DFN CERT

deutsches forschungsnetz

# Automatisierung mit ACME

Januar 2026

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# Automatisierung mit ACME

Zu diesem Webinar:

- Folien werden zur Verfügung gestellt
- Rückfragen per Zoom-Q&A
- Kontakt: dfnpca@dfn-cert.de
- Dokumentation auf
  https://doku.tid.dfn.de/de:dfnpki:tcs:2025:acme
- Community auf dfnpki-d-Mailingliste
  https://www.listserv.dfn.de/sympa/info/dfnpki-d

# Automatisierung mit ACME

- Motivation
- Basisbegriffe
- Werkzeuge
- Praxis mit HARICA
- Ausblick

# Motivation

# Motivation

- „Früher“:
  - 5 Jahre lang gültige Serverzertifikate
  - ...über Webseiten bei der CA beantragt
  - ...nach manuellem Prozess ausgestellt
  - ...per Hand installiert

# Motivation

- Jetzt:
  - TLS auf jedem Server => Viel mehr Zertifikate
  - Protokolle für Automatisierung existieren
  - Roadmap für drastische Reduzierung der Gültigkeit von Serverzertifikaten von Domainvalidierungen ist beschlossen

# Motivation

Roadmap Gültigkeit von Serverzertifikaten:

| Ab Datum | Maximale Gültigkeit |
|---|---|
| 15.03.2026 | 200 Tage |
| 15.03.2027 | 100 Tage |
| **15.03.2029** | **47 Tage** |

# Motivation

Roadmap Gültigkeit von Domainvalidierungen:

| Ab Datum | Maximale Gültigkeit |
|---|---|
| 15.03.2026 | 200 Tage |
| 15.03.2027 | 100 Tage |
| **15.03.2029** | **10 Tage** |

# Motivation

- Konsequenz: Ohne Automatisierung geht nichts mehr
- Positiv: Automatisierung und Monitoring kann höhere Qualität bringen
- Zwei verschiedene Probleme zu lösen:
  - Problem 1: Gültigkeit von Serverzertifikaten 47 Tage ab 2029

    Lösung: Automatisierung per ACME => Dieses Webinar
  - Problem 2: Gültigkeit von Domainvalidierungen 10 Tage ab 2029

    Lösung: Teilweise ACME, teilweise *TODO* => *später*

# Basisbegriffe

# Basisbegriffe

- RFC8555 Automatic Certificate Management Environment (ACME)
  - Entwicklung von 2015-2019 durch Mozilla, EFF, University of Michigan
  - Eng gekoppelt mit der Entwicklung von Let’s Encrypt
- Starke Anreize für PKI-Anbieter, ACME zur Verfügung zu stellen

  („SHOULD“ durch Google Chrome Root Programm)
- Vielfalt an Werkzeugen auf Client-Seite
- Darum: ACME als empfehlenswerte Lösung

# Basisbegriffe

## ACME Server

- ACME Schnittstelle eines PKI-Anbieters
- Definiert durch eine URL. Diese kann auch für jeden User individuell sein.

## ACME Client

- Software, die mit dem ACME Server kommuniziert
- Muss nicht das System sein, auf dem die Zertifikate eingesetzt werden.

## Account

- Beim ersten Kontakt erstellt jeder Client einen Account mit dem Server
  - Technisch: Schlüsselpaar. Public Key ist beim Server registriert.

## External Account Binding (EAB)

- Zweck:
  - Bindung eines ACME-Accounts eines Clients an ein Konto in einer Kundenverwaltung der CA separat von ACME
  - Zur Verwendung von vorvalidierten Werten,
    z.B. O=DFN-CERT oder vorvalidierte Domains
- HMAC Key und Key Identifier
  - Ausgegeben von der CA
  - Geheim zu halten!

## Challenge

- Mehrere Verfahren, mit denen der Client dem Server demonstrieren kann, dass er die Kontrolle über einen FQDN hat
- Challenges sind notwendig
  - wenn der FQDN nicht anderweitig validiert wurde
  - oder die CA eigene Gründe hat
- Client kann sich vom Server ein Verfahren wünschen
  - z.B. per Parameter `--preferred-challenges http` o.ä.

## Challenge http-01

- Server gibt dem Client ein Token (eine Zufallszahl)
- Client erzeugt aus dem Token eine "Key Authorization" und legt diese ab unter `http://<FQDN>/.well-known/acme-challenge/<token>`
- Server prüft die an dieser URL hinterlegte Key Authorization
  - Webserver auf Port 80, HTTP
  - Server SOLLTE Redirects folgen
  - Wenn der FQDN auf mehrere IPs auflöst, kann der Server sich eine aussuchen.
- Nicht für Wildcard-Zertifikate

## Challenge dns-01

- Server gibt dem Client ein Token (eine Zufallszahl)
- Client erzeugt aus dem Token eine "Key Authorization" und davon den SHA256-Hash, und legt diesen im DNS als TXT-Record ab:

```
_acme-challenge.www.example.org. 300 IN TXT "gfj9Xq...Rg85nM"
```

- Server prüft den Hash der Key Authorization in diesem TXT-Record
- Server darf CNAMEs folgen
  - Damit können „ACME-Challenge"-Zonen gebaut werden mit anderem Access als die Haupt-Zonen
- Für Wildcard-Zertifikate

## Challenge tls-alpn-01

- Verfahren auf Ebene TLS mit Application Layer Protocol Negotiation
- Wenige Implementierungen verfügbar
- Für Spezialfälle

## ACME Renewal Information (ARI)

- RFC 9773 - ACME Renewal Information (ARI) Extension- Juni 2025
- Erweiterung, mit dem der Client den optimalen Erneuerungszeitpunkt für ein Zertifikat vom Server abfragen kann
- Wichtiges Werkzeug, um Ausfallrisiko durch CA-seitige Sperrungen von Zertifikaten zu minimieren
- ARI muss sowohl vom Server als auch vom Client implementiert werden. Z.B. derzeit:
  - Certbot ja, mod_md ja, acme.sh noch nicht,
  - Let’s Encrypt ja, HARICA noch nicht.

# Werkzeuge

# Werkzeuge

Betriebsweise von ACME Clients:

1. Zertifikat initial ausstellen lassen und installieren
2. Regelmäßiger Check, ob Erneuerung notwendig
   - cron
   - Windows Aufgabenplanung
   - Integrierte Tasks vom ACME Client in der Anwendung

# Werkzeuge

- Zu Beachten bei der Auswahl des ACME Clients:

  Individueller Funktionsumfang!

- Insbesondere zu Prüfen:
  - Kompatibilität Zertifikatinstallation?
  - Support für ACME Renewal Information?
  - Wenn Nutzung von dns-01 geplant: Plugins für schreibenden Zugriff auf DNS-Server vorhanden?

# Werkzeuge

`certbot`

- In vielen (allen?) Linux-Distributionen enthalten
- Referenzimplementierung eines ACME Clients der EFF
- Zertifikatinstallation in Apache, nginx
- Plugins für viele DNS-Server/Anbieter
- Unterstützt ARI
- Benötigt externe `cron`-Konfig

# Werkzeuge

## `simple-acme`

- Standard-Lösung für Windows
- Nachfolger von `win-acme`
- Zertifikatinstallation in IIS
- Plugins für viele DNS-Server/Anbieter
- Unterstützt ARI
- Besonders nützlich: `--setuptaskscheduler`

# Werkzeuge

ACME Clients direkt in der Infrastruktur:

- Apache Modul `mod_md`
- Caddy, Traefik
- Certmanager (Kubernetes/OpenShift)

Viele weitere Werkzeuge:

- acme.sh, dehydrated, getssl, CertSage, lego, Posh-ACME,...

# Praxis mit HARICA

# Praxis mit HARICA

- ACME bei HARICA ausschließlich per External Account Binding
  1) EAB Account mit HMAC Key/Key Identifier im certmanager erzeugen
  2) ACME Client mit HMAC Key/Key Identifier konfigurieren
- Verschiedene Ausprägungen:
  - Enterprise EAB Accounts
    - SSL OV
    - SSL DV
  - Personal EAB Accounts

# Praxis mit HARICA

## Wann ist eine ACME Challenge erforderlich?

| **Account Typ** | **Variante** | **Domain** | **Challenge?** |
|---|---|---|---|
| Enterprise | SSL DV | vorvalidiert | nein |
| | | nicht validiert | **ja** |
| Enterprise | SSL OV | vorvalidiert | nein |
| | | nicht validiert | **nicht möglich, Fehler** |
| Personal | | vorvalidiert | **ja** |
| | | nicht validiert | **ja** |

# Praxis mit HARICA

Enterprise EAB Accounts:

- Können nur vom Enterprise Admin angelegt werden
- Verfügbare Domains müssen dem EAB Account zugewiesen werden
- Kontrollierte Weitergabe von HMAC Key/Key Identifier an Systemverantwortliche möglich

# Praxis mit HARICA

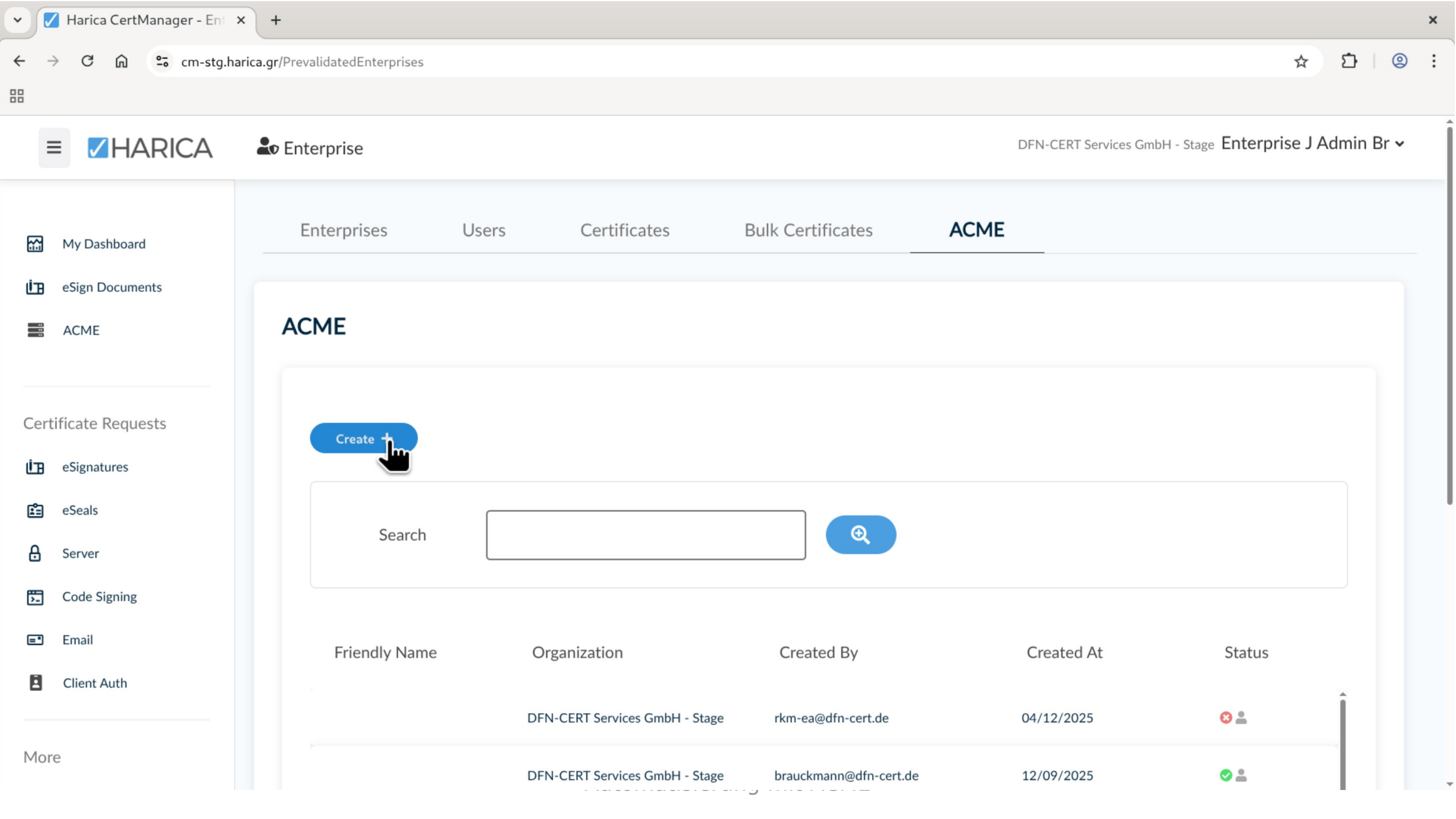
Enterprise EAB Accounts in zwei Varianten:

| **SSL DV** | **SSL OV** |
|---|---|
| Ohne Organisationsinfo | Mit Organisationsinfo (O=DFN-CERT) |
| Domain muss im certmanager eingetragen sein | Domain muss im certmanager eingetragen **und** vorvalidiert sein |
| Für Domains mit und ohne Vorvalidierung. Ohne Vorvalidierung: ACME Challenge | Nur vorvalidierte Domains möglich |

# Praxis mit HARICA

Tour durch das HARICA-Interface:

- Enterprise Admin: Erzeugen von Enterprise EAB Accounts


Harica CertManager - En
cm-stg.harica.gr/PrevalidatedEnterprises
HARICA
Enterprise
DFN-CERT Services GmbH - Stage
Enterprise J Admin Br
My Dashboard
eSign Documents
ACME
Certificate Requests
eSignatures
eSeals
Server
Code Signing
Email
Client Auth
More
Enterprises
Users
Certificates
Bulk Certificates
ACME
ACME
Create
Search
Friendly Name
Organization
Created By
Created At
Status
DFN-CERT Services GmbH - Stage
rkm-ea@dfn-cert.de
04/12/2025
DFN-CERT Services GmbH - Stage
brauckmann@dfn-cert.de
12/09/2025

Harica CertManager - Ent

cm-stg.harica.gr/PrevalidatedEnterprises

## Create ACME EAB Account

### 1 Choose Organization

DFN-CERT Services GmbH - Stage

**Country:** DE
**State:** Hamburg
**Locality:**
**Name:** DFN-CERT Services GmbH - Stage
**Domains:**
uni-pellworm.de
dfn-cert.de

**Please note**: You can define specific rules for each domain that will be included in this ACME EAB account later.

### 2 Choose Certificate Type

SSL OV

### 3 Add Friendly Name

A custom label to help you identify this account

jbr-acme-demo

I, Enterprise J Admin Br , declare that I read and agree with, by submitting this request, the Terms of Use and the Certification Practices of HARICA. I also agree that HARICA shall process, use and store the data from this request in accordance with the Data Privacy Statement.

Create | Close

DFN-CERT Services GmbH - Stage brauckmann@dfn-cert.de 12/09/2025

Harica CertManager - En

cm-stg.harica.gr/PrevalidatedEnterprises

HARICA Enterprise

DFN-CERT Services GmbH - Stage Enterprise J Admin Br

- My Dashboard
- eSign Documents
- ACME

Certificate Requests

- eSignatures
- eSeals
- Server
- Code Signing
- Email
- Client Auth

More

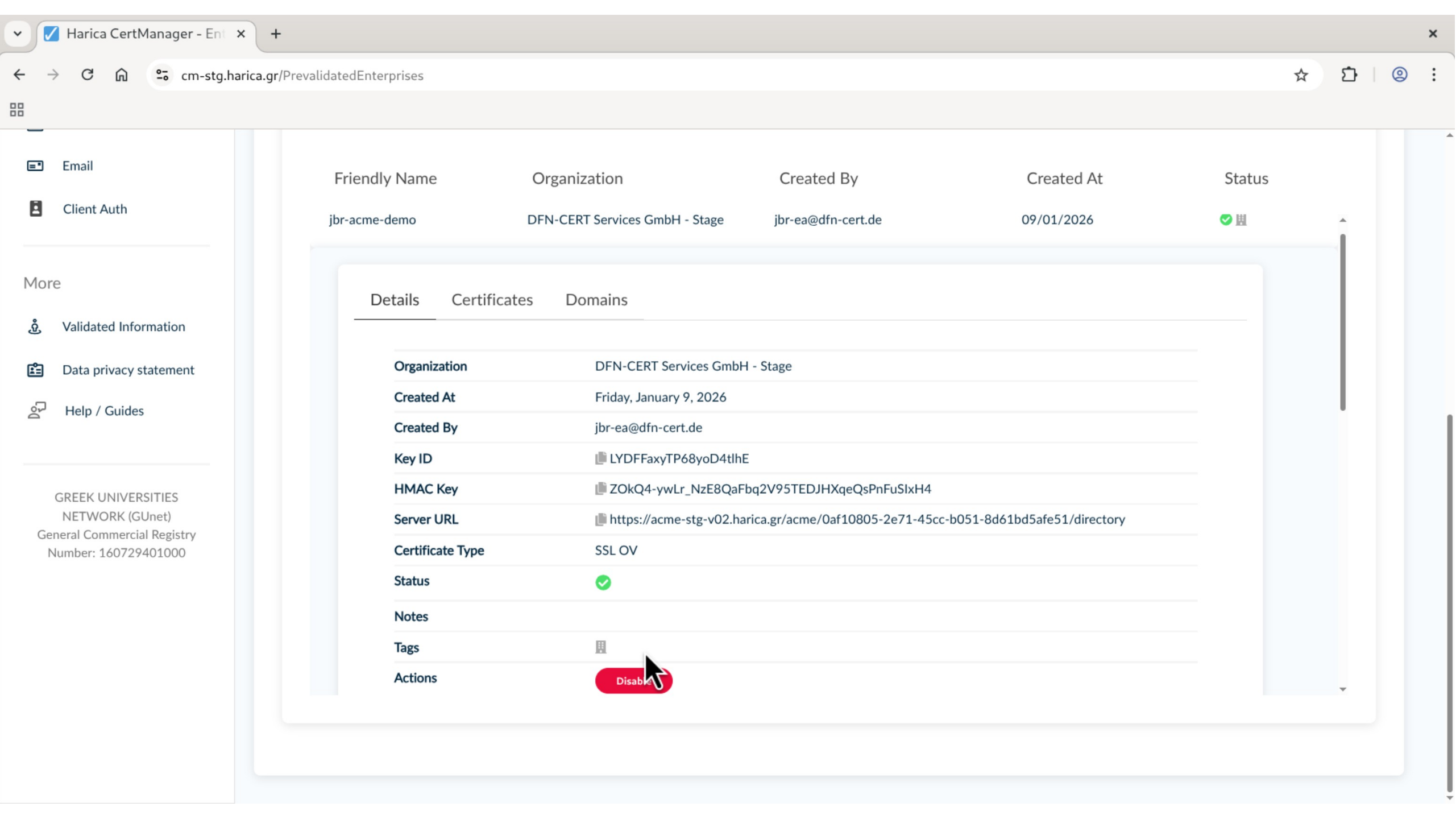
Enterprises | Users | Certificates | Bulk Certificates | ACME

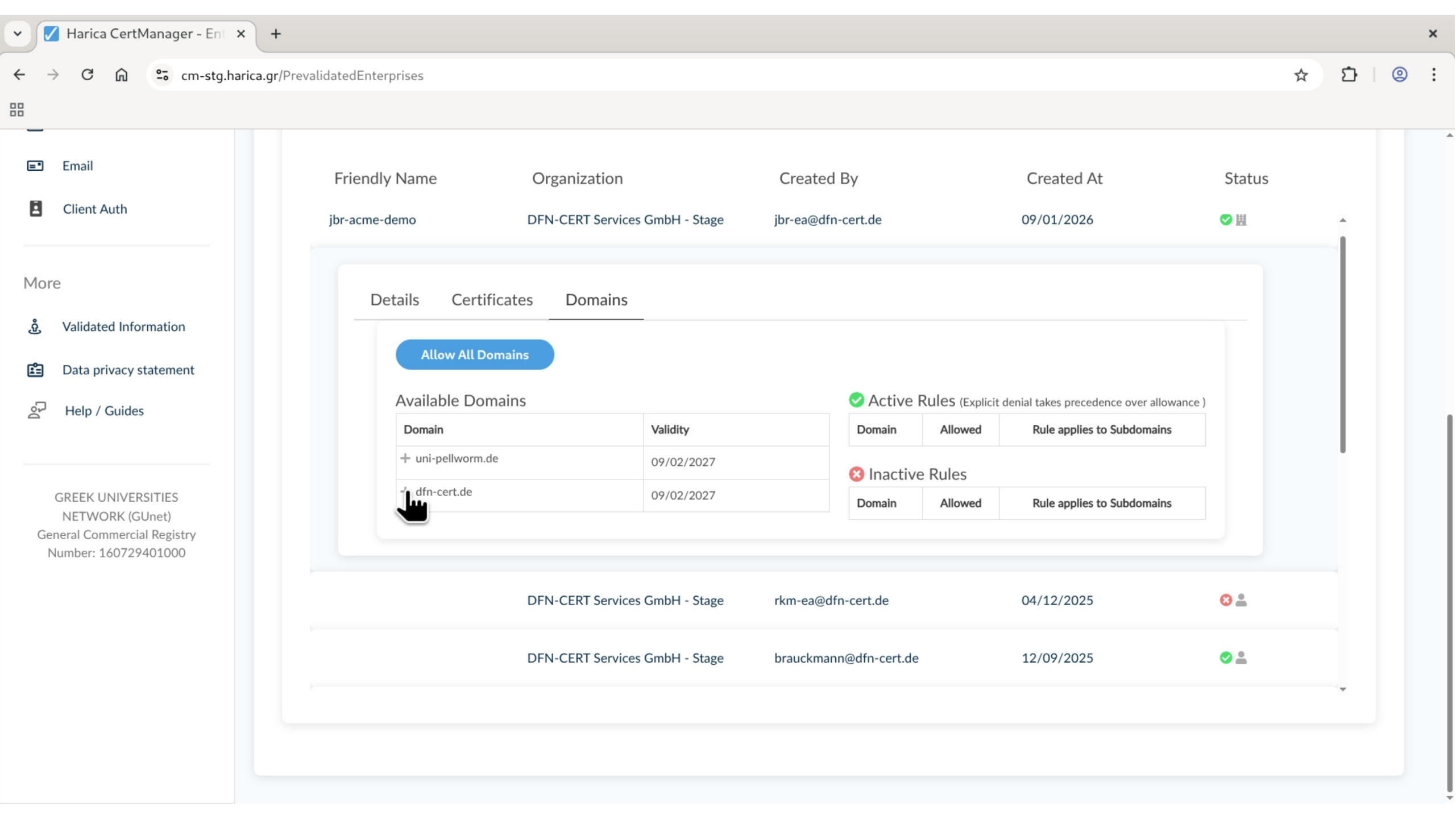
# ACME

Create +

Search

| Friendly Name | Organization | Created By | Created At | Status |
|---|---|---|---|---|
| r-acme-demo | DFN-CERT Services GmbH - Stage | jbr-ea@dfn-cert.de | 09/01/2026 | |
| | DFN-CERT Services GmbH - Stage | rkm-ea@dfn-cert.de | 04/12/2025 | |


Harica CertManager - En
cm-stg.harica.gr/PrevalidatedEnterprises
Email
Client Auth
More
Validated Information
Data privacy statement
Help / Guides
GREEK UNIVERSITIES NETWORK (GUnet)
General Commercial Registry Number: 160729401000
Friendly Name
Organization
Created By
Created At
Status
jbr-acme-demo
DFN-CERT Services GmbH - Stage
jbr-ea@dfn-cert.de
09/01/2026
Details
Certificates
Domains
Organization
DFN-CERT Services GmbH - Stage
Created At
Friday, January 9, 2026
Created By
jbr-ea@dfn-cert.de
Key ID
LYDFFaxyTP68yoD4tlhE
HMAC Key
ZOkQ4-ywLr_NzE8QaFbq2V95TEDJHXqeQsPnFuSIxH4
Server URL
https://acme-stg-v02.harica.gr/acme/0af10805-2e71-45cc-b051-8d61bd5afe51/directory
Certificate Type
SSL OV
Status
Notes
Tags
Actions
Disable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DFN-CERT Services GmbH - Stage
jbr-ea@dfn-cert.de
09/01/2026
Details
Certificates
Domains
Allow All Domains
Available Domains
Domain
Validity
uni-pellworm.de
09/02/2027
dfn-cert.de
09/02/2027
Active Rules (Explicit denial takes precedence over allowance )
Domain
Allowed
Rule applies to Subdomains
Inactive Rules
Domain
Allowed
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DFN-CERT Services GmbH - Stage
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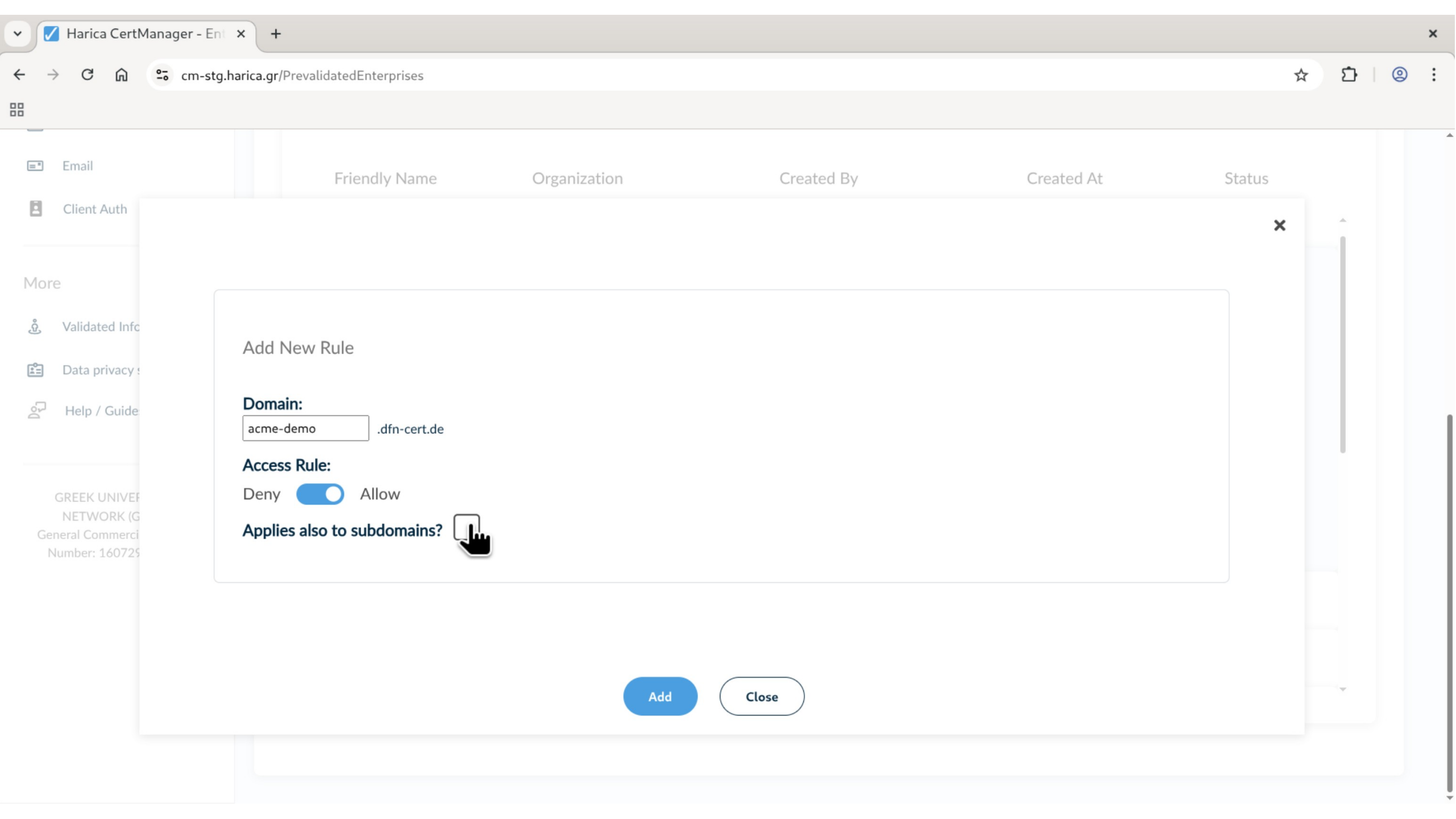
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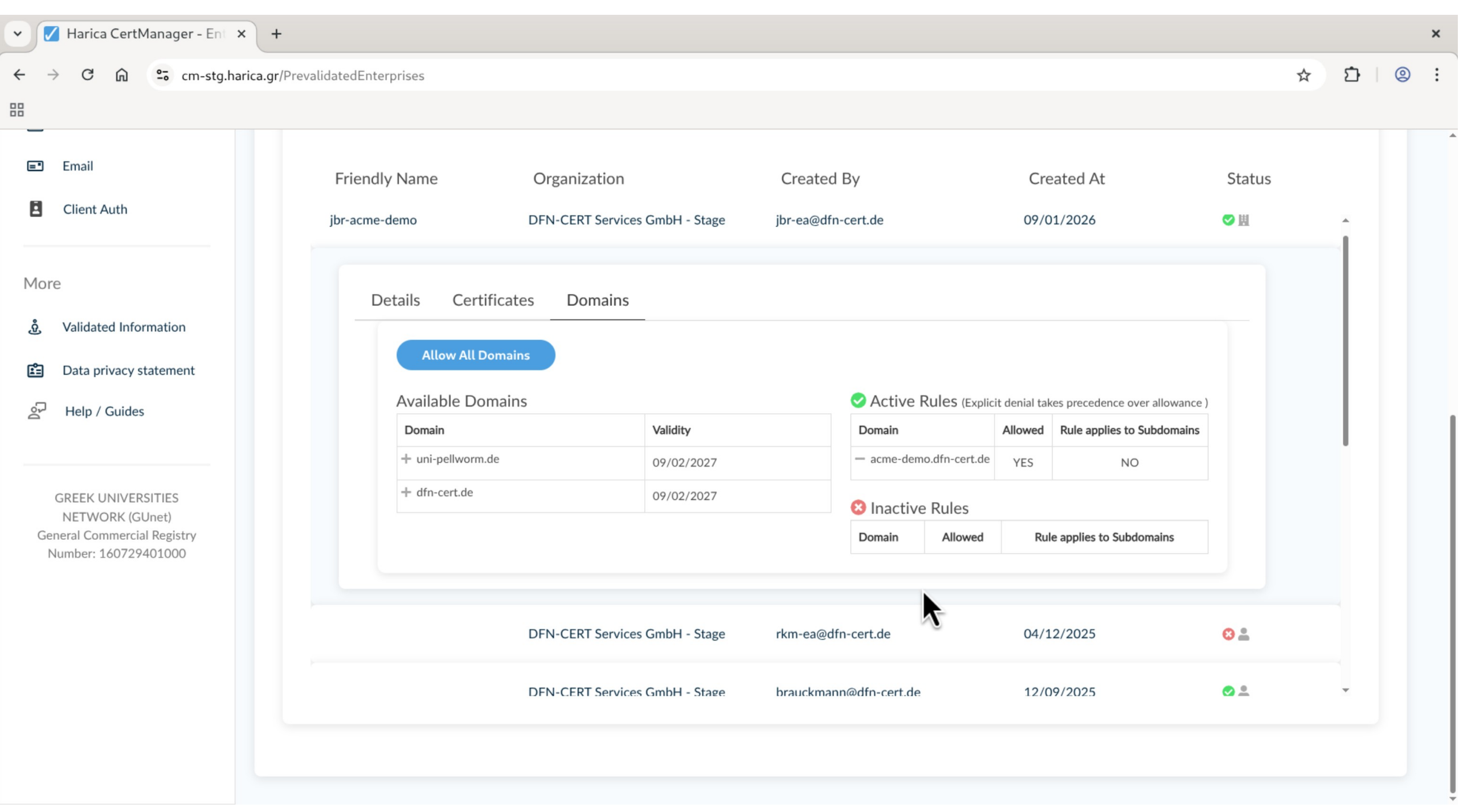
Email
Client Auth
More
Validated Info
Data privacy
Help / Guide
GREEK UNIVER
NETWORK (G
General Commerci
Number: 160729
Friendly Name
Organization
Created By
Created At
Status
Add New Rule
Domain:
acme-demo
.dfn-cert.de
Access Rule:
Deny
Allow
Applies also to subdomains?
Add
Close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DFN-CERT Services GmbH - Stage
rkm-ea@dfn-cert.de
04/12/2025
DFN-CERT Services GmbH - Stage
brauckmann@dfn-cert.de
12/09/2025

# Praxis mit HARICA

## Tour: Nutzung der EAB Accounts mit `certbot`

Harica CertManager - Ent

cm-stg.harica.gr/PrevalidatedEnterprises

Email

Client Auth

More

Validated Information

Data privacy statement

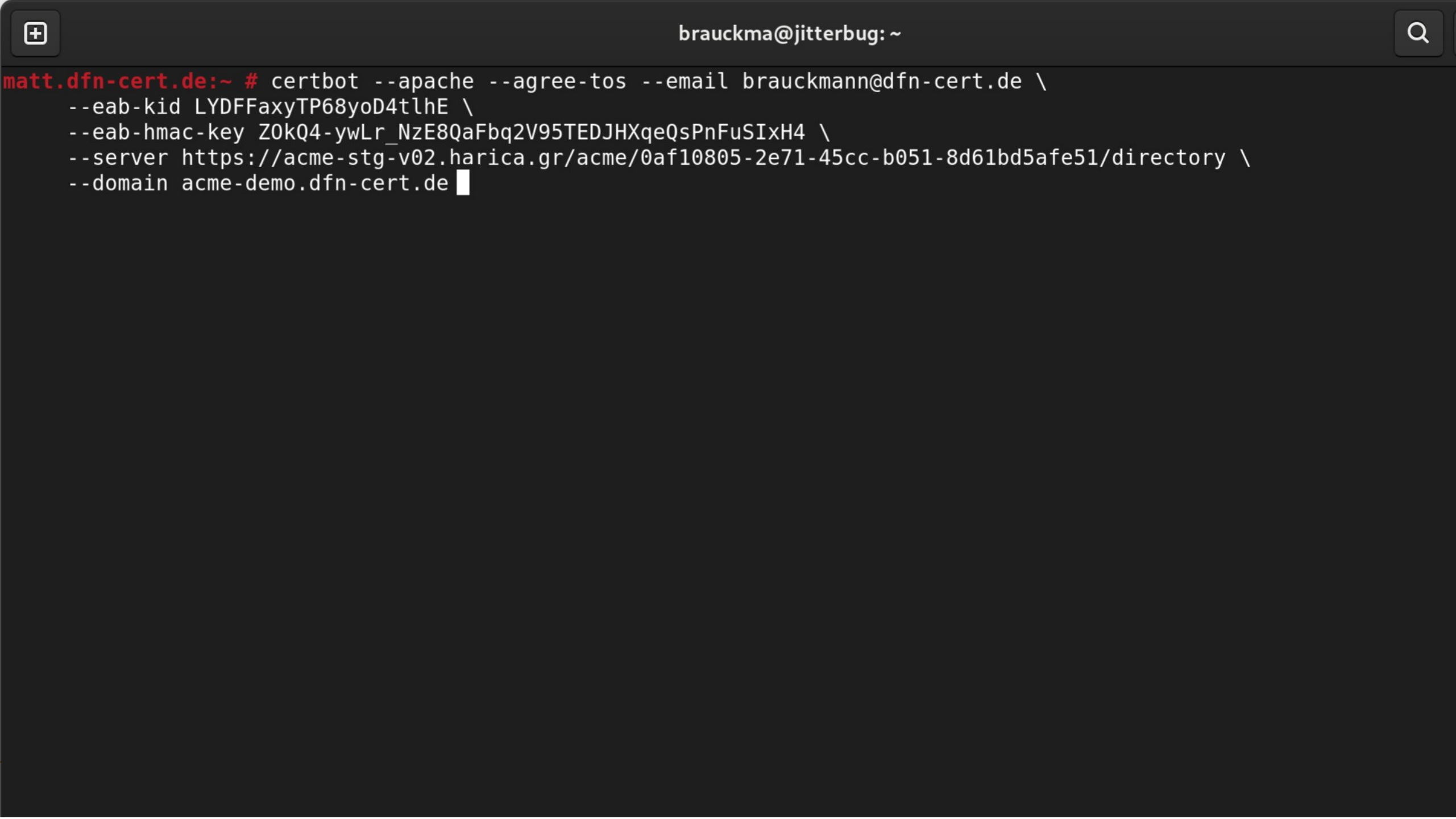
Help / Guides

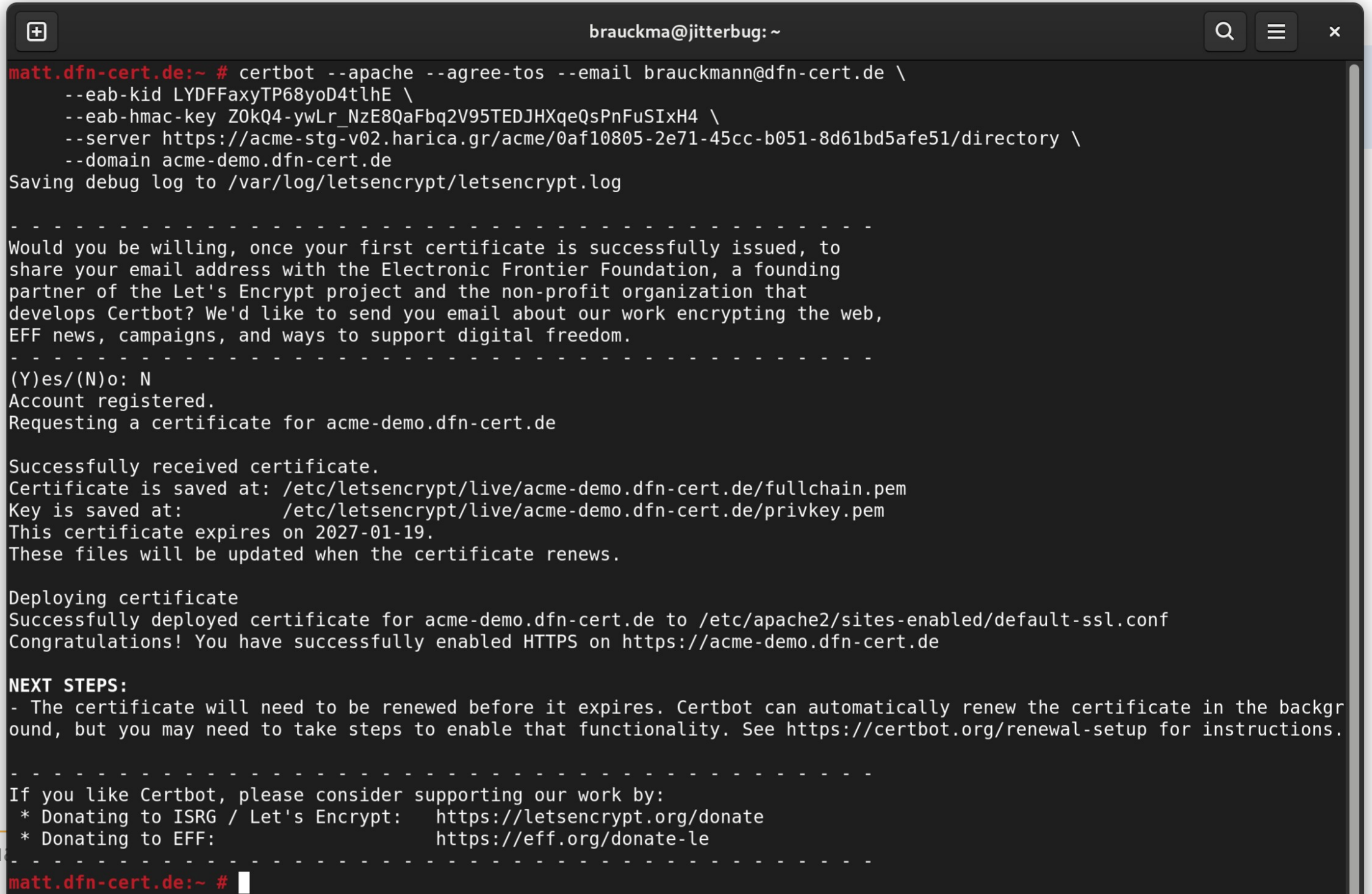
GREEK UNIVERSITIES NETWORK (GUnet)
General Commercial Registry Number: 160729401000

| Friendly Name | Organization | Created By | Created At | Status |
|---|---|---|---|---|
| jbr-acme-demo | DFN-CERT Services GmbH - Stage | jbr-ea@dfn-cert.de | 09/01/2026 | |

Details | Certificates | Domains

| | |
|---|---|
| **Organization** | DFN-CERT Services GmbH - Stage |
| **Created At** | Friday, January 9, 2026 |
| **Created By** | jbr-ea@dfn-cert.de |
| **Key ID** | LYDFFaxyTP68yoD4tlhE |
| **HMAC Key** | ZOkQ4-ywLr_NzE8QaFbq2V95TEDJHXqeQsPnFuSIxH4 |
| **Server URL** | https://acme-stg-v02.harica.gr/acme/0af10805-2e71-45cc-b051-8d61bd5afe51/directory |
| **Certificate Type** | SSL OV |
| **Status** | |
| **Notes** | |
| **Tags** | |
| **Actions** | Disable |


brauckma@jitterbug: ~
matt.dfn-cert.de:~ # certbot --apache --agree-tos --email brauckmann@dfn-cert.de \
--eab-kid LYDFFaxyTP68yoD4tlhE \
--eab-hmac-key ZOkQ4-ywLr_NzE8QaFbq2V95TEDJHXqeQsPnFuSIxH4 \
--server https://acme-stg-v02.harica.gr/acme/0af10805-2e71-45cc-b051-8d61bd5afe51/directory \
--domain acme-demo.dfn-cert.de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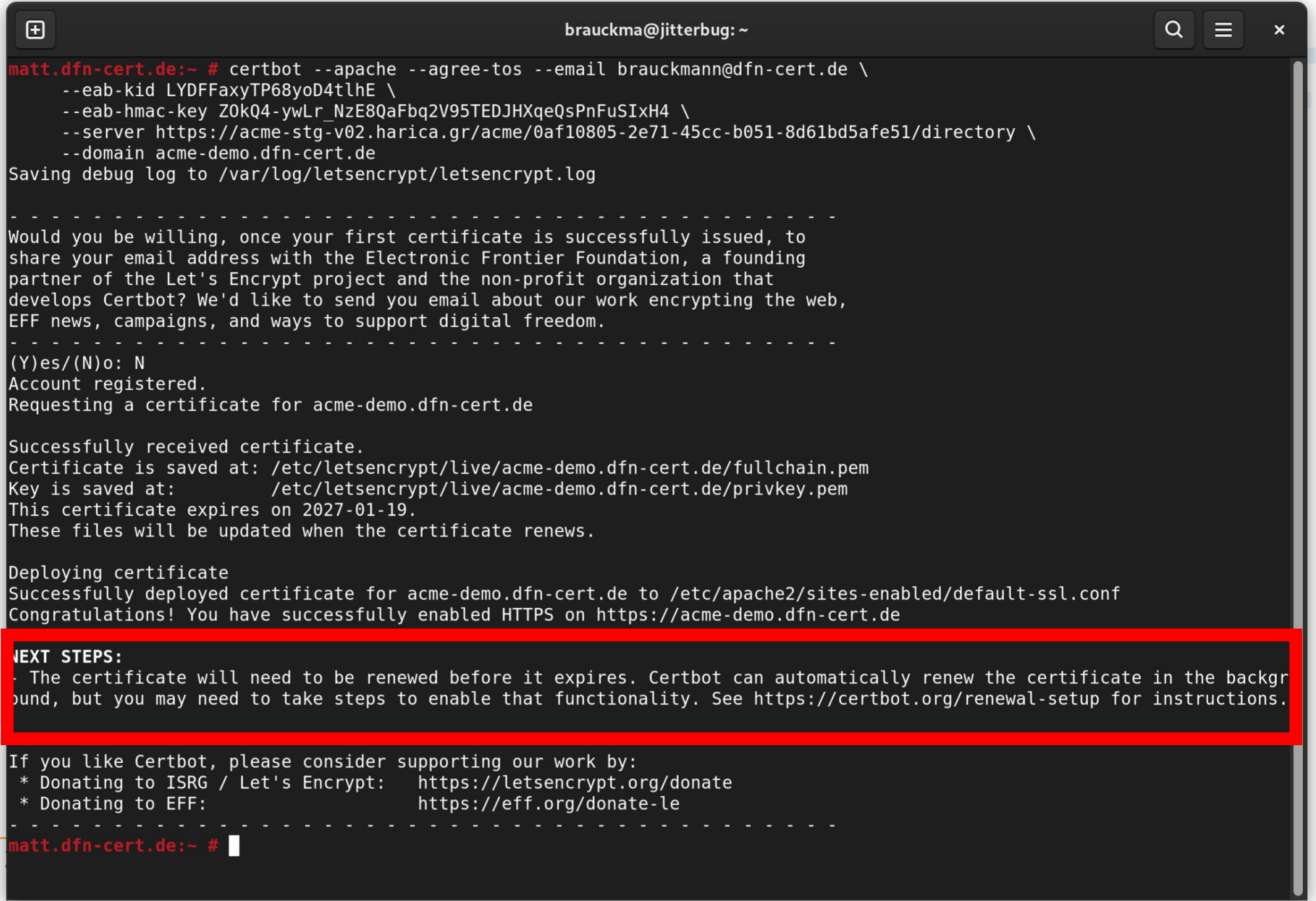
--server https://acme-stg-v02.harica.gr/acme/0af10805-2e71-45cc-b051-8d61bd5afe51/directory \
--domain acme-demo.dfn-cert.de
Saving debug log to /var/log/letsencrypt/letsencrypt.log
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
Would you be willing, once your first certificate is successfully issued, to
share your email address with the Electronic Frontier Foundation, a founding
partner of the Let's Encrypt project and the non-profit organization that
develops Certbot? We'd like to send you email about our work encrypting the web,
EFF news, campaigns, and ways to support digital freedom.
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
(Y)es/(N)o: N
Account registered.
Requesting a certificate for acme-demo.dfn-cert.de
Successfully received certificate.
Certificate is saved at: /etc/letsencrypt/live/acme-demo.dfn-cert.de/fullchain.pem
Key is saved at: /etc/letsencrypt/live/acme-demo.dfn-cert.de/privkey.pem
This certificate expires on 2027-01-19.
These files will be updated when the certificate renews.
Deploying certificate
Successfully deployed certificate for acme-demo.dfn-cert.de to /etc/apache2/sites-enabled/default-ssl.conf
Congratulations! You have successfully enabled HTTPS on https://acme-demo.dfn-cert.de
NEXT STEPS:
- The certificate will need to be renewed before it expires. Certbot can automatically renew the certificate in the backgr
ound, but you may need to take steps to enable that functionality. See https://certbot.org/renewal-setup for instructions.
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
If you like Certbot, please consider supporting our work by:
* Donating to ISRG / Let's Encrypt: https://letsencrypt.org/donate
* Donating to EFF: https://eff.org/donate-le
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
matt.dfn-cert.de:~ #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--domain acme-demo.dfn-cert.de
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Successfully received certificate.
Certificate is saved at: /etc/letsencrypt/live/acme-demo.dfn-cert.de/fullchain.pem
Key is saved at: /etc/letsencrypt/live/acme-demo.dfn-cert.de/privkey.pem
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* Donating to ISRG / Let's Encrypt: https://letsencrypt.org/donate
* Donating to EFF: https://eff.org/donate-le
matt.dfn-cert.de:~ #

# Praxis mit HARICA

## Tour: Fehlerfälle bei Enterprise EAB Accounts

- Domain nicht im Enterprise EAP Account hinterlegt, aber prinzipiell im Enterprise verfügbar:

  `The following domains are not whitelisted: <fqdn>`

- Domain nicht im Enterprise verfügbar:

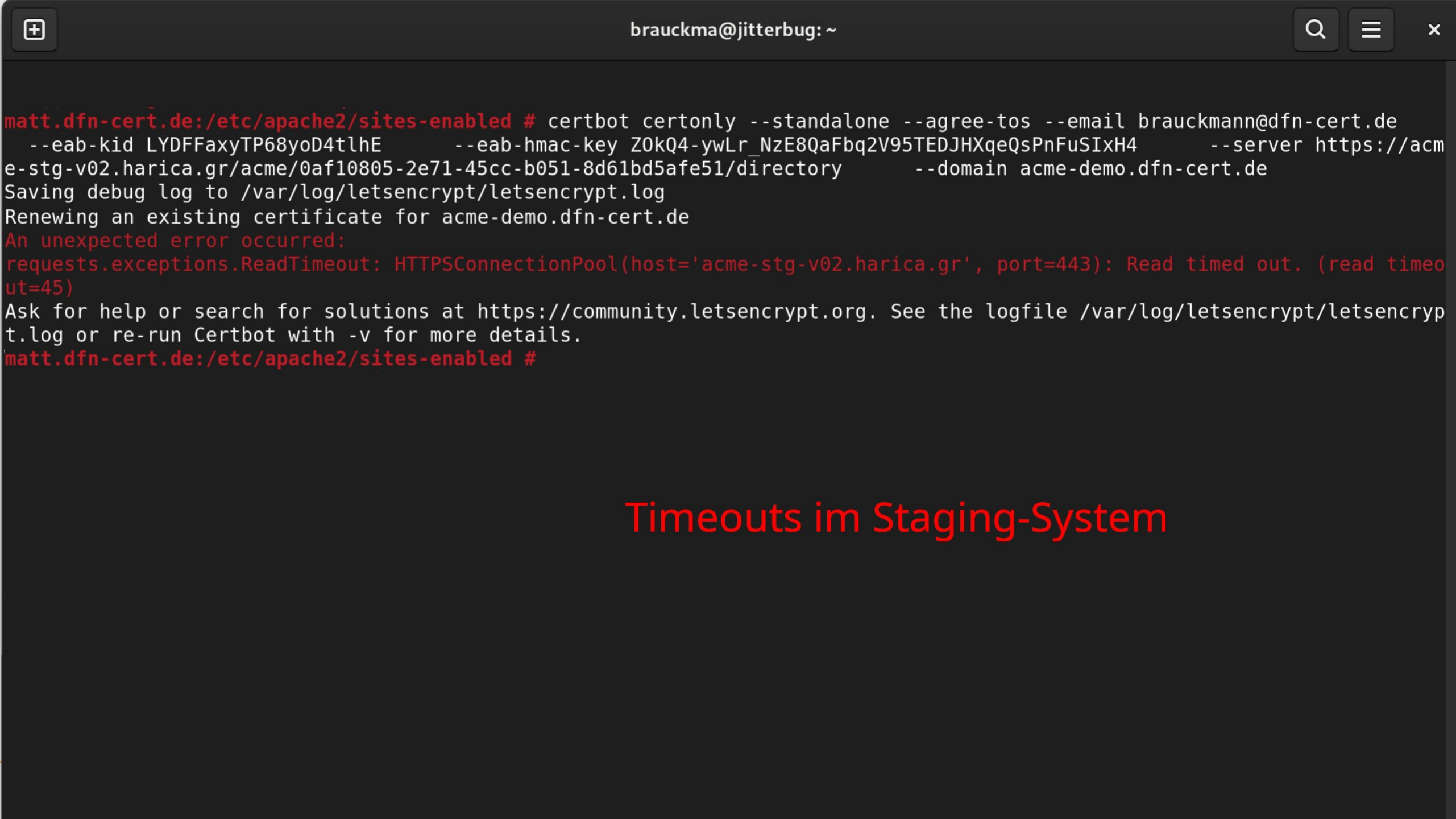
  `Identifiers could not be parsed from ACME Server`

- Timeouts im Staging System:

  `requests.exceptions.ReadTimeout: ...`


brauckma@jitterbug: ~
matt.dfn-cert.de:~ # certbot certonly --standalone --agree-tos --email brauckmann@dfn-cert.de --eab-kid LYDFFaxyTP68y
oD4tlhE --eab-hmac-key ZOkQ4-ywLr_NzE8QaFbq2V95TEDJHX
s://acme-stg-v02.harica.gr/acme/
0af10805-2e71-45cc-b051-8d61bd5afe51/directory --domai acme-demo1.dfn-cert.de
Saving debug log to /var/log/letsencrypt/letsencrypt.log
Requesting a certificate for acme-demo1.dfn-cert.de
An unexpected error occurred:
The following domains are not whitelisted: acme-demo1.dfn-cert.de.
Ask for help or search for solutions at https://community.letsencrypt.org. See the logfile /var/log/letsencrypt/letsencryp
t.log or re-run Certbot with -v for more details.
matt.dfn-cert.de:~ #
Domain nicht im Enterprise EAB Account hinterlegt, aber prinzipiell im Enterprise verfügbar


brauckma@jitterbug: ~
matt.dfn-cert.de:~ # certbot certonly --standalone --agree-tos --email brauckmann@dfn-cert.de --eab-kid LYDFFaxyTP68y
oD4tlhE --eab-hmac-key ZOkQ4-ywLr_NzE8QaFbq2V95TEDJH qeQsPhFu5IxH4 --server https://acme-stg-v02 harica.gr/acme/
0af10805-2e71-45cc-b051-8d61bd5afe51/directory --dom in acme-demo.akjjdlgjdslgjdlgjfdgjfdgdfg.de
Saving debug log to /var/log/letsencrypt/letsencrypt.log
Requesting a certificate for acme-demo.akjjdlgjdslgjdlgjf
An unexpected error occurred:
Identifiers could not be parsed from ACME Server
Ask for help or search for solutions at https://community.letsencrypt.org. See the logfile /var/log/letsencrypt/letsencryp
t.log or re-run Certbot with -v for more details.
matt.dfn-cert.de:~ #
Domain nicht im Enterprise verfügbar


brauckma@jitterbug: ~
matt.dfn-cert.de:/etc/apache2/sites-enabled # certbot certonly --standalone --agree-tos --email brauckmann@dfn-cert.de
--eab-kid LYDFFaxyTP68yoD4tlhE --eab-hmac-key ZOkQ4-ywLr_NzE8QaFbq2V95TEDJHXqeQsPnFuSIxH4 --server https://acme-stg-v02.harica.gr/acme/0af10805-2e71-45cc-b051-8d61bd5afe51/directory --domain acme-demo.dfn-cert.de
Saving debug log to /var/log/letsencrypt/letsencrypt.log
Renewing an existing certificate for acme-demo.dfn-cert.de
An unexpected error occurred:
requests.exceptions.ReadTimeout: HTTPSConnectionPool(host='acme-stg-v02.harica.gr', port=443): Read timed out. (read timeout=45)
Ask for help or search for solutions at https://community.letsencrypt.org. See the logfile /var/log/letsencrypt/letsencrypt.log or re-run Certbot with -v for more details.
matt.dfn-cert.de:/etc/apache2/sites-enabled #
Timeouts im Staging-System

# Praxis mit HARICA

Tour: Nutzung der EAB Accounts mit Apache `mod_md`

Harica CertManager - Ent

cm-stg.harica.gr/PrevalidatedEnterprises

Email

Client Auth

More

Validated Information

Data privacy statement

Help / Guides

GREEK UNIVERSITIES NETWORK (GUnet)
General Commercial Registry Number: 160729401000

| Friendly Name | Organization | Created By | Created At | Status |
|---|---|---|---|---|
| jbr-acme-demo | DFN-CERT Services GmbH - Stage | jbr-ea@dfn-cert.de | 09/01/2026 | |

Details | Certificates | Domains

| | |
|---|---|
| **Organization** | DFN-CERT Services GmbH - Stage |
| **Created At** | Friday, January 9, 2026 |
| **Created By** | jbr-ea@dfn-cert.de |
| **Key ID** | LYDFFaxyTP68yoD4tlhE |
| **HMAC Key** | ZOkQ4-ywLr_NzE8QaFbq2V95TEDJHXqeQsPnFuSIxH4 |
| **Server URL** | https://acme-stg-v02.harica.gr/acme/0af10805-2e71-45cc-b051-8d61bd5afe51/directory |
| **Certificate Type** | SSL OV |
| **Status** | |
| **Notes** | |
| **Tags** | |
| **Actions** | Disable |

```
matt.dfn-cert.de:/etc/apache2 # a2enmod md ssl
Module md already enabled
Considering dependency mime for ssl:
Module mime already enabled
Considering dependency socache_shmcb for ssl:
Module socache_shmcb already enabled
Module ssl already enabled
matt.dfn-cert.de:/etc/apache2 #
```

```
matt.dfn-cert.de:/etc/apache2 # a2enmod md ssl
Module md already enabled
Considering dependency mime for ssl:
Module mime already enabled
Considering dependency socache_shmcb for ssl:
Module socache_shmcb already enabled
Module ssl already enabled
matt.dfn-cert.de:/etc/apache2 # head sites-enabled/default-ssl.conf
MDomain acme-demo.dfn-cert.de
MDContactEmail dfnpca@dfn-cert.de
MDCertificateAuthority https://acme-stg-v02.harica.gr/acme/0af10805-2e71-45cc-b051-8d61bd5afe51/directory
MDCertificateAgreement accepted
MDExternalAccountBinding /etc/apache2/secret/harica-eab-file

<VirtualHost *:443>
        ServerName acme-demo.dfn-cert.de

        DocumentRoot /var/www/html
matt.dfn-cert.de:/etc/apache2 #
```

```
matt.dfn-cert.de:/etc/apache2 # a2enmod md ssl
Module md already enabled
Considering dependency mime for ssl:
Module mime already enabled
Considering dependency socache_shmcb for ssl:
Module socache_shmcb already enabled
Module ssl already enabled
matt.dfn-cert.de:/etc/apache2 # head sites-enabled/default-ssl.conf
MDomain acme-demo.dfn-cert.de
MDContactEmail dfnpca@dfn-cert.de
MDCertificateAuthority https://acme-stg-v02.harica.gr/acme/0af10805-2e71-45cc-b051-8d61bd5afe51/directory
MDCertificateAgreement accepted
MDExternalAccountBinding /etc/apache2/secret/harica-eab-file

<VirtualHost *:443>
        ServerName acme-demo.dfn-cert.de

        DocumentRoot /var/www/html
matt.dfn-cert.de:/etc/apache2 # cat secret/harica-eab-file
{"kid": "LYDFFaxyTP68yoD4tlhE", "hmac": "ZOkQ4-ywLr_NzE8QaFbq2V95TEDJHXqeQsPnFuSIxH4"}
matt.dfn-cert.de:/etc/apache2 #
```

```
matt.dfn-cert.de:/etc/apache2 # a2enmod md ssl
Module md already enabled
Considering dependency mime for ssl:
Module mime already enabled
Considering dependency socache_shmcb for ssl:
Module socache_shmcb already enabled
Module ssl already enabled
matt.dfn-cert.de:/etc/apache2 # head sites-enabled/default-ssl.conf
MDomain acme-demo.dfn-cert.de
MDContactEmail dfnpca@dfn-cert.de
MDCertificateAuthority https://acme-stg-v02.harica.gr/acme/0af10805-2e71-45cc-b051-8d61bd5afe51/directory
MDCertificateAgreement accepted
MDExternalAccountBinding /etc/apache2/secret/harica-eab-file

<VirtualHost *:443>
        ServerName acme-demo.dfn-cert.de

        DocumentRoot /var/www/html
matt.dfn-cert.de:/etc/apache2 # cat secret/harica-eab-file
{"kid": "LYDFFaxyTP68yoD4tlhE", "hmac": "ZOkQ4-ywLr_NzE8QaFbq2V95TEDJHXqeQsPnFuSIxH4"}
matt.dfn-cert.de:/etc/apache2 # apache2ctl restart
matt.dfn-cert.de:/etc/apache2 # apache2ctl restart
```

# Praxis mit HARICA

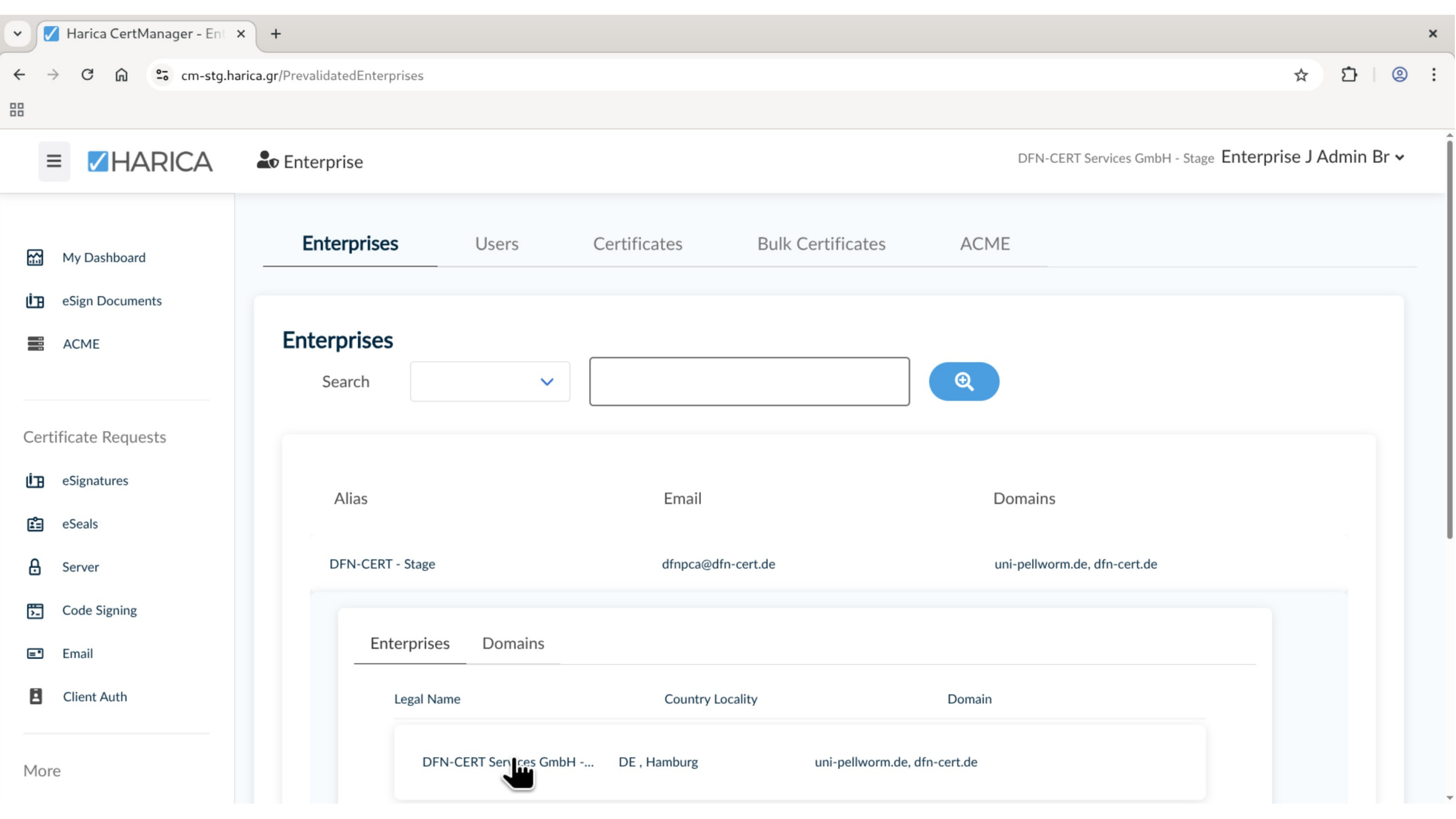
Personal EAB Accounts:

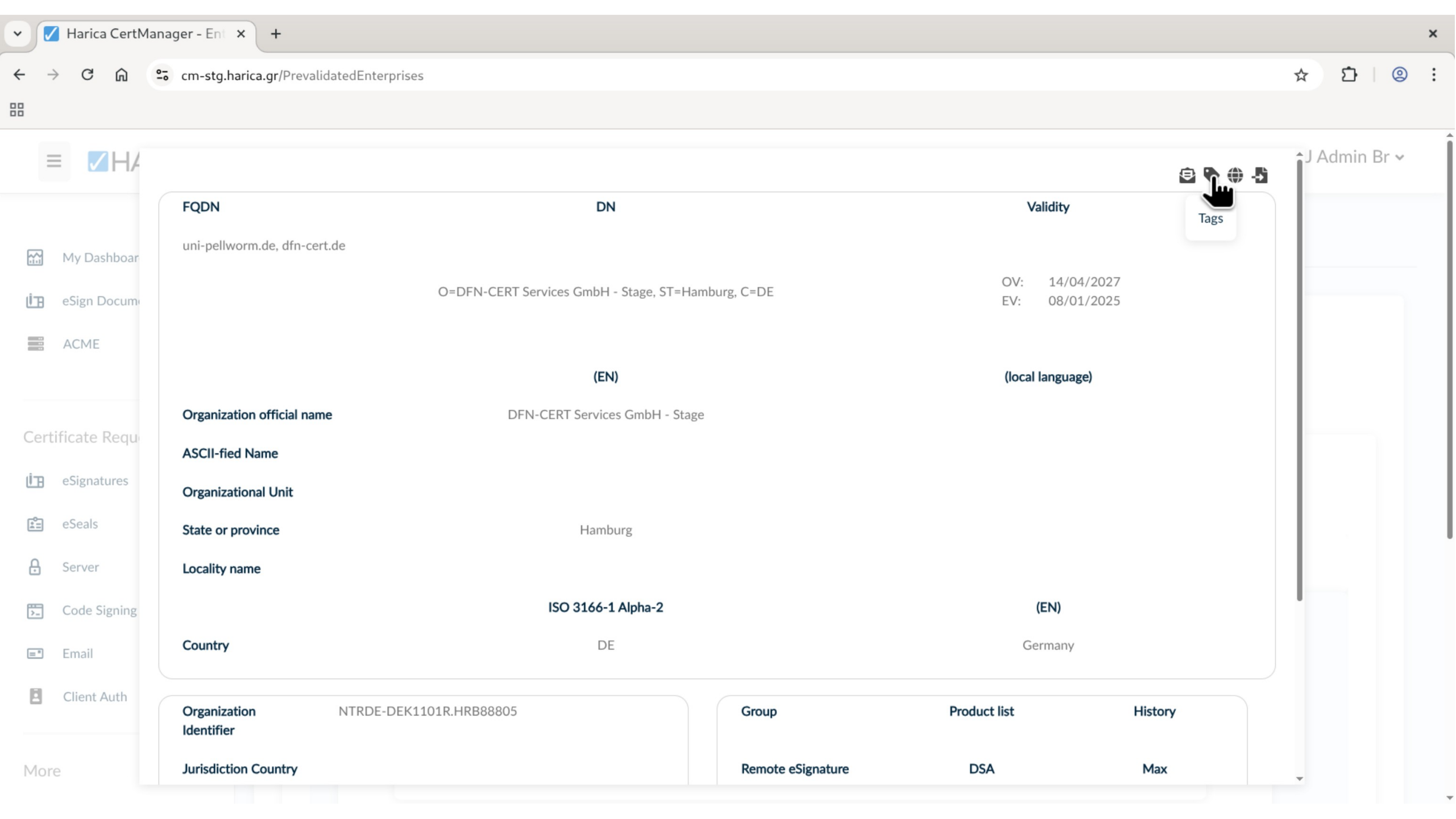
- Für alle User, die im certmanager dem Enterprise zugeordnet sind
- Generelle Funktion nur nach Freischaltung Enterprise Admin
- SSL DV (ohne Organisationsinformation)
- Alle Domains aus dem Enterprise, dem der User zugeordnet ist, verfügbar (auch nicht vorvalidierte)
- Immer mit ACME Challenge zur Berechtigungsprüfung

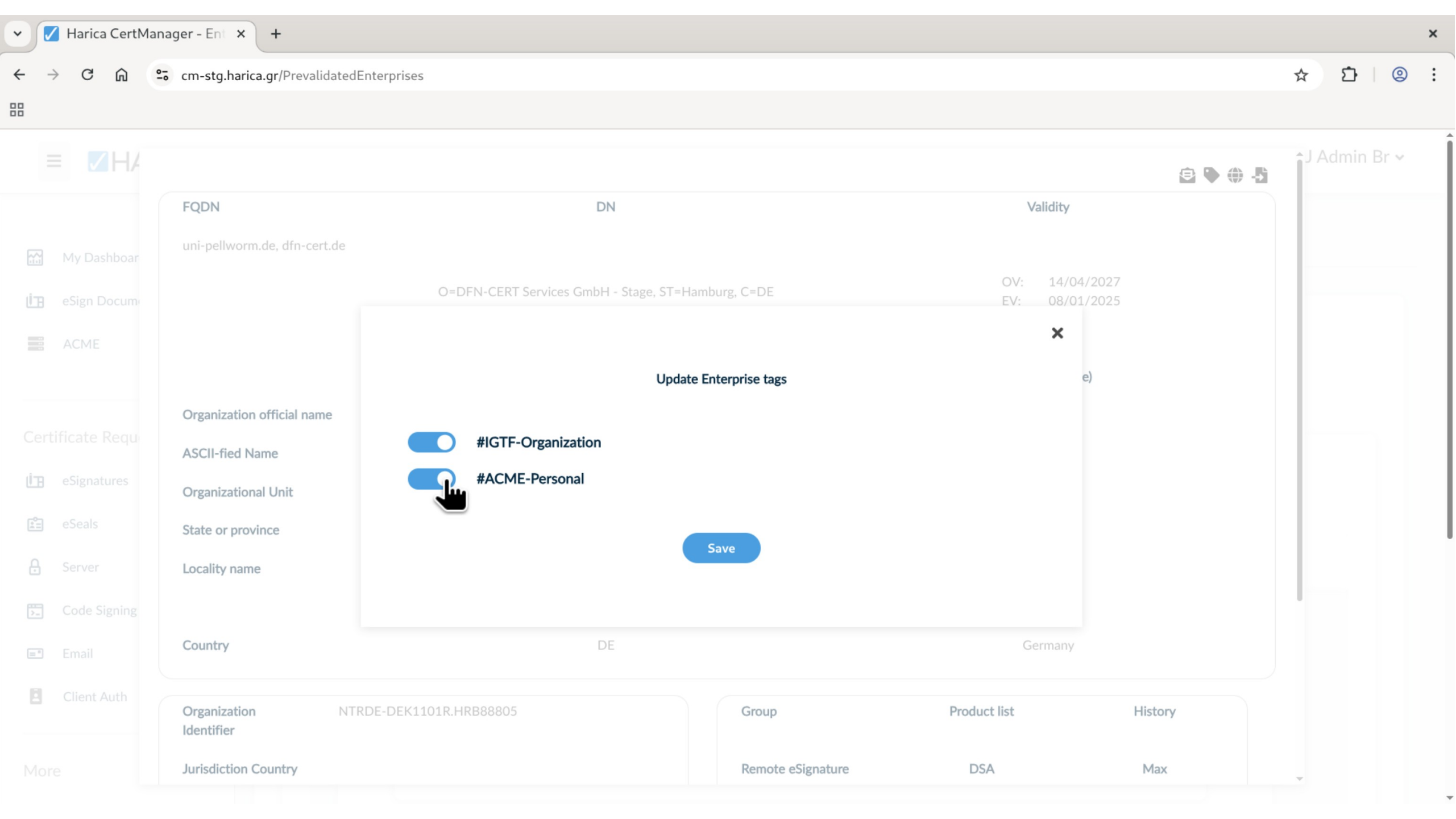
# Praxis mit HARICA

Tour durch das HARICA-Interface:

- Enterprise Admin: Freischalten von Personal ACME für alle User


Harica CertManager - Ent
cm-stg.harica.gr/PrevalidatedEnterprises
HARICA
Enterprise
DFN-CERT Services GmbH - Stage
Enterprise J Admin Br
My Dashboard
eSign Documents
ACME
Certificate Requests
eSignatures
eSeals
Server
Code Signing
Email
Client Auth
More
Enterprises
Users
Certificates
Bulk Certificates
ACME
Enterprises
Search
Alias
Email
Domains
DFN-CERT - Stage
dfnpca@dfn-cert.de
uni-pellworm.de, dfn-cert.de
Enterprises
Domains
Legal Name
Country Locality
Domain
DFN-CERT Services GmbH -...
DE , Hamburg
uni-pellworm.de, dfn-cert.de

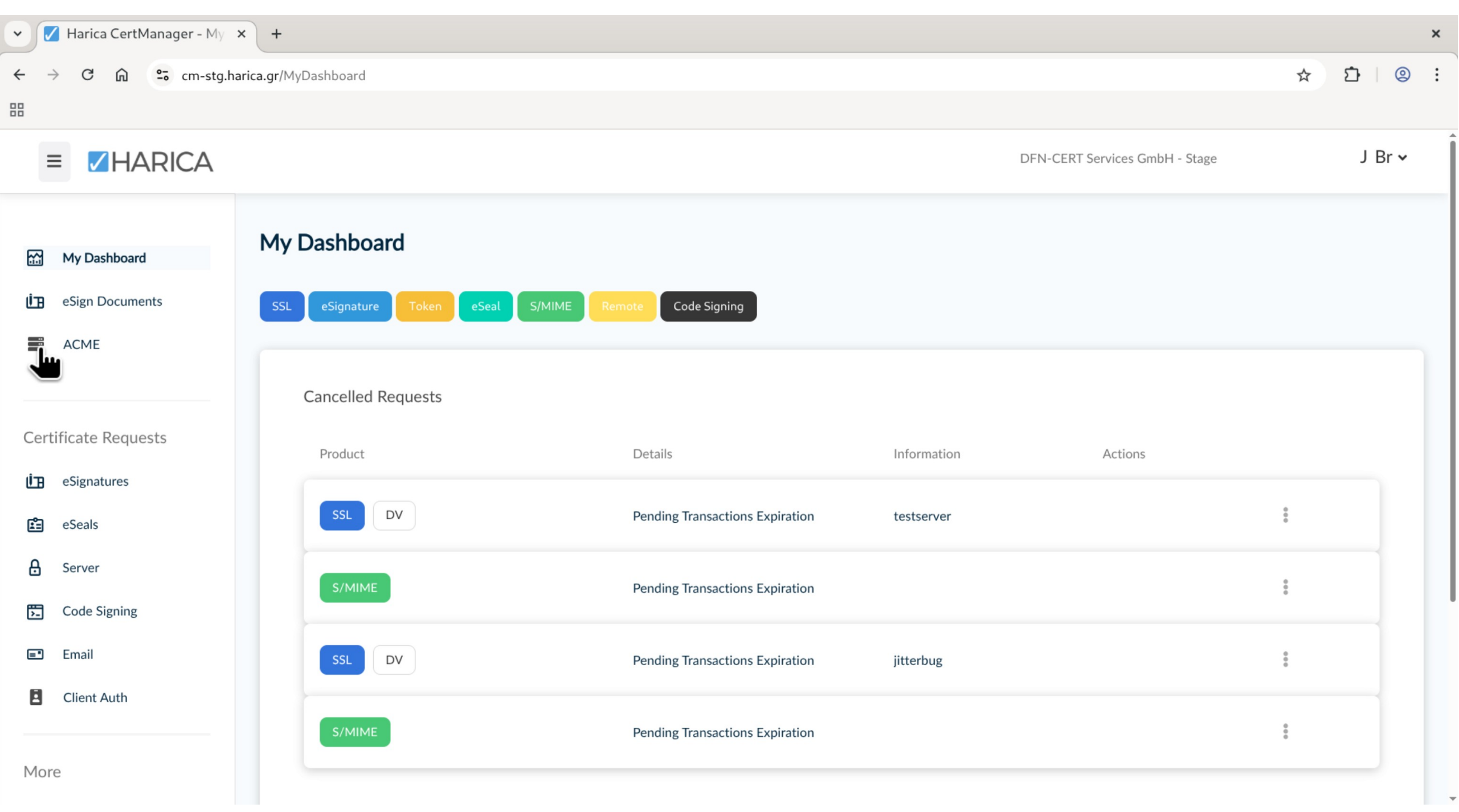

Harica CertManager - En
cm-stg.harica.gr/PrevalidatedEnterprises
J Admin Br
Tags
FQDN
DN
Validity
uni-pellworm.de, dfn-cert.de
O=DFN-CERT Services GmbH - Stage, ST=Hamburg, C=DE
OV: 14/04/2027
EV: 08/01/2025
(EN)
(local language)
Organization official name
DFN-CERT Services GmbH - Stage
ASCII-fied Name
Organizational Unit
State or province
Hamburg
Locality name
ISO 3166-1 Alpha-2
(EN)
Country
DE
Germany
Organization Identifier
NTRDE-DEK1101R.HRB88805
Jurisdiction Country
Group
Product list
History
Remote eSignature
DSA
Max
My Dashboar
eSign Docum
ACME
Certificate Requ
eSignatures
eSeals
Server
Code Signing
Email
Client Auth
More


Harica CertManager - En
cm-stg.harica.gr/PrevalidatedEnterprises
FQDN
DN
Validity
uni-pellworm.de, dfn-cert.de
O=DFN-CERT Services GmbH - Stage, ST=Hamburg, C=DE
OV: 14/04/2027
EV: 08/01/2025
Update Enterprise tags
#IGTF-Organization
#ACME-Personal
Save
Organization official name
ASCII-fied Name
Organizational Unit
State or province
Locality name
Country
DE
Germany
Organization Identifier
NTRDE-DEK1101R.HRB88805
Jurisdiction Country
Group
Product list
History
Remote eSignature
DSA
Max

# Praxis mit HARICA

Tour durch das HARICA-Interface:

- User: Erzeugen eines Personal EAB Accounts


Harica CertManager - My
cm-stg.harica.gr/MyDashboard
HARICA
DFN-CERT Services GmbH - Stage
J Br
My Dashboard
eSign Documents
ACME
Certificate Requests
eSignatures
eSeals
Server
Code Signing
Email
Client Auth
More
My Dashboard
SSL
eSignature
Token
eSeal
S/MIME
Remote
Code Signing
Cancelled Requests
Product
Details
Information
Actions
SSL
DV
Pending Transactions Expiration
testserver
S/MIME
Pending Transactions Expiration
SSL
DV
Pending Transactions Expiration
jitterbug
S/MIME
Pending Transactions Expiration

Harica CertManager - Ac

cm-stg.harica.gr/Acme

HARICA

DFN-CERT Services GmbH - Stage

J Br

- My Dashboard
- eSign Documents
- ACME

Certificate Requests

- eSignatures
- eSeals
- Server
- Code Signing
- Email
- Client Auth

More

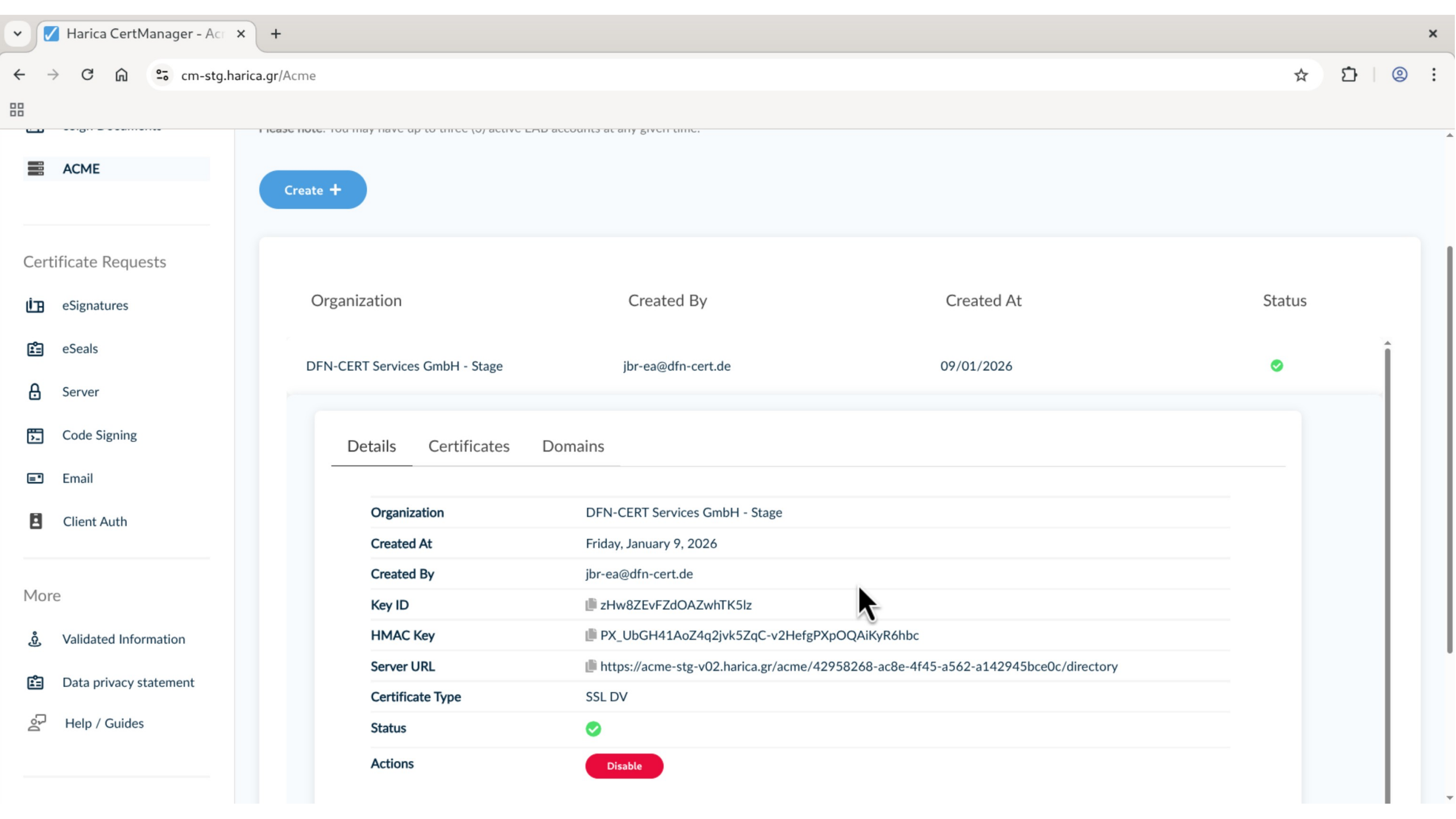
## Manage ACME EAB Accounts

To issue SSL/TLS server certificates using the ACME protocol, you must first create an ACME External Account Binding (EAB) account. This account currently allows you to obtain Domain Validated (DV) certificates by demonstrating control over your domain using the supported ACME challenge types: HTTP-01 and DNS-01.

**Please note**: You may have up to three (3) active EAB accounts at any given time.

Create +

| Organization | Created By | Created At | Status |
|---|---|---|---|
| DFN-CERT Services GmbH - Stage | jbr-ea@dfn-cert.de | 24/06/2025 | |
| DFN-CERT Services GmbH - Stage | jbr-ea@dfn-cert.de | 19/06/2025 | |
| DFN-CERT Services GmbH - Stage | jbr-ea@dfn-cert.de | 19/06/2025 | |


Harica CertManager - Ac
cm-stg.harica.gr/Acme
ACME
Create +
Certificate Requests
eSignatures
eSeals
Server
Code Signing
Email
Client Auth
More
Validated Information
Data privacy statement
Help / Guides
Organization
Created By
Created At
Status
DFN-CERT Services GmbH - Stage
jbr-ea@dfn-cert.de
09/01/2026
Details
Certificates
Domains
Organization
DFN-CERT Services GmbH - Stage
Created At
Friday, January 9, 2026
Created By
jbr-ea@dfn-cert.de
Key ID
zHw8ZEvFZdOAZwhTK5lz
HMAC Key
PX_UbGH41AoZ4q2jvk5ZqC-v2HefgPXpOQAiKyR6hbc
Server URL
https://acme-stg-v02.harica.gr/acme/42958268-ac8e-4f45-a562-a142945bce0c/directory
Certificate Type
SSL DV
Status
Actions
Disable

# Ausblick

# Ausblick

Fortgeschrittene Themen:

- Systeme, die nicht outbound zum ACME Server kommunizieren können
  - Lösung: Zentrales System in der Infrastruktur, dass als ACME Client Zertifikate bezieht und intern weiterverteilt
- dns-01 challenges

# Ausblick

Jetzt ist der richtige Zeitpunkt,

mit der Automatisierung zu beginnen.

- Kontakt: dfnpca@dfn-cert.de
- Dokumentation auf
  https://doku.tid.dfn.de/de:dfnpki:tcs:2025:acme
- Community auf dfnpki-d-Mailingliste
  https://www.listserv.dfn.de/sympa/info/dfnpki-d