

Calypso® Certification

For Ticketing Today,
Tomorrow and the Future





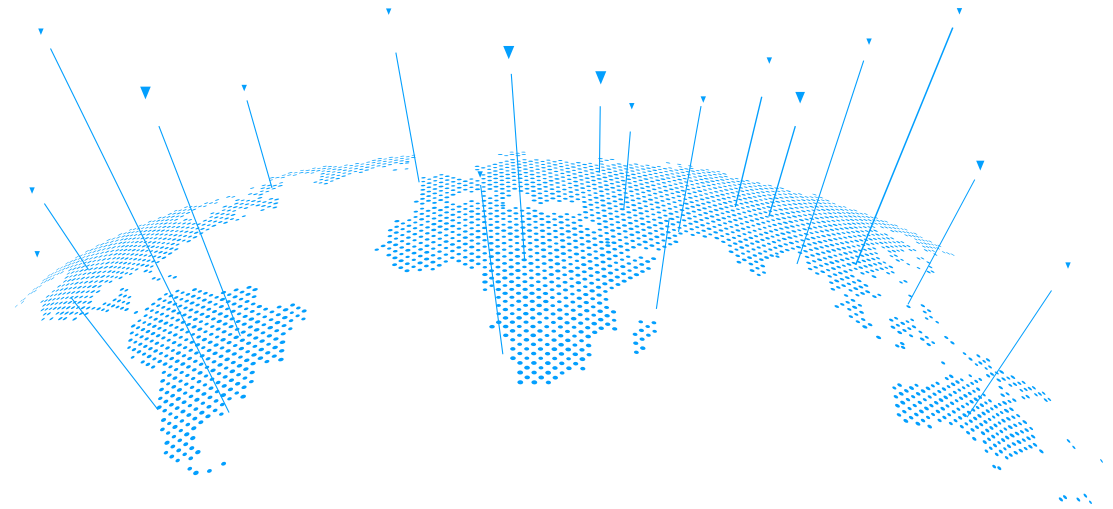
Welcome

Calypso® is an open, secure ticketing standard that promotes innovation. It is used in more than 25 countries and over 170 cities globally and is designed by transport operators and authorities for transport operators and authorities to ensure long-term usability and sustainability.

But how do we maintain the **integrity** of the open and competitively sourced standard? All Calypso products are based on existing international standards to ensure seamless integration and support global interoperability, such as ISO and CEN.

But does this go far enough?

No. Calypso Network Association (CNA) recognises that to guarantee that products comply with the Calypso standard and that the integrity of Calypso is maintained, **independent certification is essential.** This delivers real and objective assurances to all entities within the transport ticketing community that Calypso technology has been validated and performs to the highest standard without bias and without restrictions.



Calypso certification is focused on confirming that the Calypso solution within a contactless card or connected consumer device, such as a smartphone, meets the functional requirements detailed within the Calypso Specification. This is often referred to 'portable objects' or 'consumer media'.



By reading this eBook you will learn:



Why

certification is needed, and the value it brings to the transport ticketing and mobility communities.



What

the elements of Calypso certification and licensing are and how they link together.



Who

provides the independent Calypso certification and licensing programmes.



Where

operators can source Calypso certified products and how to request this.



How

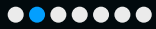
manufacturers can achieve Calypso certification.



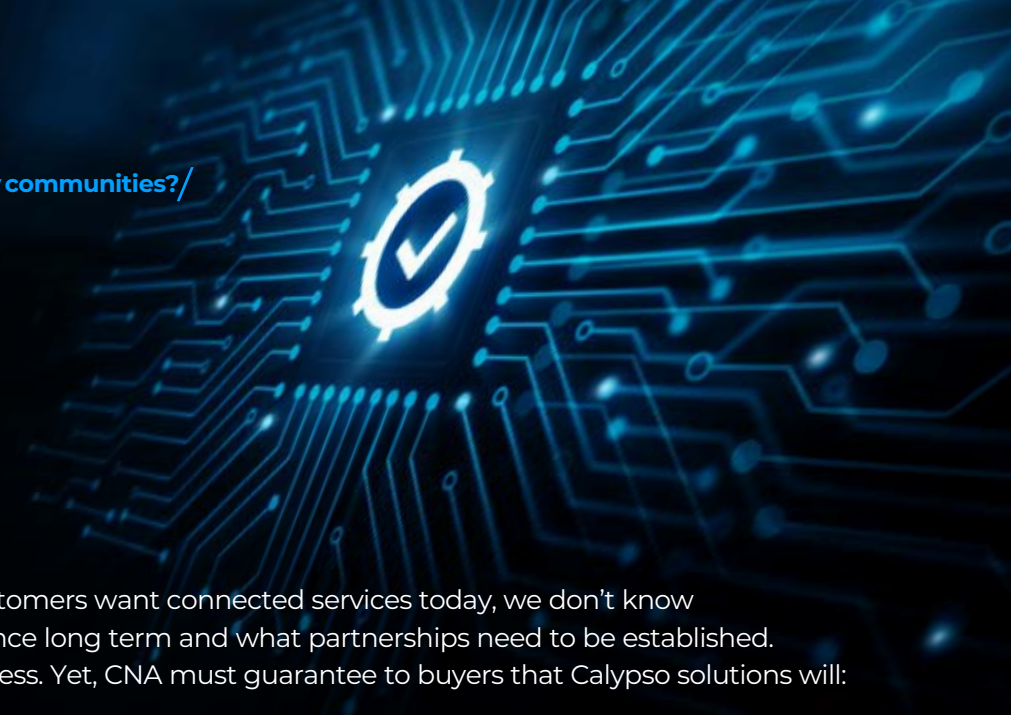
Why is certification needed?

What value does it bring to the transport ticketing and mobility communities?





Why is certification needed? What value does it bring to the transport ticketing and mobility communities?/



Certification is mandatory to achieving openness.

It promotes trust among all entities and provides assurances to a buyer that a Calypso product has successfully completed a robust evaluation process and will functionally perform as advertised.

This is vital as technology evolves.

Transport operators and authorities want and need to provide a range of ticketing solutions supporting different consumer media and using several suppliers to avoid vendor lock-in and contain costs.

New and exciting partnership are also being created across networks; connecting different modes of transport and connecting different regions, as well as a range of access control services. These need to interoperate without compromising functionality or security.

While we know that customers want connected services today, we don't know how demands will advance long term and what partnerships need to be established. The possibilities are endless. Yet, CNA must guarantee to buyers that Calypso solutions will:



Perform in accordance with our specifications.



Continue to be competitively sourced.



Evolve in line with the specifications.



Be compatible with next generation functionality requirements.

Defining and maintaining an independent and transparent certification programme which is open to all creates a trusted foundation and confidence that Calypso ticketing solutions are sustainable, scalable and compatible, not just today, but tomorrow and in the future.



Why is certification needed? What value does it bring to the transport ticketing and mobility communities?/

CERTIFICATION BENEFITS:



Calypso certification offers transport operators and authorities:

- Assurances that products will meet the performance, security and reliability expected to achieve a trusted framework, regardless of suppliers.
- Confirmation that the ticketing system has long-term sustainability and that products will be backward-compatible.
- Guarantees that the products will behave in a consistent form regardless of the product provider.

Calypso certification offers Calypso product providers:

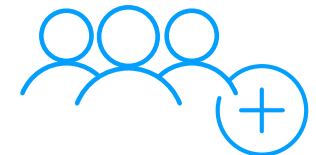
- Access to public procurement without discrimination.
- Guarantees evolutions of the Calypso standard to meet long-term market needs, which benefits and supports the ticketing community.
- Removal of unfair competition from products that make false claims of Calypso compliance / functionality.

YOUR STANDARD, YOUR CERTIFICATION

CNA is a not for profit technical body that is exclusively committed to enabling all transport and mobility operators and authorities globally with the ability to deliver the best possible ticketing experience to their customers. Calypso technology is designed to empower the transport and mobility community to control and evolve their smart ticketing ecosystem their way.

All entities within the transport ticketing community can join CNA and contribute to the evolution of the standard. The CNA membership recognises the value of certification in providing proof of compliance and has embraced the process. This is creating a continuous process of improvement and modernisation to secure the future of open standard ticketing.

JOIN THE CONVERSATION,
have your say and become a member.



02

What are the elements of
Calypso certification and licensing?
How do they link together?





What are the elements of Calypso certification and licensing? How do they link together?

To guarantee security, interoperability and suitability for competitive tender, the Calypso standard specifies alignment with international standards and security certifications, alongside Calypso specific functional certification. To sell a Calypso product, a licensee agreement is required.



International Organization of Standardization (ISO) and European Committee for Standardization (CEN)

The foundation of all IT security standards, ISO helps to keep sensitive information secure. The Calypso standard requires alignment to:

- ISO 14443, to define the proximity cards/chips used for identification and the transmission protocol for communicating with the media.
- ISO 7816-4, to define the organisation, security and commands for interchange.

The use of CEN 1545 is also recommended, to specify data formats and elements and types for cards for general use within transport applications.

This ensures Calypso products are widely interoperable with other technology products and solutions.

Security Certification

Most Calypso solutions achieve a hardware security evaluation of EAL4+ in line with Common Criteria (CC). This is completed by the chip manufacturer as part of their core product development work, and means that the chip is methodically designed, tested and reviewed to achieve a high level of security.

For Calypso products using host card emulation (HCE), Calypso proposes a security certification which is supported by fully accredited labs. Watch this space for more detail.



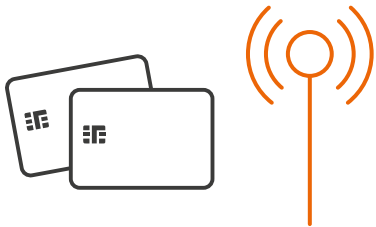
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RF Interface Certification

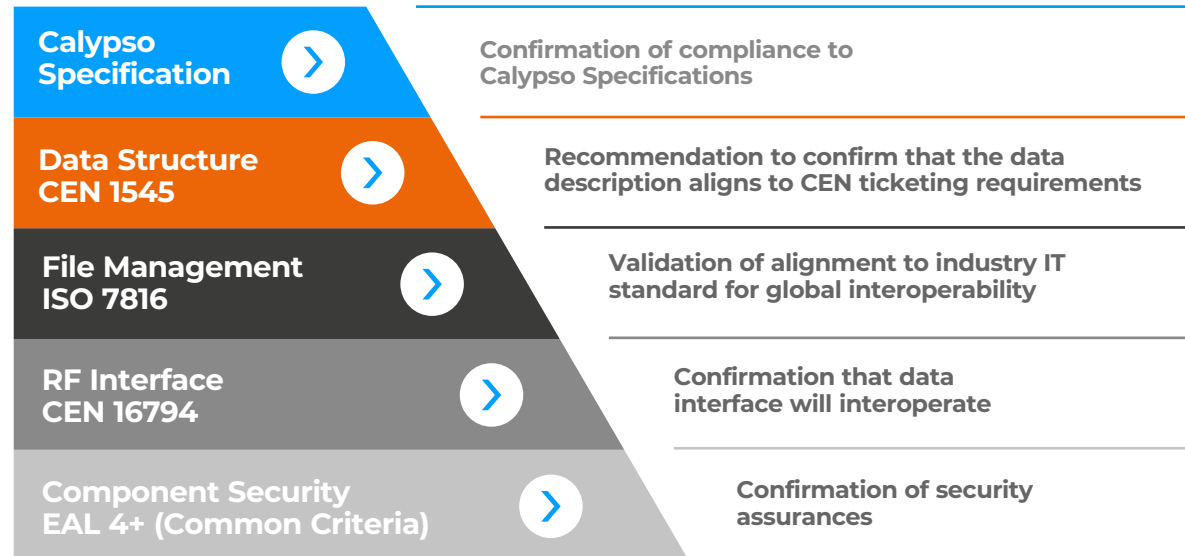
Contactless Interface Certification for Public Transport Products has been defined by the Smart Ticketing Alliance, a non-profit technical association that promotes and facilitates cooperation between national and regional smart ticketing schemes to achieve cross-scheme interoperability. The aim of this certification, managed and delivered by PayCert, is to certify that cards used within the transport ticketing ecosystem comply with the European Committee for Standardization (CEN) technical specification TS 16794, which defines the radio frequency between the contactless readers and portable object.

This is completed by the card embedders when developing their products.



Functional Certification

Calypso certification is focused on confirming that the Calypso solution within a contactless ticket or connected consumer device, such as a smartphone, meets the functional requirements detailed within the Calypso Specification.



The different elements of certification



What are the elements of Calypso certification and licensing? How do they link together? /

Licensee

A licensing agreement is required if a manufacturer wants to create and sell Calypso products. This is a contractual commitment from the manufacturer to comply with Calypso Specification and security rules. It once again offers reassurances to all entities within the solution chain that the manufacturer is fully and legally dedicated to maintaining the integrity of Calypso.

By completing this process, a manufacturer receives access to:

- Calypso technical materials and documents to produce Calypso solutions.
- CNA services, such as unique serial numbers.
- Use of the Calypso brand to sell products, which is a registered trademark.

Calypso is a registered trademark and is the 'stamp' used to certify products and confirm that they have achieved the requirements as stated in the Calypso Specifications.

Calypso®

Licensee agreements are available to any manufacturer interested in producing Calypso portable objects. They are vital to:

- Ensure fair competition between all manufacturers and create a competitive sales environment.
- Confirm the commitment of the manufacturer to support the Calypso community.
- Generate revenue to support the evolution of the specifications and security to meet market requirements.
- Avoid the development of counterfeit products.
- Guarantee performance of Calypso solutions globally.

Only manufacturers of Calypso portable objects need a license. Other entities can freely use the standard and access the Calypso specifications. For example, users (transport operators and authorities), integrators, manufacturers of readers and terminals.

Licensee and certification flow for manufacturers

Manufacturer signs license agreement



Access to Calypso standards and documentation



Calypso solution developed using ISO compliant chip/required security certification



Product submitted for Calypso certification



Certification received - solution Calypso branded



Product available for purchase

03

Who provides the independent Calypso certification and licensing programmes?





Who provides the independent Calypso certification and licensing programmes?

Independence is key.

It ensures full transparency and guarantees that no party is discriminated against. CNA has therefore appointed third parties to provide a neutral certification process.

Paycert – A certification body for secure electronic transactions

- Independent certification body which has partnered with CNA
- Manages Calypso product functional evaluations applications
- Uses accredited laboratories for the testing of Calypso products
 - Manufacturer can select an accredited laboratory for product testing
- Reviews the results and issues the certification letter
- Ensures complete neutrality of the programme



Innovatron – For contactless licensing management

- Legal and administrative management of licensee contracts
- Provides an official list of license holders on its website
- Supports CNA in all legal actions against improper use of the Calypso mark and related claims.



CNA – Governing body of Calypso technology and works to maintain integrity throughout the community

- Oversees the administrative process through its dedicated CNA team
- Makes available certification and branding documentation on its website
- Issues and manages Calypso registration trademarks
- Creates a forum for the ticketing community to have its say on the certification process and the evolution of this work
- Seeks to educate on the value of Calypso certification and branding, and its crucial role in achieving true open standards





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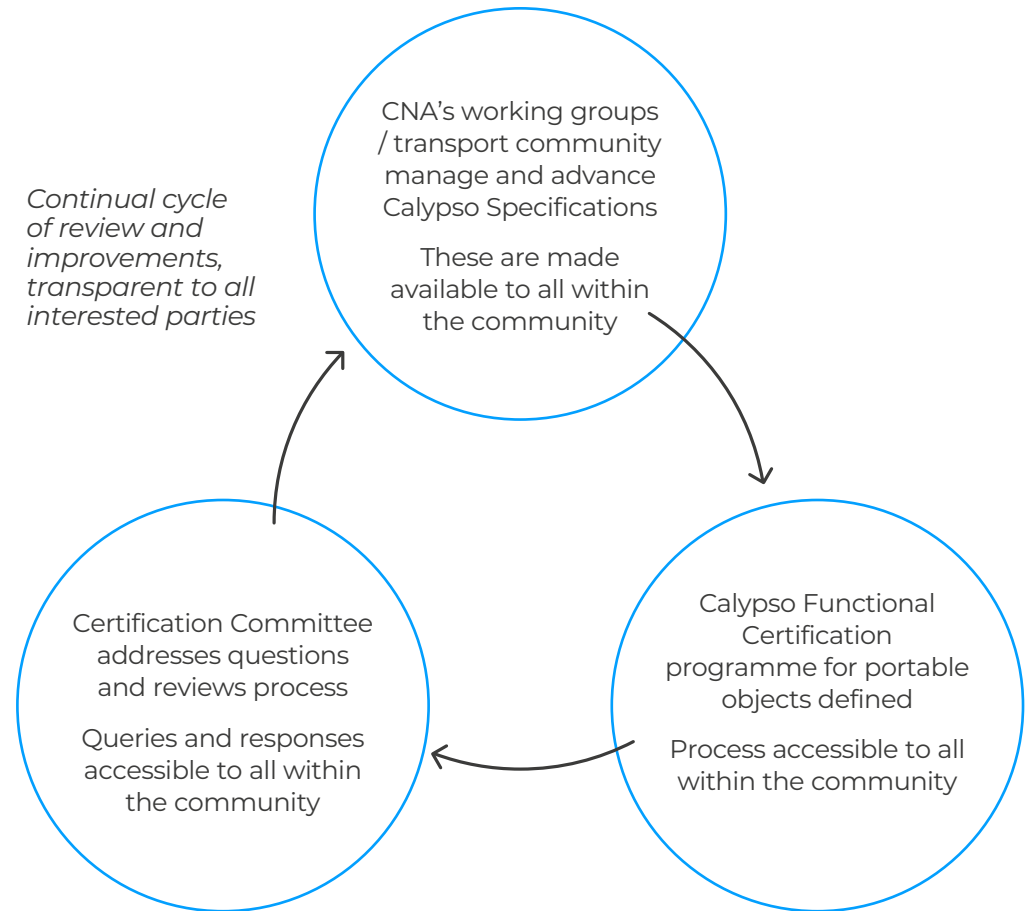
You, The Community

CNA and its partners do not work in isolation. The role of the transport ticketing community to engage and inform the process is vital to provide oversight and ensure transparency.

CNA has a working group – the Certification Committee – which comprises a representative from PayCert and CNA, alongside members of an expertise committee (non-vendor CNA members). The group is responsible to:

- Address any questions or clarifications arising from the certification programme and submitted to the test labs or PayCert.
- Detail these queries in Calypso Implementation Notes on an annual basis.
- Support any certification evolutions based on the advancements of the Calypso standard.

Learn more about the
CNA Working Groups





Where can transport operators and authorities source Calypso certified products?





Where can transport operators and authorities source Calypso certified products?

Calypso is proud to offer more than 30 certified products, available from ten different suppliers.

Certified Products

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All Calypso solutions purchased from a manufacturer should be Calypso certified and have the registration mark as proof of certification and confirmation of being a licensee. **It is recommended that transport operators and authorities seeking Calypso products ask for the certificates as part of the Request for Tenders.**

As a transport operator or authority, it is important you understand the certification process, why it is integral to an open ticketing ecosystem and know that you have a voice to contribute and share ideas on its continuous improvement. You are not, however, required to undertake any aspect of Calypso certification. Your role is to ensure you are using certified and branded products from a licensed provider.

Approved product certifications can be viewed by any entity on the Paycert website: <https://www.cna-paycert-certification.eu/cpoc/>.

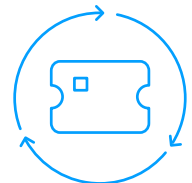
As a transport operator or authority requesting certified Calypso products in a tendering process, you will benefit from:

- Multi-sourcing opportunities and competitor bidding over time (there is no vendor 'lock-in' as multiple manufacturers provide Calypso products).
- Ability to offer travellers seamless, end-to-end ticketing services.
- Opportunity to connect with other transport and mobility operators using Calypso to deliver travel convenience / multi-servicing.
 - Across different modes of transport, as well as across regions and boarders and services.
- Reassurance that you have a sustainable framework that is capable to evolve and support new trends.
 - The Calypso community advances and adapts its ticketing technology to optimise ticket performance in line with latest technology developments.
- Direct ownership, management and access to the security features and traveller data.
- Ability to influence the strategic and technical direction of the technology by joining and contributing to CNA.

> This ultimately leads to greater control of your ticketing network.



Want to learn more about Calypso technology? >



05

How can manufacturers
achieve Calypso certification?





How can manufacturers achieve Calypso certification?

CNA defines the comprehensive functional and security requirements that a product must satisfy

PayCert is the Certification Body (CB) and accredits laboratories to certify Calypso products

Today these include ELITT and ICUBE



STEP 1

Manufacturer registers with PayCert

- Signed certification contract with PayCert
- A valid licensee number

This step only needs to be completed once by a manufacturer

STEP 2

Manufacturers can complete two actions simultaneously:

Manufacturer informs PayCert that a new product is being submitted for evaluation

- Certification contact
- A valid Calypso license identification number
- A signed certification request
- A completed Implementation Conformance Statement (ICS)

Manufacturer appoints an accredited laboratory to complete the evaluation

- Contact is agreed to confirm laboratory fees
- Evaluation scope defined
- Samples necessary to perform the test plan shared

STEP 3

PayCert confirms the paperwork and assigns required numbers

PayCert reviews the forms and assigns a certification number and ISC number
A copy of the validated and signed certification request is returned to the manufacturer and shared with the appointed test laboratory

STEP 4

Laboratory undertakes test session and produces a *Laboratory Functional Test Report*

The report confirms the results of the test session
It is shared and validated by the manufacturer before being sent to PayCert





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STEP 5

PayCert validates the test report by ensuring alignment with the Calypso Specification

No discrepancy
Certification report produced

Minor discrepancies
nominal impact on interoperability / user experience
Consultation with Certification Committee prior to certification report completion

Critical discrepancies
serve impact on interoperability / user experience
Certification is denied

Clarifications or Questions
Referred to the Expertise Committee by PayCert before evaluation completed

STEP 6

PayCert produces certification report

- Full product details
- Evaluation details, including any discrepancies or clarifications requested
- Evaluator conclusion

STEP 7

Certification decision - PayCert makes a final decision based on the certification report

Approved products

Certification Letter issued to manufacturer and PayCert website updated
The certification is valid for 10 years, or until a product is changed

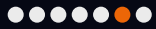
Non-Approved products

Certification report shared with manufacturer, alongside details of discrepancies to be eliminated to achieve approval

STEP 8

Future approvals

For products that have received minor technical updates, requests can be made to complete a modified evaluation process



How can manufacturers achieve Calypso certification?

The CNA community thanks all manufacturers for their commitment to the certification process. Our joint efforts ensure the long-term stability and commercial viability of the Calypso standard by:

- 1** Promoting competition and lowering lifecycle management costs by avoiding vendor lock-in.
- 2** Sharing knowledge, experiences and expertise through education and networking.
- 3** Supporting innovation by removing fragmentation and creating a technically secure 'baseline' on which stakeholders can build upon.
- 4** Encouraging the use of open source software, which is accessible and usable by all.
- 5** Advancing global standardisation through the development of interoperable systems and standards. This helps to share knowledge and reduce system costs, by reducing manufacturer costs.



Want to get involved and shape the future direction of Calypso technology? Join the conversation and become a member.



Useful Resources:





About CNA

CNA/Paycert

<https://www.cna-paycert-certification.eu/cpoc/>



Innovatron

<https://www.innovatron.fr/>



ISO

<https://www.iso.org>



CEN

<https://www.cen.eu>



Smart Ticketing Alliance

<https://www.smart-ticketing.org>



Common Criteria

<https://www.commoncriteriaportal.org>



Calypso Networks Association (CNA) is a not-for-profit organisation which brings members of the transport, mobility and services community together to exchange ideas, experiences and requirements to advance open systems that support seamless, consumer ticketing needs. The CNA community combines transport and mobility authorities, operators, and service providers, as well as technology manufacturers and transport consultants. It is a diverse and welcoming community which spans public and private sector organisations.

As an open standards body, CNA empowers the community to control and evolve the smart ticketing ecosystem, so it advances smart ticketing systems and supports mobility as a service. CNA regulates the use of Calypso technology, and delivers expert services, to promote open standards and enable their use across local, regional, national and global ticketing requirements. Its work is defined and driven by a global network of members.

New members are warmly invited to join the CNA community. All members of CNA receive exclusive membership benefits and ongoing support from the association. Through CNA's working groups, its members shape the future direction of Calypso technology.