

eIDAS Qualified Certificates Under PSD2 Frequently Asked Questions

Table of Contents

About Open Banking Exchange Europe	3
Purpose	3
History	3
Audience	3
Disclaimer	3
About This Document	4
Terminology	4
Scope	4
Audience	4
References	4
Certificates	5
What are certificates?	5
What are Qualified Certificates?	5
Why are eIDAS Certificates relevant to PSD2?	5
Is there a Standard for the new PSD2 data fields?	6
When is it appropriate to use QSealCs or QWACs?	6
Can multiple certificates be used to handle multiple brands from the same bank?	7
Can the certificate's contents be edited?	8
Where can I get further guidance on the link between eIDAS & PSD2?	8
When might a certificate no longer be valid?	8
Certificate Validation	9
What do we mean by certificate validation?	9
Where do I get the QTSP trust anchor for certificate validation?	9

What is the EU Trusted List? _____	10
Can a certificate be accepted if the QTSP is no longer Qualified? _____	11
How can a certificate's technical correctness be validated? _____	12
How can the Qualified status of a certificate be checked? _____	12
How can the fact that it is a PSD2 compliant certificate be validated? _____	12
How can certificate revocation information be obtained? _____	13
How frequently should a certificate be validated? _____	13
Are Reported Errors with Certificate Key Usage Bits Correct? _____	13
Qualified Certificates & National Competent Authority Registers _____	14
What is the NCA Registration Number? _____	14
What is the link between the NCA Register & the Registration Number in the certificate? _____	14
What are the PSP's Roles? _____	14
Are PSP Authorisation & Roles updates synchronised with certificates? _____	15
Is NCA revocation notification harmonised between the NCAs & QTSPs? _____	15
Commercial Relations with QTSPs & Procuring Certificates _____	17
Who issues PSD2 Qualified Certificates? _____	17
What are the liability models of QTSPs? _____	17
Where can Test PSD2 Certificates be obtained? _____	17
Other _____	18
Are there any character restrictions on PSD2 Authorisation Numbers? _____	18
Are there any PSP requirements on Private Key management? _____	18
Will a Web Browser accept a PSD2 QWAC? _____	18
Does an ASPSP need to use a qualified certificate? _____	19
Can a non-EU/EEA TPP be issued a PSD2 compliant certificate? _____	19
Bibliography _____	20
Appendices _____	22
Appendix A: National Competent Authority (NCA) Registers _____	22
Appendix B: QWACs & the CA/Browser Forum _____	23

About Open Banking Exchange Europe

Purpose

The revised Payment Services Directive (PSD2) came into force in January 2018, with a requirement deadline of 14 September 2019 to implement Strong Customer Authentication (SCA). At this point, all regulated entities (Payment Service Providers) had to ensure that they individually complied with PSD2 and the Regulatory Technical Standards (RTS) set out by the European Banking Authority (EBA).

There is a clear regulatory expectation that the financial industry will organise itself to make sure that the implemented solutions for PSD2 are interoperable. However, at the time of writing, there remains a few outstanding activities required to successfully achieve this expectation.

Open Banking Europe was created to support Payment Service Providers (PSPs) and Third Party Providers (TPPs) in meeting the Access to Account (XS2A) requirements of PSD2 and to facilitate the wider aims of Open Banking.

History

Following a series of stakeholder consultations that started in 2016 to determine industry requirements, PRETA S.A.S. launched Open Banking Europe to build a PSD2 Directory solution to support PSPs and TPPs in meeting the PSD2 XS2A requirements. The Open Banking Europe Directory Service was released in January 2019, providing a single, standardised reference point for banks to accurately identify which TPPs are authorised to access their interfaces and which roles and services they are authorised to perform on behalf of their customers. Additionally, a Transparency Directory has been developed to help TPPs understand developer portals, and to help Account Servicing Payment Services Providers (ASPSPs) understand TPP brands. Open Banking Europe continues to work with stakeholders on a range of initiatives to facilitate a greater understanding of Open Banking and enable collaboration between interested parties. Open Banking Exchange is a subsidiary of Konsentus Ltd.

Audience

Open Banking Europe is aimed at the following audiences:

- Competent Authorities
- Payment Service Providers (PSPs), including:
 - Account Servicing Payment Services Providers (ASPSPs)
 - Third Party Providers (TPPs)
- Qualified Trust Service Providers (QTSPs)
- Service Providers, Solution Providers, and relevant consultancies

Disclaimer

Whilst care has been taken to ensure that the information contained in this document is true and correct at the time of publication, there are still clarifications needed around PSD2's scope and implementation and this may impact on the accuracy of the information contained within this document.

As such, Open Banking Europe cannot guarantee the accuracy or reliability of any information contained within this document at the time of reading, or that it is suitable for your intended use.

About This Document

Scope

This document provides the answers to common questions about the use of Qualified certificates to support secure communications between payment services under PSD2 and their related Regulatory Technical Standards (RTS). The aim of this document is **NOT** to define how security works, but rather to explain which types of certificates are used, how to procure and validate them and the various operational and commercial processes.

Audience

This document is aimed at the following audiences:

- Account Servicing Payment Services Providers (ASPSPs)
- National Competent Authorities (NCAs)
- Third Party Providers (TPPs)

References

This document cites a number of sources. For links to these sources, please see the [Bibliography](#) on page 20. The key documents are:

- The Revised Payment Services Directive (PSD2) - Directive (EU) 2015/2366
- Regulation (EU) No 910/2014 of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market (eIDAS)
- The RTS for Strong Customer Authentication and Common and Secure Communications Under PSD2 (RTS SCA/CSC for PSD2)

Terminology

Certificate: Public key certificate, as defined in ITU-T X.509.

eIDAS: Regulation (EU) No 910/2014 of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market.

ETSI: The European Telecommunications Standards Institute.

CA/Browser Forum or CAB Forum: The Certification Authority & Browser Forum.

CRL: Certificate Revocation List, as defined in ITU-T X.509.

IETF: The Internet Engineering Task Force.

OCSP: Online Certificate Status Protocol, as defined in RFC 6960.

PSP: Payment Service Provider, as defined in PSD2.

PSD2: The Revised Payment Services Directive (EU) 2015/2366 on payment services in the internal market.

QSealC: Qualified Certificate for Electronic Seals, as defined in eIDAS.

QTSP: Qualified Trust Service Provider meeting the requirements at Qualified level, as defined in eIDAS.

Qualified Certificate: Public key certificate meeting the requirements at Qualified level, as defined in eIDAS.

QWAC: Qualified Certificate for Website Authentication, as defined in eIDAS.

RTS: Commission Delegated Regulation (EU) 2018/389 of 27 November 2017 supplementing Directive (EU) 2015/2366 with regard to regulatory technical standards for strong customer authentication and common and secure open standards of communication.

TLS: Transport Layer Security, as defined in IETF RFC 5246 (v1.2) or IETF RFC 8446 (v1.3).

XS2A: Access to Account.

Certificates

What are certificates?

Certificates are widely used as a means for identifying persons, systems, or organisations and are an important part of securing modern day communications. A certificate binds an identity to a cryptographic key which can be used to secure communications.

Certificates are issued by an organisation trusted to assure the identity of the owner of a key. This trusted organisation is commonly called a Certification Authority, or under European Union (EU) legislation it is called a Trust Service Provider (TSP).

The security of certificates is based on a special type of cryptography, called Public Key Cryptography, and the infrastructure used by a TSP to manage certificates is called a Public Key Infrastructure (PKI).

Certificates are based around a common set of recognised standards which are adapted to meet the requirements of a community of users.

What are Qualified Certificates?

Qualified Certificates are certificates aimed at enhancing trust in electronic transactions across the EU, regulated through **Regulation (EU) No 910/2014 of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market (eIDAS)**. eIDAS defines requirements on Qualified Certificates, and the Qualified Trust Service Providers (QTSP) that issue them, which ensure their trustworthiness. The operation of QTSPs is supervised by a national supervisory body to assure that these requirements are met.

The 'Qualified' status gives a certificate a legal and trust mark which indicates that it meets specific technical and security requirements.

Most of the requirements of the eIDAS regulation are aligned with generally accepted standards and practices. However, these are enhanced to include technical features specific to Qualified Certificate such as being automatically identifiable as Qualified.

A list of QTSPs recognised by a supervisory body as meeting the requirements of eIDAS is issued by each nation. Each national list is referenced through a list of lists issued by the European Commission. All the lists can be viewed through a Trusted List Browser or automatically processed through the List of Trusted Lists.

Why are eIDAS Certificates relevant to PSD2?

Article 34

Certificates

1. For the purpose of identification, as referred to in Article 30(1)(a), payment service providers shall rely on qualified certificates for electronic seals as referred to in Article 3(30) of Regulation (EU) No 910/2014 or for website authentication as referred to in Article 3(39) of that Regulation.

Article 34 of the **RTS for Strong Customer Authentication and Common and Secure Communications Under PSD2 (RTS SCA/CSC for PSD2)** says that eIDAS certificates will be used for the identification of Payment Service Providers (PSPs), and specifically references two of the existing types of Qualified Certificate as follows:

- Qualified Certificate for Electronic Seals (QSealC)
- Qualified Certificate for Website Authentication (QWAC)
- Article 34 of the RTS also places additional requirements on the content of a PSD2 Qualified Certificate. In particular:
 - Article 34.2 requires that the certificate contains the PSP Authorisation Number issued by the National Competent Authority (NCA),
 - Article 34.3 requires that the certificate includes the role(s) of the PSP,
 - and the name of the Competent Authority where the PSP is registered.

Certificates and related infrastructures are a key part of securing modern day communications and it is assumed that they will be used for securing the PSP interfaces, i.e. Application Programming Interfaces (APIs), in PSD2.

Having said that, while the interface must be secure and based on international standards, there is no explicit legal requirement that certificates, or Qualified Certificates are used for securing communications where identification is not a concern.

Is there a Standard for the new PSD2 data fields?

ETSI has specified a recommended Standard - **ETSI TS 119 495** - for Qualified Certificates to meet the requirements of the RTS. This standard builds on other ETSI Standards for QTSPs and Qualified Certificates, in particular **ETSI EN 319 411-2** on policy requirements for TSPs issuing qualified Certificates and **ETSI TS 119 412-1**, **ETSI EN 319 412-3**, **ETSI EN 319 412-4** and **ETSI EN 319 412-5** on certificate profiles.

When is it appropriate to use QSealCs or QWACs?

Article 34 of the RTS has generated some questions, as it allows QSealCs or QWACs to be used for identification, leading some to believe there is a choice. In fact, QSealCs and QWACs are designed to be used with different security protocols which have different features.

QSealCs are used with Advanced (or Qualified) Electronic Seals, based on using Public Key cryptography (commonly called Digital Signatures), such as is defined in ETSI **PADES**, **CADES** or **XADES** standards¹ to protect application data blocks. QWACs are used with a Transport Layer Security Protocol such as is defined in **IETF RFC 5246** or **IETF RFC 8446** to protect data in peer-to-peer communications.

¹ Currently, no specific standard exists for use of JSON Web Signatures as eIDAS Advanced Electronic Signatures, although **IETF RFC 7515** provides a general structure for such signatures.

In particular, the following features of the protection may be provided using the certificates with Electronic Seals or Transport Layer Security:

Feature	QSealC with Electronic Seal	QWAC with Transport Layer Security
Where is protection applied?	During communication and in storage	Just during communication
Is data protected when passed through intermediary?	Protection applies end-to-end, even if passed through intermediary	Only applied to direct peer-to-peer communications
What data is protected?	Specific data block	All data passing through channel
Evidential value?	Advanced or Qualified Electronic Seals are specifically recognised under eIDAS	No specific recognition
Type of protection?	Authentication and integrity	Authentication, integrity and confidentiality

In general, there are advantages with the type of protection that may be afforded with either type of certificate. Paragraph 14 of the Opinion of the European Banking Authority on the use of eIDAS certificates under the RTS on SCA and CSC identifies three basic choices:

1. **Parallel use of QWACs and QSealCs:** this will allow PSPs to identify themselves to each other and communicate securely using QWACs with a Transport Layer Security Protocol and ensure that the application data submitted originates from the PSP identified in the QSealC using Advanced or Qualified Electronic Seals.
2. **Use of QWACs only:** this will allow PSPs to identify themselves and communicate securely using QWACs with a Transport Layer Security Protocol but cannot provide evidence that the data submitted originates from the PSP identified.
3. **Use of QSealCs with an additional element that ensures secure communication:** this will allow PSPs to identify themselves to each other but cannot ensure confidentiality during the communication session. Therefore, an additional element that ensures secure communication should be used in order to comply with the requirements of Article 35(1) of the RTS, such as a Transport Layer Security Protocol using general commercially available (i.e. not Qualified) certificates.

In summary, whether a QSealC or QWAC is used is not an arbitrary choice but depends on the way the Certificates are used within the design of the interface.

Can multiple certificates be used to handle multiple brands from the same bank?

If a PSP, as identified by its authorisation number, wishes to employ separate certificates for different brands or operational identifiers that the customer will recognise, then this is possible and can be indicated in the certificate.

Generally, the 'Organizational Unit' sub-identifier within the name of the subject will be used.

This information will need to be verified by the QTSP in some way.

Can the certificate's contents be edited?

There is no possibility to 'edit' a certificate.

If the information carried within the certificate changes, for example, changing the name or removing a role, then the old certificate must be revoked, and a new certificate needs to be issued.

You could keep the old certificate, if you are only adding information to the new one, as the old certificate is still accurate, even if not complete.

The point is, you cannot modify or edit the fields of an existing certificate.

Where can I get further guidance on the link between eIDAS & PSD2?

Further guidance on the use of eIDAS Qualified Certificates for PSD2 is given in:

- Annex B of **ETSI TS 119 495**
- **Open Banking Europe: Understanding Internet Security & eIDAS Certificates**
- **The Euro Retail Payments Board (ERPB): Final Report of the ERPB Working Group on Payment Initiation Services**
- **Opinion of the European Banking Authority on the use of eIDAS certificates under the RTS on SCA and CSC**

A resource page can also be found at the following link, including a list of QTSPs that are offering PSD2 certificates: <https://www.openbankingeurope.eu/qtsp-and-eidas/>

When might a certificate no longer be valid?

A certificate might become invalid, and so need replacing, for several reasons such as:

- The security of the signing key is called into question, for example, due to loss of a card holding a backup.
- The lifetime of the certificate, commonly one or two years, has expired.
- There is an error in the certificate content as may be found through QTSP regular audit or problems reported by scanners looking for problem certificates.

Thus, a certificate's validity can unexpectedly be revoked with less than 24 hours' notice. If PSPs are not prepared for such an eventuality this could result in significant downtime in its service whilst a replacement is obtained.

Therefore, it is recommended that a PSP's disaster recovery planning includes procedures for recovery from unexpended loss of validity of a certificate, for example by having a second certificate from an alternative supplier available as a backup. In addition, a PSP should have in place procedures to ensure that new certificates are obtained well before the expiry of existing certificates.

Certificate Validation

What do we mean by certificate validation?

When a party uses a PSD2 Qualified Certificate to identify another party, they will want to check that the certificate is 'valid'. This check generally involves checks on the following aspects of a certificate:

What to Check	How to Check it
That the Trust Service Provider (TSP) is Qualified	EU Trusted Lists
That the certificate is technically correct and has not expired	A raft of standards and practices in current use today
That the certificate is Qualified	QCStatement marking certificate as Qualified, etc.
That the certificate contains the required PSD2 information	Checking against ETSI TS 119 495
That the certificate has not been revoked since it was issued	Certificate Revocation List (CRL) / Online Certificate Status Protocol (OCSP) checks

Note these checks confirm the validity of the certificate and the identity authentication supported by the certificate. However, it does not necessarily confirm that the authorisations for the PSP are up to date (please see 5.4 Are PSP Authorisation & Roles updates synchronised with certificates? on page 15).

Where do I get the QTSP trust anchor for certificate validation?

Before validating a certificate, it is necessary to have a list of trusted QTSPs and their 'trust anchors' which will be used as the basis for validation checks.

The trust anchors can be root CA certificates but are often intermediate CA certificates which only issues qualified certificates for a particular 'trust service(s)' (e.g. for signing). By validating from the trust anchor, which is not a root, the validation can be targeted at end user certificates appropriate for a particular application.

Major software platforms often come with a pre-configured 'root certificate store' but this generally does **not** include those root or intermediate certificates which are recognised as trusted QTSPs under the eIDAS regulation.

The EU provide the list of all QTSPs in the form of a set of national trusted lists which include the trust anchors required for validation.

Before validation is carried out this trusted list needs to be downloaded into any validation module and updated on a regular basis. Please see **0 HOW FREQUENTLY SHOULD A CERTIFICATE BE VALIDATED?** on page 13 for a discussion on the frequency of checking.

More information on trusted lists is available at: https://ec.europa.eu/cefdigital/DSS/webapp-demo/doc/dss-documentation.html#_eu_trusted_lists_of_certification_service_providers

Providers of System/Browser Root Certificate Stores (for example, Microsoft, Google, Apple, Mozilla) do not currently support trusted lists. For more information, please see Appendix B: QWACs & the CA/Browser Forum on page **Error! Bookmark not defined.**

What is the EU Trusted List?

A list of Qualified Trust Service Providers (QTSPs) recognised by a supervisory body as meeting the requirements of **Regulation (EU) No 910/2014 of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market (eIDAS)** is issued by each country.

Each national trusted list is then referenced through a List of Trusted Lists issued by the European Commission (EC). The combined national lists as referenced through the EC List of Trusted Lists is referred to as the EU Trusted List.

All the lists (both the EU Trusted List and the national trusted lists) are XML documents which can automatically processed

The national Trusted Lists include information for each trusted service a QTSP provides such as the service type (for example, issuing qualified certificates – Svctype/CA/QC²) and the QTSP’s trust anchors as used for verification (please see **0 WHERE DO I GET THE QTSP TRUST ANCHOR FOR CERTIFICATE VALIDATION?** on page 9).

The trust anchors held in the EU Trusted Lists can be a root CA certificate but are often an intermediate CA certificate which only issues qualified certificates for a particular trust service(s).

The EU Trusted List can be found at:

<https://ec.europa.eu/tools/lotl/eu-lotl.xml>

Within the EU Trusted List, the **TSLLocation** tag contains the URL of each national trusted list. For example, here is the link to the German list:

```

- <OtherTSLPointer>
  - <ServiceDigitalIdentities>
    - <ServiceDigitalIdentity>
      - <DigitalId>
        <X509Certificate>MIIECjCCAvKgAwIBAgICBH8wDQYJKoZIhvcNAQENBQAwPzI
        </DigitalId>
      </ServiceDigitalIdentity>
    - <ServiceDigitalIdentity>
      - <DigitalId>
        <X509Certificate>MIIECjCCAvKgAwIBAgICBM4wDQYJKoZIhvcNAQENBQAwPz
        </DigitalId>
      </ServiceDigitalIdentity>
    - <ServiceDigitalIdentity>
      - <DigitalId>
        <X509Certificate>MIIF2TCCA5GgAwIBAgIBKjA9BgkqhkiG9w0BAQowMKANMA
        </DigitalId>
      </ServiceDigitalIdentity>
    <TSLLocation>https://www.nrca-ds.de/st/TSL-XML.xml</TSLLocation>
    <AdditionalInformation>
  </OtherTSLPointer>
  
```

² Other “qualified” service types recognised under the eIDAS regulation include timestamping, signature/seal validation and signature/seal preservation. Further qualifiers to the service may indicate additional restrictions to the service (for example, only for QSealC or QWAC).

The national list shows one or more records for each QTSP. In the example below (the German list which is found at <https://www.nrca-ds.de/st/TSL-XML.xml>) D-TRUST and one of their trust anchor CA certificates, which is found under the **x509Certificate** tag:

```

- <DigitalId>
  <X509SubjectName>CN=ChamberSign Qualified CA 1 2008:PN, O=D-Trust GmbH, C=DE</X509SubjectName>
</DigitalId>
- <DigitalId>
  <X509SKI>y4ZsYi8sKsb+uM3yP2ECXaUrM80=</X509SKI>
</DigitalId>
</ServiceDigitalIdentity>
<ServiceStatus>http://uri.etsi.org/TrstSvc/TrustedList/Svcstatus/undersupervision</ServiceStatus>
<StatusStartingTime>2001-10-21T22:00:00Z</StatusStartingTime>
- <ServiceInformationExtensions>
  - <Extension Critical="false">
    - <ns5:Qualifications>
      - <ns5:QualificationElement>
        - <ns5:Qualifiers>
          <ns5:Qualifier uri="http://uri.etsi.org/TrstSvc/TrustedList/SvcInfoExt/QCWithSSCD"/>
          </ns5:Qualifiers>
        - <ns5:CriteriaList assert="atLeastOne">
          - <ns5:KeyUsage>
            <ns5:KeyUsageBit name="nonRepudiation">true</ns5:KeyUsageBit>
            </ns5:KeyUsage>
          </ns5:CriteriaList>
        </ns5:QualificationElement>
      </ns5:Qualifications>
    </Extension>
  </ServiceInformationExtensions>
</ServiceHistoryInstance>
</ServiceHistory>
</TSPService>
- <TSPService>
  - <ServiceInformation>
    <ServiceTypeIdentifier>http://uri.etsi.org/TrstSvc/Svctype/CA/QC</ServiceTypeIdentifier>
    - <ServiceName>
      <Name xml:lang="en">ChamberSign Qualified CA 1 2012:PN</Name>
      <Name xml:lang="de">ChamberSign Qualified CA 1 2012:PN</Name>
    </ServiceName>
    - <ServiceDigitalIdentity>
      - <DigitalId>
        <X509Certificate>MIIFFTCCA/2gAwIBAgIDDodpMA0GCSqGSIb3DQEBCwUAMFExCzAJBgNVBAYTAkRFMRUwEwYDVQQKDAxELVRYt
      </DigitalId>
    </ServiceDigitalIdentity>
    <ServiceStatus>http://uri.etsi.org/TrstSvc/TrustedList/Svcstatus/granted</ServiceStatus>
  </ServiceInformation>
</TSPService>

```

The EU Trusted List can be validated from a certificate published in the Official Journal. This is done indirectly using the 'Pivot' List of Trust Lists (Pivot LOTL), the last of which should match that used in the latest EU List of Trusted Lists (LOTL). The LOTL signing certificate can then be used to validate the EU LOTL which holds, under the national entry, the certificate to be used to validate the national Trusted list. Finally, the certificate of a TSP, as used for a given Trust Service, is held in the relevant entry for that TSP and Trust Service.

To understand more fully how to use the EU Trusted Lists reference, see:

- The Official Journal announcement of a list of the initial LOTL signing certificates and how they are to be used with Pivot LOTL (referred to as the 'compiled list'):

http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2016.233.01.0001.01.ENG

- Clause 4.1 of TS 119 615 (to be published Summer 2019).
- YouTube videos:

https://www.youtube.com/watch?time_continue=661&v=J6LRcCx_yn0

Can a certificate be accepted if the QTSP is no longer Qualified?

If a QTSP is no longer seen as meeting the requirements of the eIDAS regulation, then the QTSP will be removed from the national list of currently valid QTSPs and should only be used in validating historical information.

A QTSP is required (under the applicable ETSI Standards) to have a termination plan which, as far as possible, minimises the disruption resulting from termination of its service. This requirement includes the revocation handling for unexpired certificates and arrangements for the revocation status information to continue to be available following termination.

At the present time, there is commercial technology available to perform checks on whether a QTSP is still Qualified. However, this may not be readily integrated into the banks existing platforms, which may be problematic under circumstances where ASPSPs do not want to accept a certificate issued by a QTSP that is no longer operating.

How can a certificate's technical correctness be validated?

As with any certificate, the general validity of PSD2 Qualified Certificates can be checked using widely implemented standards for certificates, such as **IETF RFC 5280**. This includes checks on:

- The content of the certificate (e.g. certificate validity period),
- Whether the certificate can be validated against a known and trusted Certificate Issuer (a QTSP) (see **4.2 WHERE DO I GET THE QTSP TRUST ANCHORS FOR CERTIFICATE VALIDATION?** on page 9), called certificate path validation, and
- That it has not been revoked.

As commercial technology is already available to perform these checks, there are no barriers to validating a PSD2 Qualified Certificate's technical correctness.

How can the Qualified status of a certificate be checked?

As well as checking that the certificate has really been issued by a QTSP, the certificate should declare itself as qualified in a QC statement.

Checking the QCStatement

The Annexes to the eIDAS regulation include specific requirements on Qualified Certificates. Most of these requirements are in line with general standards but includes the EU specific requirement for:

"(a) an indication, at least in a form suitable for automated processing, that the certificate has been issued as a qualified certificate for electronic signature;"

This requirement is met by including a specific 'QCStatement' called **esi4-qcStatement-1** in the certificate which can be checked to ensure that the certificate is Qualified. **esi4-qcStatement-1** is defined in ETSI EN 319 412-5. Other specific requirements on the use of existing standard fields to meet the requirements of eIDAS are defined in:

- **ETSI EN 319 412-4** for QWAC
- **ETSI EN 319 412-3** for QSealC

Checking the presence of the **esi4-qcStatement-1** requires the use of certificate parsing tool to extract this information from a certificate. Such checking is a standardised procedure.

How can the fact that it is a PSD2 compliant certificate be validated?

The **RTS for Strong Customer Authentication and Common and Secure Communications Under PSD2 (RTS SCA/CSC for PSD2)** requires the Qualified Certificate to include the Authorisation Number or equivalent, and as well as the name of the National Competent Authority (NCA) and the role(s) granted to the Payment Service Provider (PSP).

These are carried in further **QCStatement** extensions to the certificate, as defined in **ETSI TS 119 495**. If this information is not present, then the certificate is not compliant with TS 119 495.

A certificate parsing tool is required to extract the PSD2 information from a certificate.

How can certificate revocation information be obtained?

Information on whether a certificate is no longer valid because it has been revoked following issuance is published either in a Certificate Revocation List (CRL) listing all the certificates that have been revoked, or on a per certificate basis using an Online Certificate Status Protocol (OCSP). The standards require that this revocation information is updated within 24 hours of a confirmed notification.

The revocation information for a specific certificate is readily accessible from the QTSP, given the information carried within a Qualified Certificate. In particular:

1. For QSealCs from QTSPs using CRLs, it is required that the certificate includes the CRL distribution point extension which points to a publicly available download for the CRL.
2. For QSealCs from QTSPs using OCSPs, it is required that the Certificate includes Authority Information Access extension with accessLocation pointing to the OCSP service.
3. For QWACs, which follow the rules of the Certification Authority & Browser Forum Extended Validation (for more information, please see [APPENDIX B: QWACs & THE CA/BROWSER FORUM](#) on page **Error! Bookmark not defined.**), it is required that the certificate includes either the CRL distribution point extension pointing to a publicly available download for the CRL, or Authority Information Access with accessLocation pointing to the OCSP service.

The use of OCSPs or CRLs for revocation status checking is commonly handled by commercial certificate validation software. Commercial technology is already in place to perform these checks, so this information can be easily obtained.

How frequently should a certificate be validated?

There is a significant overhead validating Qualified Certificates, particularly with regards checking external information on the revocation (see [4.8 HOW CAN CERTIFICATE REVOCATION INFORMATION BE OBTAINED?](#) above) and the EU Trusted List (see [4.6 HOW CAN THE QUALIFIED STATUS OF A CERTIFICATE BE CHECKED?](#) on page 12).

This overhead can be reduced by caching this information, but the use of cached information needs to be balanced against the risks. The following should be taken into account in considering any caching policy:

- **Technical Correctness & PSD2 Formatting:** this is unlikely to change during the life of a certificate.
- **Certificate Expiry:** A certificate includes an expiry date after which it is no longer valid.
- **Trusted List:** A certificate that is issued as Qualified will remain as Qualified for its lifetime, unless the QTSP loses its Qualified status, or a new QTSP may be added to the trusted list, in either case the EU Trusted Lists are updated (see [4.4 CAN A CERTIFICATE BE ACCEPTED IF THE QTSP IS NO LONGER QUALIFIED?](#) on page 11).
- **Revocation:** the revocation information is regularly updated at least every 24 hours but can be quicker depending on the QTSPs practices, and as indicated by the 'next update' in the CRL or OCSP revocation information. Also, in some cases, a QTSP may make changes to revocation status immediately available without waiting for the next update.

In conclusion, an ASPSP will (probably) not download all the information needed to check a certificate validity for every transaction but must make a risk/cost based decision on how frequently or when to check against the latest download.

Are Reported Errors with Certificate Key Usage Bits Correct?

Some general purpose toolkits for handling certificates may falsely report error with certain uses of the certificate 'key-usage' bits in QSealCs, for example, the 'non-repudiation' bit set on its own, without the digital signature bit, can give error such as: "java.security.InvalidKeyException: Wrong key usage". This is not in line with the applicable standards and should not be considered as an error. This is explicitly allowed in X.509 and the ETSI standard certificate profile applicable to Qualified Certificates for Electronic Seals.

Qualified Certificates & National Competent Authority Registers

What is the NCA Registration Number?

All systems use identifiers to uniquely identify who is who in a system. In the consumer space, these can be email addresses, identity card numbers, or specially issued numbers or codes (such as your insurance policy number). In payments, these can be BICs, sort codes, or national clearing codes.

Within PSD2, Article 34 of the **RTS for Strong Customer Authentication and Common and Secure Communications Under PSD2 (RTS SCA/CSC for PSD2)** makes it clear that the number issued by the National Competent Authorities (NCAs) will be the identifier used.

Within Open Banking Europe (OBE), we call this the Unique Reference Number or URN.

These numbers are not standardised or checked for duplicates across countries. So, to be made unique, the country code and the code of the NCA are added together to create a Global Unique Reference Number (G-URN), formatted as follows:

- > 2 character country code representing the NCA country
- > Hyphen-minus
- > 2-8 character NCA identifier
- > Hyphen-minus
- > Authorisation Number as specified by the NCA

For example: *PL-PFSA-1234567890*

The above is the G-URN for a Polish Regulated Entity that is created by the Polish Financial Standard Authority with number '1234567890'.

As the Authorisation Number may contain non-Latin characters, for example, ' ' (space) or '-' (hyphen-minus), this will also be included into the Global URN.

For example: *MT-MFSA-A 12345* (note the space after the 'A')

What is the link between the NCA Register & the Registration Number in the certificate?

The Registration Number of a Payment Service Provider (PSP) is placed in the *organizationIdentifier* attribute of the **Subject Distinguished Name** field of its Qualified Certificate, as specified in Clause 5.2.1 of **ETSI TS 119 495**. This can be encoded in the certificate as a PSD2 Authorisation Number, using the encoding as specified.

This encoding of a PSD2 Authorisation Number includes the country code and identifier of the National Competent Authority (NCA). This information can be used to identify the relevant Register as listed in **APPENDIX A: NATIONAL COMPETENT AUTHORITY (NCA) REGISTERS** on page 22.

What are the PSP's Roles?

According to the RTS on CSC and SCA, there are four PSP Roles:

- > Account Servicing
- > Payment Initiation
- > Account Information
- > Issuing of Card-Based Payment Instruments

The Roles are derived from the NCA Registers which publish 'Services' or 'Authorisations', in line with the Services found in Annex 1 of PSD2.

The mapping from Services to Roles is as follows (as set out in the **Opinion of the European Banking Authority on the use of eIDAS certificates under the RTS on SCA and CSC**):

- a) *Account servicing - in accordance with Article 4(17) of PSD2, an 'ASPSP' means a payment service provider providing and maintaining a payment account for a payer. However, there is not a specific payment service corresponding to that role, but in almost all cases PSPs that should be able to provide and maintain payment accounts for PSUs are those that provide the payment services as referred to in points (1), (2) and/or (3) of Annex I to PSD2.*
- b) *Payment initiation - this corresponds to payment initiation service as referred to in point (7) of Annex I to PSD2.*
- c) *Account information - this corresponds to account information service as referred to in point (8) of Annex I to PSD2.*
- d) *Issuing of card-based payment instruments - this corresponds to the issuing of payment instruments and/or acquiring of payment transactions as referred to in point (5) of Annex I to PSD2.*

ETSI TS 119 495 describes how these Roles are encoded into the certificates.

Are PSP Authorisation & Roles updates synchronised with certificates?

A Qualified Certificate contains information on a PSP which is checked by the Qualified Trust Service Provider (QTSP) when the certificate is first issued. If the status of the PSP changes such that any authorisations are revoked, the QTSP will not revoke the certificate unless informed of the change by the NCA responsible for PSD2 or the PSP itself. Thus, it is possible for certificates to remain valid, even if the authorisations implied by the certificate are no longer valid, although the identity authenticated through the certificate is still correct.

Thus, considering that the NCA is not obliged to inform the QTSP and the QTSP is not obliged to check the NCA register, it is clear that although we can trust the certificates for identification, in the case that an NCA has withdrawn a license and the certificate has not yet been revoked, there is a period when the roles in the certificate will not be accurate. In the case that any party wishes to check the up to date role of a PSP, then they must look at the Home NCA of that entity.

Is NCA revocation notification harmonised between the NCAs & QTSPs?

There is no obligation on NCAs to revoke certificates if the role assigned to a PSP is revoked.

ETSI TS 119 495 obliges the QTSP to provide an interface to enable the NCA to revoke certificates issued based on its Register but there are no assurances that this will be done.

Considering the above and despite the aspirations of the Regulators, it is not guaranteed that the possession of a Qualified eIDAS Certificate means that the entity holding that certificate is still regulated. This issue is best documented in The Euro Retail Payments Board (ERPB): Final Report of the ERPB Working Group on Payment Initiation Services published in November 2017.

It is for this reason, that most ASPSPs are choosing to separately check that the entity identified in the certificate is (still) authorised for the role that they are trying to perform, by checking in the NCA Register, or in a consolidated operational directory.

A note on TS 119 495 NCA/QTSP information exchange requirements:

1. NCAs may make available contact information which may be used by the QTSPs to notify the NCAs of certificates issued for their TPPs.

The EBA intends to centralise the list of any NCA email addresses that are published.

2. In accordance with TS 119 495, QTSPS **are required** to make available contact information which **may** be used by the NCAs to notify the QTSP of changes to the PSD2 information or revocations relating to a PSP.

The EU Trusted List provides contact information which can be used to request a contact point specifically for NAC to QTSP information exchanges.

3. NCAs **may** notify the QTSP of changes to the PSD2 information or revocations relating to a PSP.

Having said this, it is not clear whether any NCA's will publish email addresses or proactively notify QTSPs.

Commercial Relations with QTSPs & Procuring Certificates

Who issues PSD2 Qualified Certificates?

While there are many Qualified Trust Service Providers (QTSPs) that can issue the right kind of certificates, not all of them will want to do so. It is a commercial choice of the QTSP.

Open Banking Europe (OBE) has issued a list of QTSPs which declare themselves ready and willing to meet the requirements of PSD2 Qualified Certificates for financial institutions. Please see:

<https://www.openbankingexchange.eu/qtsp-and-eidas/>

What are the liability models of QTSPs?

Article 13.2 of Regulation No 910/2014 on electronic identification and trust services (eIDAS) states:

“...trust service providers [including QTSPs] shall be liable for damage caused intentionally or negligently to any natural or legal person due to a failure to comply with the obligations under this Regulation”

However, in Article 13.2 this can be overridden by limitations stated by the QTSP in the Certificate Policy. A QTSP will make generally available any limitations of liability which should be checked by any party relying on the certificate in its terms and conditions. This is generally defined within the context of national legislation and specified in the Certificate Policy.

Where can Test PSD2 Certificates be obtained?

The **RTS for Strong Customer Authentication and Common and Secure Communications Under PSD2 (RTS SCA/CSC for PSD2)** makes it a requirement that Account Servicing Payment Service Providers (ASPSPs) must provide a Test Facility. There is an expectation that this Test Facility will include demonstrations of the security mechanisms that will be used in the live environment, and that parties will want to become familiar with the type of certificates that will be used in production. This generates a demand for test certificates.

Test PSD2 certificates are generally issued by a test Certificate Authority which is not a QTSP as listed in the EU Trusted List. The test certificate is expected to contain the identity, PSD2 authorisation number, and other attributes as required by **ETSI TS 119 495**. This will check most aspects of use PSD2 certificates, but the issuer will not be listed in the EU Trusted List.

Some QTSPs are already offering test certificates. Contact the QTSPs for further information.

Other

Are there any character restrictions on PSD2 Authorisation Numbers?

The encoding used for the PSD2 Authorisation Number as held in a Qualified Certificate (see clause 5.2.1 of **ETSI TS 119 495**) does not place any restrictions on the characters that may be used in a PSD2 Authorisation Number.

Are there any PSP requirements on Private Key management?

There are no specific hardware requirements for the management of Private Keys related to Qualified Certificates for Website Authentication (QWACs) used for Transport Layer Security (TLS) nor when using Qualified Certificates for Electronic Seals (QSealCs).

There is a confusion in the market between Qualified Certificates for Electronic Seals and Qualified Electronic Seals. **These are not the same thing.**

Some QTSP may require Payment Services Providers (PSPs) to use Qualified Electronic Seals with a certified Qualified Signature/Seal Creation Device (QSCD) due to existing policy constraints or as agreed with its national authority. If a PSP does not want to use a QSCD, it may need to shop around for alternative QTSPs that do not require use of a QSCD.

Regulation (EU) No 910/2014 of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market (eIDAS) defines two levels of Electronic Seal, either of which may be used with a QSealC, but one places further requirements on the management of the private key:

Advanced Electronic Seals, which can be met using a QSealC without any requirements on the use of a specialised device to hold the private key.

Qualified Electronic Seals which require the private key to be held within a device certified as meeting requirements as specified in the eIDAS regulation, referred to a Qualified Signature/Seal Creation Device (QSCD). Qualified Electronic Seals are given specific legal presumption under the eIDAS Regulation.

Use of Qualified Electronic Seals, created using a QSCD, gives legal presumption of the origin and integrity of the sealed data. This can have advantages to Payment Service Providers (PSPs) wanting to assure the evidential value of the sealed data.

A list of notified QSCDs is available at:

<https://ec.europa.eu/futurium/en/content/compilation-member-states-notification-sscds-and-qscds>

Advice on the most relevant device may be obtained from the QTSP or the eIDAS National Supervisory Body.

Will a Web Browser accept a PSD2 QWAC?

Certificates issued for PSD2 are aimed primarily at security of communications between PSPs. However, the PSPs may want to use the same certificate to secure access to customers which are likely to be using a Web Browser.

Using the PSD2 QWAC in the public interface to web browsers could have security implications. In particular, certificates used for public interfaces are required by CA/Browser Forum standards to be placed in a public 'certificate transparency' register, which could leave PSPs open to potential targeted attacks.

Furthermore, some PSD2 QWACs when used on a customer facing interface may not be accepted by some web browsers.

For more information, please see **APPENDIX B: QWACS & THE CA/BROWSER FORUM** on page **Error! Bookmark not defined.4**.

Does an ASPSP need to use a qualified certificate?

The best practice is to always use a Qualified Certificate.

Credit Institutions or other PSPs must use a Qualified Certificate when they are playing the role of an Account Information Service Provider (AISP), Payment Initiation Service Provider (PISP) or Payment Instrument Issuer Service Provider (PIISP).

When playing the role of an ASPSP they must use certificates for mutual authentication, and it is **recommended** that this certificate is qualified, but it is not a regulatory requirement. This question is handled specifically in Article 20 of the **Opinion of the European Banking Authority on the use of eIDAS certificates under the RTS on SCA and CSC**.

Can a non-EU/EEA TPP be issued a PSD2 compliant certificate?

No, PSD2 certificates should not be issued to non-EU/EEA countries. Even if a PSD2 certificate were issued to a non EU/EEA country it would have no meaning. From the legal viewpoint PSD2 certificates exist to identify entities that are incorporated in and regulated by EU/EEA member states. From the technical viewpoint there can be no Authorisation Number issued as the list of NCAs referenced by ETSI TS 119 495 in Annex D only contains EU/EEA countries.

Bibliography

More information about can be found at the following sources:

- Certification Authority & Browser Forum (CA/Browser Forum)
<https://cabforum.org/>
- ETSI EN 319 122: CAdES digital signatures
<https://www.etsi.org/standards-search#page=1&search=EN319122>
- ETSI EN 319 132: XAdES digital signatures
<https://www.etsi.org/standards-search#page=1&search=EN319132>
- ETSI EN 319 142: PAdES digital signatures
<https://www.etsi.org/standards-search#page=1&search=EN319142>
- ETSI TS 119 412-1: Certificate Profiles; Part 1: Overview and common data structures
<https://www.etsi.org/standards-search#page=1&search=TS119412-1>
- ETSI EN 319 412-3: Certificate Profiles; Part 3: Certificate profile for certificates issued to legal persons
<https://www.etsi.org/standards-search#page=1&search=EN319412-3>
- ETSI EN 319 412-4: Certificate Profiles; Part 4: Certificate profile for web site certificates
<https://www.etsi.org/standards-search#page=1&search=EN319412-4>
- ETSI EN 319 412-5: Certificate Profiles; Part 5: QCStatements
<https://www.etsi.org/standards-search#page=1&search=EN319412-5>
- ETSI TS 119 495: Qualified Certificate Profiles and TSP Policy Requirements under the payment services Directive (EU) 2015/2366
<https://www.etsi.org/standards-search#page=1&search=TS119495>
- The EU List of Trusted Lists (LOTL)
<https://ec.europa.eu/tools/lotl/eu-lotl.xml>
- The Euro Retail Payments Board (ERPB): Final Report of the ERPB Working Group on Payment Initiation Services
https://www.ecb.europa.eu/paym/retpaym/shared/pdf/8th-ERPB-meeting/PIS_working_group_report.pdf
- The European Technology Standards Institute (ETSI)
<http://www.etsi.org/>
- IETF RFC 5246: The Transport Layer Security (TLS) Protocol Version 1.2
<https://tools.ietf.org/html/rfc5246>
- IETF RFC 5280: Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
<https://www.ietf.org/rfc/rfc5280.txt>
- IETF RFC 8446: The Transport Layer Security (TLS) Protocol Version 1.3
<https://tools.ietf.org/html/rfc8446>
- ITU-T X.509: Information technology - Open Systems Interconnection - The Directory: Public-key and attribute certificate frameworks
<https://www.itu.int/rec/T-REC-X.509>
- Opinion of the European Banking Authority on the use of eIDAS certificates under the RTS on SCA and CSC
<https://eba.europa.eu/documents/10180/2137845/EBA+Opinion+on+the+use+of+eIDAS+certificates+under+the+RTS+on+SCACSC.pdf>

- Open Banking Europe: Understanding Internet Security & eIDAS Certificates
<https://www.openbankingeurope.eu/wp-content/uploads/2018/09/OBE-PSD2-XS2A-Understanding-Internet-Security-eIDAS-Certificates-Guide.pdf>
- Regulation (EU) No 910/2014 of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market (eIDAS)
<http://data.europa.eu/eli/reg/2014/910/oj>
- The Revised Payment Services Directive (PSD2 - Directive (EU) 2015/2366)
<http://eur-lex.europa.eu/eli/dir/2015/2366/oj>
- The RTS for Strong Customer Authentication & Common Secure Communications Under PSD2
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018R0389>

Appendices

Appendix A: National Competent Authority (NCA) Registers

Country	National Competent Authority	Link
AT	Financial Market Authority (FMA)	https://www.fma.gv.at/en/search-company-database/
BE	National Bank of Belgium (NBB)	https://www.nbb.be/fr/supervision-financiere/controle-prudentiel/domaines-de-controle/etablisements-de-paiement-et-5?l=fr
BG	Financial Supervision Commission (FSC)	http://www.fsc.bg/en/supervised-entities/lists/
HR	Hrvatska Narodna Banka (HNB)	https://www.hnb.hr/en/core-functions/supervision/list-of-credit-institutions
CY	Central Bank of Cyprus (CBC)	https://www.centralbank.cy/en/licensing-supervision
CZ	Czech National Bank (CNB)	https://apl.cnb.cz/apljerrsdad/JERRS.WEB09.DIRECT_FIND?p_lang=en
DE	Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)	https://portal.mvp.bafin.de/database/ZahlInstInfo/
DK	Finanstilsynet (FSA)	https://vut.finanstilsynet.dk/en/Tal-og-fakta/Virksomheder-under-tilsyn/VUT-database.aspx
EE	Finantsinspektsioon (FSA)	https://www.fi.ee/index.php?id=593
ES	Banco de Espana (BDE)	http://app.bde.es/ren/app/GetData?CFG=ConsultaTipos.xml&TipoFormato=XSL&Paginate=OPEN&HIST=N
FI	Finanssivalvonta (FIN-FSA)	http://www.fin-fsa.fi/en/About_us/Supervised/Pages/supervisedentities.aspx
FR	Autorité de Contrôle Prudentiel (ACPR) "Regafi"	https://www.regafi.fr/spip.php?page=results&type=advanced&id_secteur=1&lang=fr&denomination=&siren=&cib=&bic=&nom=&siren_agent=&num=&cat=21-TBR07&retrait=0
GB	Financial Conduct Authority (FCA)	https://register.fca.org.uk/
GR	Bank Of Greece	https://www.bankofgreece.gr/Pages/en/Supervision/SupervisedInstitutions/default.aspx
HU	Magyar Nemzeti Bank (MNB)	https://www.mnb.hu/en/supervision/licensing-and-institution-oversight/market-participants/search-of-market-participants
IE	Central Bank of Ireland (CBI)	http://registers.centralbank.ie/DownloadsPage.aspx
IS	Fjármálaeftirlitið (FME)	https://en.fme.is/supervision/supervised-entities/
IT	Banca d'Italia	https://infostat.bancaditalia.it/giava-inquiry-public/flex/Giava/GIAVAFEInquiry.html#
LI	Finanzmarktaufsicht Liechtenstein (FMA)	http://register.fma-li.li/
LT	Bank of Lithuania (LB)	https://www.lb.lt/en/sfi-financial-market-participants?market=1
LU	Commission de Surveillance du Secteur Financier (CSSF)	https://www.cssf.lu/entites-surveillees
LV	Finansu un Kapital Tirgus Komisija (FKTK)	http://www.fktk.lv/en/market/payment-institutions/authorized-payment-institution.html
MT	Malta Financial Services Authority (MFSA)	https://www.mfsa.com.mt/pages/licenceholders.aspx
NL	De Nederlandsche Bank (DNB)	https://www.dnb.nl/en/supervision/public-register/index.jsp
NO	Finanstilsynet (FSA)	https://www.finanstilsynet.no/en/finanstilsynets-registry/
PL	Komisja Nadzoru Finansowego (KNF)	https://www.knf.gov.pl/en/ENTITIES/entities_search
PT	Banco De Portugal	https://www.bportugal.pt/en/entidades-autorizadas
RO	Banca Nationala a Romaniei (BNR)	http://www.bnro.ro/NBR-Public-Registers-1701.aspx
SE	Finansinspektionen (FI)	https://www.fi.se/sv/vara-register/foretagsregistret/
SK	Narodna Banka Slovenska (NBS)	https://subjekty.nbs.sk/?l=en
SI	Banka Slovenije (BSI)	https://www.bsi.si/en/financial-stability/banking-system-supervision/supervisory-disclosure

Appendix B: QWACs & the CA/Browser Forum

A group of Web Browsers and Certificate Issuers, called the Certification Authority & Browser Forum (CA/Browser Forum or CABF), formed a community to develop guidelines for the issuance and management of publicly trusted certificates. This group is international and includes some European Qualified Trust Service Providers (QTSPs) who also issue PSD2 Qualified Certificates for Website Authentication (QWACs). The main aim of these guidelines is for suppliers of Web Browser software (Google, Microsoft, Apple, and Mozilla) to establish criteria for acceptance of Website Authentication Certificates by Web Browsers.

Before use of QWACs for securing PSD2 communications was envisaged, it was expected that the use of QWACs overlapped with that of the CA/Browser Forum guidelines with security of Web-browser to Website communications being the primary use case. Thus, the general standard for QWACs issued by the European Telecommunications Standards Institute (ETSI), as referenced in the **ETSI PSD2 Standard TS 119 495**, included requirements from the CA/Browser Forum guidelines.

The ETSI requirements for QSealCs do not include any requirements which are impacted by the CA/Browser Forum guidelines.

The CA/Browser Forum issued two guidelines: 'Baseline' which establishes a baseline for any certificate to be used by Web Browsers, and 'Extended Validation' (EV) which add additional requirements to ensure the validity of the identity held in Website certificates. The CA/Browser Forum EV Guideline requirements were included in ETSI standards for QWACs.

Using the PSD2 QWAC in the public interface to web browsers could have security implications. In particular, certificates used for public interfaces are required by CA/Browser Forum standards to be placed in a public 'certificate transparency' register, which could leave Payment Service Providers (PSPs) open to potential targeted attacks.

ETSI and CA/Browser Forum aim to work together to maintain alignment. This includes recent changes CA/Browser Forum EV guidelines to incorporate use of *organisationIdentifier* to carry the authorisation number as specified in TS 119 495.