1

Card
Functional
Certification
Version 1.2.1

- First version validated
- Full compliant with the Calypso Basic 1.1 specification
- Bug correction

Released in November 2022
Calypso Test Suite for Light

Version 1.2.0

- Full compliant with the Calypso Light 1.2 specification
- Bug correction

Released in November 2022
Calypso Test Suite for Prime

Version 3.1.0
- Full compliant with the Calypso Prime Revision 3.3 Edition 2 specification
- For Calypso Prime Native & Calypso Prime Applet
- Allows certification with all or a subset of modes (PKI, Extended, Regular)

Released in November 2022

Version 3.2.0
- Improved test coverage
- Bug correction
- Will be applicable for all new certifications as soon as it is released

Expected in January 2024
Version 1.0.0

• Will be compliant with the new version 1.5 of Calypso HCE specification

Expected in 2024
Terminal specifications
Terminal Requirements

**Reader Layer Requirements**
Requirements of the lowest level of the transaction related to the management of all types of cards and SAMs by a smartcard reader.

**Calypso Layer Requirements**
Specific requirements for the management of Calypso cards and SAMs in strict compliance with Calypso specifications.

**Ticketing Layer Requirements**
Requirements on the use of the Calypso high-level API.
Best practices to follow in a Calypso ticketing system.

The reference documents for developers of the different components of a Terminal.

A developer no longer needs to start from the card specifications to develop a Terminal.
Terminal API

**Calypso Card API**

Used by the application layer that uses Calypso library.

It defines the interfaces needed to:

- Operate a Calypso transaction
- Recover a Calypso card image

**Calypso Legacy SAM API**

Used by the application layer that uses Calypso library.

It defines the interfaces needed to:

- Operate management transaction with a legacy SAM
- Recover a Calypso SAM image

**Reader API**

Used by the application layer that implements reader management.

It defines the interfaces needed to:

- Manage readers
- Manage reader events
- Manage selection mechanisms

**Card API**

Link between the layer dedicated to the functional processing of cards and the layer of communication with the readers.

It defines the interfaces needed to:

- Communicate with the cards
- Specify the card selection data
Terminal certification
Terminal certification steps

Since December 2020 – Terminal requirements and recommendations published

Since 1st September 2021 – Declarative procedure available

Expected 2024 – Terminal certification
  Certification of the Reader based on the Reader Layer Requirements
  Certification of the Calypso Library based on the Calypso Layer Requirements
Not a certification.

Provides a guarantee that the vendor has read the documents concerning the terminal requirements and has undertaken to comply with them.

Declarative Procedure

CNA sends to the vendor.
- A registration form
- An ICS (Implementation Conformance Statement) to complete
  - Product definition
  - Requirements declaration
    Check list with comments

Evaluation Committee reviews the ICS
- Analysis of discrepancies (m, M or C)
- Refining process with the Vendor

Registration on the CNA website
Registered Products

Registered Readers

CNA has put in place a declaratory procedure where the vendor undertakes compliance with the Reader Layer Requirements.

The following list identifies the registered Readers. This registration procedure is not a certification but a simple validation by CNA that the Vendor’s declaration is consistent.

Learn more about the declarative process for the Reader Layer.

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Product Name</th>
<th>Record</th>
<th>Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASIS Elektronik</td>
<td>VAL8</td>
<td>CNA-221125-RLDP-A1</td>
<td>14/03/2023</td>
</tr>
</tbody>
</table>

Registered Calypso Layer libraries

CNA has put in place a declaratory procedure where the vendor undertakes compliance with the Calypso Layer Requirements. The following list identifies the registered Calypso Layer libraries. This registration procedure is not a certification but a simple validation by CNA that the Vendor’s declaration is consistent.

Learn more about the declarative process for the Calypso Layer.

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Product Name</th>
<th>Record</th>
<th>Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>HID Global</td>
<td>CalypsoLib 1.4</td>
<td>CNA-211119-CLDP-29M1</td>
<td>22/02/2023</td>
</tr>
</tbody>
</table>
Guide for tenders available!

Call for tenders for cards, NFC mobile ticketing and terminals based on the Calypso standard

How to guarantee the complete opening of your ticketing system during a call for tenders

<table>
<thead>
<tr>
<th>Hardware/Software Type</th>
<th>Certification to be required</th>
<th>Registration letter to be required</th>
<th>Commitment letter to be required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ISO/IEC TS 24192</td>
<td>Reader Layer</td>
<td>Ticketing Layer</td>
</tr>
<tr>
<td>Hardware without Calypso library</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Hardware with Calypso library</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Equipment integrating the network's ticketing application</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Calypso library only</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Ticketing application only</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
Terminal Approval

The terminal approval will include:

- ISO/IEC TS 24192 certificate (formerly named CEN/TS 16794)
- Reader Layer certificate
- Calypso Layer certificate

CNA site will highlight these approvals, while keeping information on the basic certificates.
The target is a certification based on a technical evaluation made by an independent laboratory.

Next steps

- Development of test tools with the following principle: **Availability and ease of use**
  - Open-source software
  - Compatible with any type of terminal
  - Use of emulator and spy

Postponed in 2024

- Need for a terminal API evolution
  - **Eclipse Keypop**
  - new ECLIPSE open-source project

- Update test plans
Eclipse Keypop
Eclipse **Keypop** – Java & C++ Terminal API

**https://terminal-api.calypsonet.org/**

new Eclipse open-source project to host Java & C++ code of the Terminal API defined by CNA

- Keypop code hosted by the Eclipse foundation but licensed under the “MIT license” → offers the widest licensing flexibility for any solution implementing Keypop interfaces

**first Keypop release October 2023** → first major evolution of the terminal API to manage cryptographic processing through the use of extensions

- From the start - API extension for symmetric crypto based on the Calypso Legacy SAM (C1)

**Coming soon**

- API extension for asymmetric crypto to support “Calypso Prime PKI” (to perform dynamic card authentication without SAM)
- API extension for symmetric crypto based on the Calypso OpenSAM → use of the Calypso API for card transactions will be independent of the SAM solution

   → proposal of PKI & OpenSAM API extension for **December 2023**

**Keypop API ready for the coming Calypso Terminal Certification**
Eclipse Keyple
Eclipse Keyple - key strengths

Keyple, a set of libraries to operate Calypso processing in a ticketing terminal

• truly open-source
• strongly supported by terminal solutions
• really user-friendly for ticketing terminal developers
• highly interoperable with Calypso ticketing systems
• widest coverage of Calypso features
• rapidly & simply upgradeable and maintainable
Keyple – truly open-source

Hosted by Eclipse, a major Open-Source foundation

offers strong guarantees of

• openness in project management
• respect for intellectual property rights

code released under ‘Eclipse Public License’ (version 2.0)
• gives ticketing integrators great flexibility in implementing their solutions
**Keyple – strongly supported**

designed to fit any embedded or distributed architecture

- whether local or remote from the terminal, smart card readers are operated in a generic & optimized way

thanks to a plug-in mechanism, any smart card reader solution can be integrated into Keyple

- all standard solutions are natively supported (PC/SC, Android NFC, Android OMAPI)
- many proprietary solutions currently integrated (e.g. SpringCard, Coppernic, Famoco, Flowbird, Bluebird, Asis, Calypso HSM …)

2 implementations (Java & C++) are available

- enables Keyple processing to be supported on most ticketing terminal solutions

Keyple-less terminal

- using the Keyple Distributed JSON protocol → ability to operate a smart card reader on a terminal not running a Keyple library (e.g. Keyple-less mobile app in a NFC iPhone operated by a ticketing server)

current challenge – integration in EMV certified payment terminals
Keyple – really user-friendly

Keyple is based on high-level interfaces: the Calypso terminal APIs (provided by Keypop)

- The solution is divided in separate software layers (reader layer, Calypso layer & ticketing)
- The Reader API & Calypso API are designed to be easily used by developers, non-expert of Calypso and smart cards solutions
Keyple – highly interoperable

Keyple fully follow all the terminal requirements defined by CNA for the Reader layer and the Calypso layer

- based on Keypop API → Keyple is ready to be evaluated for the coming terminal certification
Keyple – wide Calypso features’ coverage

**Calypso card processing**
- Support of all features of Calypso Prime Regular & Prime Extended (including Calypso Basic, Light & HCE)
- Prototype for Prime PKI scheduled for December 2023

**Calypso legacy SAM processing**
- Support of all SAM features involved in Calypso card transaction
- Main SAM features for SAM management transaction (perso, settings, ceilings)

**Calypso OpenSAM processing**
- Support for SAM functionalities involved in Calypso card transaction planned for the first quarter of 2024
Keyple – rapidly/simply upgradeable & maintainable

maybe the most important & unique ability of Keyple

• for early versions of Keyple, the time required for a fix was up to 1 year
• from Keyple 2.0 (October 2021), proven ability to develop and distribute a fix within a week

by isolating software layers and limiting dependencies between components

• extraction of the 3 terminal interfaces (now Keypop components)
• split of Keyple into 18 components (Service Lib, Plugin API, Common API, Util Lib, Service Resource Lib, Calypso Card Lib, Generic. Card Lib, Distributed libraries, plugins’ libraries)

In less than 2 years, release of:

• 17 minor upgrades to Calypso terminal APIs
• 56 minor upgrades to Keyple components

(for most Calypso feature additions and fixes, 100% backwards compatible, which can be transparently deployed)
Keyple Java – new features

Latest news

Calypso card processing

• Support of all features of Calypso Prime Regular & Prime Extended (including Calypso Basic, Light & HCE)
• prototype for Prime PKI scheduled for beginning 2024

Calypso legacy SAM processing

• Support of all SAM features involved in Calypso card transaction
• main SAM features for SAM management transaction (perso, settings, ceilings)

Calypso OpenSAM processing

• support for SAM functionalities involved in Calypso card transaction planned for the first quarter of 2024
Title
2 lines