

FZK-Grid-CA
Certificate Policy and
Certification Practice Statement

Version 0.1 (Draft)

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1 Introduction

This document is a draft, based on the structure suggested by the RFC 2527.
The terms used in this document are explained in the Glossary.

1.1 Overview

This document describes the set of rules and operational practices used by FZK-Grid-CA, the Certification Authority (CA) for the Forschungszentrum Karlsruhe für Technik und Umwelt GmbH for all purposes of Grid-Computing, for issuing certificates.

1.2 Identification

Title: FZK-Grid-CA Certificate Policy (CP) and Certification Practice Statement (CPS).

Version: Version 0.1 DRAFT

Date: 13.02.2002

Expiration: This document is valid until further notice.

1.3 Community and Applicability

FZK-Grid-CA provides PKI services for members of FZK in general and for the German scientific community that is involved in one of the following projects:

- High energy physics experiments: Alice, Atlas, BaBar, CDF, CMS, COMPASS, D0, LHCb
- International projects: CrossGrid, DataGrid, LHC Computing Grid Project.

1.3.1 Certification Authorities

FZK-Grid-CA doesn't issue certificates to subordinate Certification Authorities at this time.

1.3.2 Registration Authorities (RA)

The FZK-Grid-CA also performs the role of a RA.

Further RA's may be operated at different sites of the German scientific community. The current list of further registration authorities may be obtained from the following URL: <http://grid.fzk.de/ca/ra-list.html>.

1.3.3 End entities

The FZK-Grid-CA issues certificates for people, hosts and host applications involved in the experiments and projects listed in 1.3.

1.3.4 Applicability

The issued certificate types and suitability are as follows:

- Personnel, Server and Application certificates: authentication and communication encryption.

1.3.5 User Restrictions

Certificates issued by the FZK-Grid-CA are only valid in the context of the Grid research activities of the Forschungszentrum Karlsruhe, any other usage including financial transactions is strictly forbidden.

The ownership of an FZK-Grid certificate does not imply automatic access to any kind of computing resources.

1.4 Contact Details

The FZK-Grid-CA is managed by the FZK Security Group.

The contact person for questions related to this document or FZK-Grid-CA in general is:

Ursula Epting

Hauptabteilung Informations- und Kommunikationstechnik (HIK)

Postfach 3640

76021 Karlsruhe

Germany

Phone: (+ 49) 7247/82-6786

Fax: (+ 49) 7247/82-7768

E-Mail: FZK-Grid-CA@hik.fzk.de

2 General Provisions

2.1 Obligations

2.1.1 CA Obligations

FZK-Grid-CA will:

- issue and publish certificates based on validated requests
- accept certification requests validated by the RA
- deliver the certificate to end entity
- accept revocation requests from RA's or end entities
- issue and publish Certificate Revocation Lists (CRLs) according to the rules described in this document

2.1.2 RA Obligations

Authorized RA's will:

- authenticate entities requesting a certificate according to the procedures described in this document
- determine if the person has the right to have a FZK-Grid-CA certificate
- send validated certificate requests to FZK-Grid-CA

- create and send validated revocation requests to the FZK-Grid-CA
- follow the policies and procedures described in this document

2.1.3 Subscriber Obligations

- Read and accept the policies and procedures published in this document
- Generate a key pair using a trustworthy method
- Keep the private key safe and protected
- Use a strong passphrase with a minimum of 8 characters to protect the private key
- Notify the FZK-Grid-CA/RA:
 - in case of possible private key compromise, key destruction or loss
 - when the certificate is no longer required
 - when the information in the certificate becomes wrong or inaccurate

2.1.4 Relying Party Obligations

- Read and accept the policies and procedures published in this document
- See paragraph 4.4.9 on CRL checking requirements for relaying parties
- Use the certificates for permitted purposes only

2.1.5 Repository Obligations

FZK-Grid-CA will publish on its web server <http://grid.fzk.de/ca/> certificates and CRLs as soon as issued.

2.2 Liability

FZK-Grid-CA:

- guarantees only to control the identity of the subjects requesting a certificate or revocation request according to the procedures described in this document; no other liability, neither implicit nor explicit is accepted
- is run on a best effort basis and does not give any guarantees about the service security or suitability
- will not be held liable for any problems arising from its operation or use made of certificates it issues
- denies any financial or any other kind of responsibilities for damages or impairments resulting from its operation

2.3 Financial responsibility

No financial responsibility is accepted.

2.4 Interpretation and Enforcement

This document must be treated according to German law. Legal disputes arising from the operation of the FZK-Grid-CA will be treated according to German Law.

2.5 Fees

No fees are charged.

2.6 Publication and Repositories

2.6.1 Publication of CA Information

FZK-Grid-CA publishes the following information through its online repository:

- The FZK-Grid-CA certificate
- Issued certificates
- The latest CRL
- A copy of this document
- Other relevant information

2.6.2 Frequency of Publication

Certificates and new information will be published as soon as available.

CRLs will be published as soon as issued and at least every month.

2.6.3 Access Controls

FZK-Grid-CA does not impose any access control restrictions to the information available at its web site, which includes the CA certificate, latest CRL and a copy of this document containing the CP and CPS.

The FZK-Grid-CA web site is maintained in a best effort basis. Excluding maintenance shutdowns and unforeseen failures the site should be available on a 24 hours per day, 7 days per week basis, subject to reasonable scheduled maintenance.

FZK-Grid-CA may impose a more restricted access control policy to the repository at its discretion.

2.6.4 Repositories

The FZK-Grid-CA online repository is available at <http://grid.fzk.de/ca>.

2.7 Compliance Audit

FZK-Grid-CA declares that their practices fully comply with this CPS.

2.8 Confidentiality

FZK-Grid-CA collects personal information about the subscribers (e.g. full name, organization and e-mail-address). These data will be protected according to the German Law.

2.8.1 Types of information to be kept confidential

All information about subscribers that is not present in the certificate and CRL is considered confidential and will not be released outside.

2.8.2 Types of information not considered to be confidential

Information included in issued certificates and CRLs issued by the FZK-Grid-CA is not considered confidential.

2.9 Intellectual Property Rights

The FZK-Grid-CA claims no intellectual property rights on issued certificates, practice/policy specifications, names or keys.

3 Identification and Authentication

3.1 Initial Registration

3.1.1 Types of Names

To each entity the FZK-Grid-CA assigns a Distinguished Name (DN, X.501) that identifies each entity uniquely. The DN is inserted in the subject field of the issued certificate to bind the entity to the certificate. The DN must be a non-empty printable string.

Following naming attributes may be used in entities' DN.

3.1.1.1 Country

Necessity: Optional

Comment: For personal certificates, this is the country of residence of the subscriber. For server/application certificates, it is the country where the server/application is located.

3.1.1.2 Organization

Necessity: Optional

Comment: For personal certificates, this is the official name of the institution employing the subscriber. For server/application certificates, it is the official name of the institution operating the server/application.

3.1.1.3 Organizational Unit

Necessity: Optional

Comment: For personal certificates, this is the official name of the organizational unit, department or experiment in which the subscriber works. For server/application certificates, it is the official name of the organizational unit or department running the server/application.

3.1.1.4 Name (Common Name)

Necessity: Mandatory

Comment: For personal certificates it is the first name followed by the surname as presented in the identity card issued by the government or the organization the

person belongs to. For server certificates it is the fully qualified domain name of the server. For application certificates it is the name of the application optionally supplemented by its version number.

3.1.2 Need for names to be meaningful

The Subject Name in a certificate must have a reasonable association with the authenticated name of the subscriber.

3.1.3 Rules for interpreting various name forms

See Section 3.1.1 and 3.1.2

3.1.4 Uniqueness of Names

The distinguished name for each certificate must be unique. In case of real subject name duplication, additional numbers and/or letters will be appended to the distinguished name to guarantee uniqueness.

3.1.5 Name claim dispute resolution procedure

No stipulation

3.1.6 Recognition, authentication and role of trademarks

No stipulation

3.1.7 Method to Prove Possession of Private Key

FZK-Grid-CA will prove the possession of the private key relating to certificate requests. Detailed procedure description will be published in the next version of this document.

3.1.8 Authentication of Organization Identity

FZK-Grid-CA verifies the identity of organizations by checking:

- that the organization is known to be part of the grid-computing project or related experiments (mentioned in 1.3) by checking with the FZK-Institute Manager or the Grid-Department-Manager
- that the organization is operating in Germany, by checking contact information

3.1.9 Authentication of Individual Identity

The FZK-Grid-RA verifies the identity of a person by

- Personal contact checking the identity card, comparing photograph and registering the number of the identity piece.
- If the requester belongs to a distant organization that makes personal contact unreasonable the following procedure may substitute the personal contact:
 - A copy of the identity card, manually signed by the Institute Manager of that establishment is sent per fax to the FZK-Grid-CA/RA. If any doubts exist that the fax couldn't be correct the CA/RA can contact the Institute Manager of the organization to get some further prove.
 - The CA/RA calls the requestor, using the indicated telephone number (it must belong to the range of the assigned organization and must not be a private

number of the individual). During the call fingerprints or content data can be compared.

- For natural persons the subject name must be conforming to the name in the identity card.
- In case the entity to be certified is a machine or a service the person in charge has to fulfil the process defined in the section above and give prove that he/she is adequately authorized.
- The CA/RA shall record the issuance of each certificate, containing:
 - the identity of the person performing the identification
 - the number and type of the identity card
 - whether the contact was personal or by fax and phone
 - the date and time of the verification or in case any reasons why the verification failed
 - a declaration of identity, signed by a handwritten signature of the requestor

3.2 Routine Rekey

Rekey before expiration can be accomplished by sending a rekey request based on a new public key.

Rekey after expiration follows the same authentication procedure as new certificate.

3.3 Rekey After Revocation

Rekey after revocation follows the same rules as an initial registration.

3.4 Revocation Request

Certificate revocation requests should be submitted by written form signed manually or E-mail sent to FZK-Grid-CA@hik.fzk.de signed with a valid FZK-Grid-CA certificate. The CA inspects the signature electronically or based on the declaration of identity mentioned in 3.1.9

4 Operational Requirements

4.1 Certification Application

The minimum key length for all certificates is 1024 bits. The default validity period is 1 year. Each applicant must generate an own key pair using either Globus grid-cert-request, OpenSSL (or similar software) or a secure Online-Procedure using Netscape or Internet Explorer browser provided by FZK-Grid-CA.

Certificate requests in PEM-format are sent by e-mail to FZK-Grid-CA@hik.fzk.de. Depending on if the requester is a person or a machine or a service the procedures outlined in 3.1.9 are applied

Openssl/SSLeay configuration files are soon available from the FZK-Grid-Website. Non-conforming requests won't be accepted.

4.2 Certificate Issuance

FZK-Grid-CA issues the certificate if, and only if, the authentication of the subject is successful according to 3.1.9. The applicant will be notified about the issuance of the certificate by signed e-mail. If the authentication is not successful, the certificate is not issued and the applicant will also be notified.

4.3 Certificate Acceptance

Not defined.

4.4 Certificate Suspension and Revocation

4.4.1 Circumstances for Revocation

A certificate will be revoked in the following circumstances:

- The subscriber's private key has been lost or is suspected to be compromised
- The information in the certificate is wrong or inaccurate
- The subject has failed to comply with the rules in this policy
- The subscriber no longer needs the certificate to access Relaying Parties' resources
- The system to which the certificate has been issued has been retired

4.4.2 Who can request revocation

The revocation of the certificate can be requested by:

- The certificate subscriber or in case of host/application-certificates each person which is responsible for the host/service.
- Any other entity presenting proof of knowledge of the private key compromise or of the modification of the subscriber's data or relation with FZK-Grid
- FZK-Grid-CA/RA

4.4.3 Procedure for Revocation Request

The entity requesting the certificate must send the revocation request by signed e-mail to the FZK-Grid-CA/RA. If this is not possible the CA/RA must be contacted directly. Authentication can be performed as described in 3.1.9.

4.4.4 Circumstances for Suspension

Not defined.

4.4.5 Who can request suspension

Not defined.

4.4.6 Procedure for suspension request

Not defined.

4.4.7 Limits on Suspension Period

Not specified.

4.4.8 CRL Issuance Frequency

CRLs are issued after every certificate revocation or every month.

4.4.9 CRL Checking Requirements for Relying Parties

A relying party must verify a certificate against the most recent CRL issued, in order to validate the use of the certificate.

4.4.10 Online Revocation/status Checking Availability

Not Implemented.

4.4.11 Online Revocation Checking Requirements

Not Implemented.

4.4.12 Other Forms of Revocation Advertisement

None.

4.4.13 Requirements for Relying Parties on Other Forms of Revocation Advertisement

None.

4.4.14 Variations of the Above in Case of Private Key Compromise

Not defined.

4.5 Security Audit Procedures

4.5.1 Types of Events Audited

- boots of the equipment,
- interactive logins on this system,
- periodic message digests of all system files on the ca system
- requests for certificates
- identify verification procedures
- certificate issuing
- requests for revocation
- CRL issuing

4.5.2 Processing Frequency of Audit Logs

The log files are analysed at least once a month.

4.5.3 Retention Period for Audit Logs

The minimum retention period is 3 years

4.5.4 Protection of Audit Logs

Only authorized CA personnel is allowed to view and process audit logs. Audit logs are copied to an off-line medium.

4.5.5 Backup Procedures

Audit log files are copied to an off-line medium, which is saved in safe storage.

4.5.6 Accumulation System

The audit log accumulation system is internal to the FZK-Grid-CA.

4.5.7 Vulnerability Assessments

Not defined.

4.6 *Records Archival*

4.6.1 Types of Events Recorded

The following events are recorded in either digital or paper-based archives:

- Certification requests
- Revocation requests
- Issued certificates
- Issued CRLs
- E-mail messages sent and received by the FZK-Grid-CA/RA

4.6.2 Retention Period for Archives

Logs will be kept for a minimum of 3 years.

4.6.3 Protection of Archive

Records are backed up on removable media, which are stored in a room with restricted access.

4.6.4 Archive Backup Procedures

See Section 4.6.3

4.6.5 Time-stamping Requirements

Not defined.

4.6.6 Archive Collection System

The archive system is internal to the FZK-Grid-CA.

4.6.8 Procedures to Obtain and Verify Archive Information

Not defined.

4.7 Key Changeover

CA's private signing key is changed periodically. To avoid interruption of validity of all subordinate keys the new CA-key should be generated one year before the old one loses validity. From that point on new certificates are signed by the new CA-key. If necessary the keys sign each other.

The new CA-key is posted in the on-line repository.

4.8 Compromise and Disaster Recovery

If the CA private key is compromised - or suspected to be - the CA will:

- Inform subscribers and other relaying parties.
- Terminate the issuance and distribution of certificates and CRLs
- Notify relevant security contacts

4.9 CA Termination

Upon termination the FZK-Grid-CA will:

- Notify subscribers and Relaying Parties
- Terminate the issuance and distribution of certificates and CRLs
- Notify relevant security contacts
- Notify widely as possible the end of the service

5 Physical, Procedural, and Personnel Security Controls

5.1 Physical Security Controls

The CA operates in a controlled environment, where access is restricted to authorized people.

5.1.1 Site Location

The FZK-Grid-CA is located at the Hauptabteilung für Informations- u. Kommunikationstechnik (HIK) of the Forschungszentrum Karlsruhe.

5.1.2 Physical Access

Physical access to the Hardware is restricted to authorized personnel. All removable media is stored in secure cabinet.

5.1.3 Power and Air Conditioning

The building has an air conditioning system and the CA machines are connected to an UPS system.

5.1.4 Water Exposures

No stipulation.

5.1.5 Fire Prevention and Protection

The building has a fire alarm system.

5.1.6 Media Storage

The FZK-Grid-CA key and Backup copies of CA related information is kept in several removable storage media.

5.1.7 Waste Disposal

No stipulation.

5.1.8 Off-site Backup

No stipulation.

5.2 Procedural Controls

Not defined.

5.3 Personnel Security Controls

5.3.1 Background Checks and Clearance Procedures for CA Personnel

CA personnel is recruited from the FZK/HIK -Security-team.

5.3.2 Background Checks and Security Procedures for Other Personnel

No other personnel is authorized to access CA facilities without the physical presence of CA personnel.

5.3.3 Training Requirements and Procedures

Not defined.

5.3.4 Training Period and Retraining Procedures

Not defined.

5.3.5 Frequency and Sequence of Job Rotation

Job rotation is not performed.

5.3.6 Sanctions Against Personnel

Not defined.

5.3.7 Controls on Contracting Personnel

Not defined.

5.3.8 Documentation Supplied to Personnel

- Copies of this document
- FZK-Grid-CA Operation Manual

6 Technical Security Controls

6.1 Key Pair Generation and Installation

6.1.1 Key Pair Generation

Keys for the FZK-Grid-CA are generated by CA staff on a dedicated machine not connected to any kind of network. The software package is OpenSSL (0.9.6.b)

Each subscriber must generate her/his own key pair. The FZK-Grid-CA doesn't generate any keys for subjects.

6.1.2 Private Key Delivery to Entity

No stipulation.

6.1.3 Public Key Delivery to Certificate Issuer

Public keys are delivered by encrypted E-mail, SSL over http or/and floppy.

6.1.4 CA Public Key Delivery to Users

The CA certificate can be downloaded from the FZK-Grid-CA web site (<http://grid.fzk.de/ca/>).

6.1.5 Key Sizes

- The minimum key length for a personnel or server certificate is 1024 bits;
- The CA key length is 2048 bits.

6.1.6 Public Key Parameters Generation

Not defined.

6.1.7 Parameter Quality Checking

Not defined.

6.1.8 Hardware/software key generation

Key generation is performed by software.

6.1.9 Key Usage Purposes

Keys may be used for authentication, non-repudiation, data encipherment, message integrity and session establishment.

The FZK-Grid-CA private key can only sign certificates and CRLs.

6.2 Private Key Protection

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

Not defined.

6.2.2 Private Key Escrow

Not defined.

6.2.3 Private Key Archival and Backup

The FZK-Grid-CA private key is kept encrypted in multiple copies in floppy disks or CD-ROMs in safe places. The passphrase is, for emergencies in a sealed envelope kept in a safe.

6.3 Other Aspects of Key Pair Management

The FZK-Grid-CA certificate has currently a validity of two years and will expire on Thursday, 4 December 2003.

6.4 Activation Data

The FZK-Grid-CA private key is protected by a passphrase of at least 12 characters length.

6.5 Computer Security Controls

6.5.1 Specific Security Technical Requirements

- CA operating systems are maintained at a high level of security by applying all the relevant patches
- Monitoring is performed to detect unauthorized software changes
- CA systems configuration is reduced to the base minimum
- The signing machine is kept powered off between uses

6.5.2 Computer Security Rating

Not defined.

6.6 Life Cycle Security Controls

Not defined.

6.7 Network Security Controls

- The CA signing machine is kept off-line;

- CA machines other than the signing machine are protected by a firewall.

6.8 Cryptographic Module Engineering Controls

Not defined.

7 Certificate and CRL Profile

7.1 Certificate Profile

7.1.1 Version Number

X.509 v3.

7.1.2 Certificate Extensions

Basic Constraints: critical, CA FALSE

Key Usage: critical, Digital Signature, Non Repudiation, Key Encipherment, Data Encipherment

Subject Key Identifier

Authority Key Identifier

Subject Alternative Name: subject's e-mail address

Issuer Alternative Name: issuer's e-mail address

CRL Distribution Points

Netscape Cert Type

Netscape Comment

Netscape Base Url

Netscape Revocation Url

Netscape CA Policy Url

7.1.3 Algorithm Object Identifiers

Not defined.

7.1.4 Name Forms

Issuer: C=DE, O= FZK-Grid, OU=HIK, CN= FZK-Grid-CA

Subject: [C=DE], O= FZK-Grid, OU=HIK CN=Subject-Name

7.1.5 Name Constraints

No stipulation

7.1.6 Certificate Policy Object Identifier

No stipulation

7.1.7 Usage of Policy Constraints Extensions

No stipulation

7.1.8 Policy Qualifier Syntax and Semantics

No stipulation

7.2 CRL Profile

7.2.1 Version

X.509 v1

7.2.2 CRL and CRL Entry Extensions

Not defined.

8 Specification Administration

8.1 Specification Change Procedures

Users will not be warned in advance of changes to FZK-Grid-CA 's policy and CPS. Relevant changes will be made as widely available as possible.

8.2 Publication and Notification Procedures

The FZK-Grid-CA policy is available at <http://grid.fzk.de/ca/fzkcps.pdf>

8.3 CPS Approval Procedures

Not defined.

Glossary

Activation Data

Data values, other than keys, that are required to operate cryptographic modules and that need to be protected (e.g., a PIN, a passphrase) 18

CA - Certification Authority

An authority trusted by one or more users to create and assign public key certificates. 5

Certificates - or Public Key Certificates

A data structure containing the public key of an end entity and some other information, which is digitally signed with the private key of the CA which issued it. 5

CP - Certificate Policy

A named set of rules that indicates the applicability of a certificate to a particular community and /or class of application with common security requirements. For example, a particular certificate policy might indicate applicability of a type of certificate to the authentication of electronic data interchange transactions for the trading of goods within a given price range

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CPS - Certification Practice Statement

A statement of the practices which a certification authority employs in issuing certificates.

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CRL - Certificate Revocation Lists

A CRL is a time stamped list identifying revoked certificates which is signed by a CA and made freely available in a public repository 6

PKI - Public Key Infrastructure

A term generally used to describe the laws, policies, standards, and software that regulate or manipulate certificates and public and private keys. All of this implies a set of standards for applications that use encryption 5

Policy Qualifier

Policy-dependent information that accompanies a certificate policy identifier in an X.509 certificate 19

RA - Registration Authority

An entity that is responsible for identification and authentication of certificate subjects, but does not sign or issue certificates. 5

Relying Party

A recipient of a certificate who acts in reliance on that certificate and/or digital signatures verified using that certificate. In this document, the terms \ 7

Subscriber

In the case of certificates issued to resources (such as web servers), the person responsible for the certificate for that resource. For certificates issued to individuals, same as certificate subject. 7