
Calypso Standard

License for cards and portable objects

The Calypso standard is the only open ticketing standard widely deployed, with more than 150 million cards used daily in more than 125 transport networks in many countries in the world.

This success has confirmed the initial choices: *openness, high security, based upon international standards.*

The Calypso license is accessible to any company wishing to supply Calypso portable objects.

Only manufacturers of Calypso portable objects need a license. Other companies may freely use the standard and access the Calypso specifications: users (public transport company or authority, parking applications, etc.), integrators, manufacturers of readers and terminals. If you are a user, you might find the right solution for your needs by contacting other Calypso users within the Calypso Networks Association.

Innovatron (www.innovatron.fr) is at the origin of the developments of the smart card technology since 1974. From 1992, a major program of Research & Development in partnership with the RATP and the SNCF has resulted in Innovatron extending the application of the Smart Card technology, enabling its use through a contactless communication interface, particularly suitable for public transport applications.

During this program, Innovatron developed proprietary technology, the subject of many patent applications protecting the investments made, and used in particular in the European remote ticketing projects, called Icare and Calypso.

The *Calypso standard* and the international standard *ISO/IEC 14443 B* directly result from this research.

Innovatron has licensed these technologies to more than 60 companies all over the world, and manages the Calypso licensing since these initial development.

CNA, Calypso Networks Association (www.calypsonet-asso.org), the nonprofit association of users of the Calypso standard, has played a central role in the development of the standard, particularly in recent years with the deployment of new ticketing approaches: NFC phones, account based ticketing, post-payment, mobility as a service ("MaaS"), light ticketing and open source.

CNA and Innovatron promote the Calypso standard since more than fifteen years, contribute to its development by updating and the maintaining its specifications, managing the database of unique Calypso serial numbers and associated registries.

CNA is also in charge of the certification process of Calypso portable objects designed to ensure the security and interoperability of products implementing the Calypso standard while protecting the licensees' products from unfair competition. CNA also manages the CALYPSO trademark (European Union no. 006917173) whose use is regulated by the *Calypso Trademark Policy*.

For more information, please contact us:

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1. Calypso Portable Objects

Suppliers of Calypso Portable Objects need to sign a Calypso license.

The license for portable objects (cards, phones, etc.) allow the use of the Calypso IP (brand, specifications, patents, etc.) to develop a Calypso compliant software and to market portable objects that include it.

The duration of the license is the duration of the market for the contractual products. The acquirer has the possibility of terminating the contract at any time.

The financial conditions of the contract include an initial payment and royalties.

Integrators and users of cards and components manufactured under license do not need to take a license nor pay any fee (e.g. card embedders integrating OEM Calypso components).

The financial conditions of the Calypso license for certified portable objects are given below.

Calypso cards certified by CNA

Initial Payment: 10 000 euros (includes a one year membership to Calypso Networks Association)

<i>Calypso Product</i>	<i>Royalty per product</i>	
Prime	0.020 euro (2.0 cent)	
Light	< 30 million units 0.0115 euro (1.15 cent)	> 30 million units 0.008 euro (0.8 cent)
Basic	< 80 million units 0.0035 euro (0.35 cent)	> 80 million units 0.0025 euro (0.25 cent)

Calypso Java Card Applet certified by CNA

To remotely activate a Calypso cardlet into a secure Java card, a Java Activation Module is required (contact CNA to acquire Activation Modules):

Cost per module: 200 euros

Cost per activation¹: 0.04 euro (4 cent)

Calypso NFC HCE Virtual Cards

To remotely activate a Calypso virtual card into a Calypso NFC HCE mobile phone, an HCE Authorization Module (HAM) is required (contact CNA to acquire Authorization Modules):

Cost per module: 1 200 euros

Cost per activation: 0.05 euro (5 cent)

¹ For licensees, the cost of 0,02 euro applies.

2. Indicative summary of the Calypso specifications

The Calypso specifications define precisely the card / terminal transaction and allow the compatibility between different suppliers.

They also describe the security features of the Calypso transaction, including the SAM management.

The Calypso specifications comply with the following standard:

- ISO 7816 for the smartcard application.
- ISO 14443 for the contactless communication.
- ENV1545 for the transport data structures.

The Calypso specifications include the main following documents, they are extended over time as technology progresses:

Calypso Specification for Ticketing

<i>Documentation</i>	<i>Reference</i>
Calypso Specification Rev.3 - Portable Object Application	060708-CalypsoAppli 060709-CalypsoFiles 091018-ReaderRecommendations
Calypso Card Application Specification, Rev 2	010209-MU-CalypsoCardSpec 060908-MU-CalypsoR2Amd1
Calypso Light Application	170101-CalypsoLightApplication
Calypso Basic Application	191011-CalypsoBasic
Calypso for Java cards	090128-ApplicationDownload 080118-UM-ActivationModule 130507-CnaCalypsoApplet_UserGuide
Calypso for Mobile Ticketing (NFC HCE)	180314-CalypsoHCEGenSpecs 141113-CalypsoHCEApplication 150118-UM-HceAuthorizationModule 150422-CalypsoHCEGuidelines
Account Based Ticketing Guidelines	180901-AccountBasedTicketing-Guide.
Hoplink (Triangle 2)	101101-Triangle2Appli 121010-Triangle2BestPractices
Secure Application Module (SAM)	101010-SamCalypso 110619SDI-UM-SamTestF5
Security Architecture and Key Ceremony	080131-CalypsoSecurity 170202-KeyArchitecture

Calypso Technical Notes (to help implementing Calypso)

<i>Documentation</i>	<i>Reference</i>
Calypso Technical Notes	CalypsoTNxxx

These specifications are available to CNA members from the Calypso web site:
<http://calypsonet.org/documents>

In addition, Calypso licensees have also access to the Calypso security and cryptographic specifications.

3. Indicative summary of the Calypso IP

The following technical elements are accessible under license:

- ✓ Calypso Trademark Policy
- ✓ Calypso specifications to manufacture portable objects

Contact us for more information (licensing@innovatron.fr)