organization name in the EV certificate. In such a case, the CERTUM follows the procedures laid down in this appendix.

2. Romanized Names

In order to include a transliteration/Romanization of the registered name, the Romanization is verified by the CERTUM using a system officially recognized by the Government in the Applicant's jurisdiction of incorporation.

If the CERTUM can not rely on a transliteration/Romanization of the registered name using a system officially recognized by the Government in the Applicant's jurisdiction of incorporation, then it must rely on one of the options below, in order of preference:

- (a) A system recognized by the International Standards Organization (ISO),
- (b) A system recognized by the United Nations or
- (c) A Lawyers Opinion confirming the Romanization of the registered name.

3. English Name

In order to include a Latin character name that is not a Romanization of the registered name in the EV certificate, the CERTUM must verify that the Latin character name is:

- (a) Included in the Articles of Incorporation (or equivalent document) filed as part of the organization registration, or
- (b) Recognized by a QGTIS in the Applicant's Jurisdiction of Incorporation as the applicant's recognized name for tax filings, or
- (c) Confirmed with a QIIS to be the name associated with the registered organization, or
- (d) Confirmed by a lawyer's opinion letter to be the trading name associated with the registered organization.

4. Country Specific Procedures

4.1 Japan

In addition to the procedures set out above:

- (a) The Hepburn method of Romanization is acceptable for Japanese Romanizations.
- (b) The CERTUM may verify the Romanized transliteration of Applicant's formal legal name with either a QIIS or a lawyer's opinion letter.

- (c) The CERTUM may use the Financial Services Agency to verify an English Name. When used, the CERTUM must verify that the English name is recorded in the audited Financial Statements filed with the Financial Services Agency.

- (d) When relying on Articles of Incorporation to verify an English Name, the Articles of Incorporation MUST be accompanied either: by a document, signed with the original Japanese Corporate Stamp, that proves that the Articles of Incorporation are authentic and current, or by a lawyer's opinion letter. The CERTUM must verify the authenticity of the Corporate Stamp.

Appendix 7: Document History

Document modification history		
V 1.0	15 th of April, 2000	Draft of the document for comments
V 1.33	12 th of March, 2002	Full version of the document. Document approved
V 2.0	15 th of July, 2002	New certificate types defined. Modifications to certification procedures, detailing certificate and CRL profile. Chapters 3,4, 6.1, 2.6, 6.2-6.9 and 7 re-edited. Document approved.
V 2.1	1 st of February, 2005	New certificate types defined. Modification to chapters regarding renewal and recertification of cryptographic keys. Introduction of entries considering usage of new extensions in the certificate. Revision of number of punctuation errors and modification of the chapter addressing requester verification. Number of lesser modifications introduced to maintain integrity of this document.
V 2.2	9 th of May, 2005	Editorial changes. Change to the company legal form and name (Unizeto Sp. z o.o. changed to Unizeto Technologies S.A.)
V 2.3	26 th of October, 2005	Change of service name and logo from Unizeto CERTUM – Centrum Certyfikacji to CERTUM – Powszechne Centrum Certyfikacji. Correction of company information in certificate's profiles.
V 2.4	19 th of May, 2006	Removal of former legal status of the company. Transfer of the details of identification documents and procedures to dedicated document. Removal of certificate suspension information. Adding information on archival of the documents and data used in identity verification process. Editorial changes and removal of inconsequence with polish version of the document.
V 2.5	12 th of May, 2008	Editorial changes and adjusting Polish and English version of this document.
V 3.0	19 th of October, 2009	Amended in line with the RFC 3647 requirements and the requirements for the issuance of EV SSL certificates. Added appendices 3-6.
V 3.1	12 th of August, 2010	Updating the information about subscriber's verification. Updating the Appendix 3.
V 3.2	9 th of February, 2011	Updated information about certificates status checking, certificates validity times and some other minor changes.
V 3.3	7 th of October, 2011	Updated information about new subordinate certificate Certum Code Signing CA. Other minor changes to certificate offer. Added information about new root certificate Certum Trusted Network CA 2

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