Calypso
Networks Association

Activity
report

2019

Contents

Editorial

Dear Calypso friends and partners

2019 has been for CNA another very beautiful and productive year, with many accomplishments and successes. First, I am proud that we have welcomed 31 new members, reaching the number of 103 and confirming the trend observed in recent years. Furthermore the association is glad to count a new gold member, Infineon, who joins the CNA Board of Directors.

The increased interest in participation to the Calypso development and CNA activities from transport authorities, operators and industrials confirms the relevance of the orientations adopted in 2017 and of the program implemented since then. It leads Calypso to be the reference of a true open ticketing technology, suited to new ticketing uses such as Mobile and Account Based Ticketing.

This strategy of the association and its beautiful achievements in 2019, such as six certified Calypso Light cards, the release of Calypso Basic specifications and ABT-Calypso guidelines, the publication of the white paper "Ticketing for MaaS, best practices for durable systems" and a new presence in Africa and Latam, demonstrate the craze for Calypso. Not to mention its unique positioning as a platform of exchanges between users and providers.

The foundations are now established and solid:

- An unambiguous orientation towards open source, concretized by Eclipse Keyple, now accessible for free on the Eclipse platform and which has already been implemented on the field.

- The operational Calypso brand policy with product certification now carried out by an independent accredited body, and a new license to which almost all industrial players in the market have subscribed in less than one year.

On this basis, we will now, from 2020, develop Calypso even further on an international scale, thanks to an increased promotion, a strong development of new cooperations, particulary with the OSPT Alliance, and to the work of the CNA team, whom I thank for their involvement. I also would like to thank you, users and suppliers, for your contribution and your faithful support to Calypso.

Philippe Vappereau
CNA Chairman

2019
Main Achievments

103 Members

8 Events organized in France, Ecuador, Italy, Hungary and Brazil

7 Trainings, courses and seminar delivered

10 New Calypso certified products, 30 in total

IDFM CETUD ATM Became members

8 Running working groups

+31 New members

All Samsung smart-phones sold in France and embedding a Secure Element integrates the Calypso applet

Creation of CNA Italia and offices in São Paulo and Paris

Release of the white paper «*Ticketing for MaaS, Best pratices for durable systems*» **Available in 5 Languages**

CNA board of
Directors

Calypso Networks Association is managed by a Board of Directors appointed by the General Assembly every three years and currently composed of twelve members.

ACTV, Venice Transport Operator
Vice-Chairperson, Promotion & Marketing
Represented by Gianluca Cuzzolin & Morgan Chirici

CTS, Strasbourg Transport Operator
President of the Hoplink Governance
Represented by Alain Caffart

GIE CARTES BANCAIRES
Represented by Pierre Chassigneux

INFINEON
Represented by Katja Kienzl

INTERPARKING
Represented by Roland Cracco

LANDKREIS KONSTANZ
General Secretary
Represented by Zeno Danner

OTLIS, Lisbon Transport Operators Consortium
Vice-Chairperson, Keyple Development
Represented by Fausto Sá-Marques

RATP, Paris Transport Operator
Chairman
Represented by Philippe Vappereau

RIGAS KARTE, Riga Ticketing Operator
Represented by Aleksandrs Brandavs

SNCF, French National Railway Operator
Vice-Chairperson, Industrial Strategy
Represented by Joël Eppe

STIB, Transport Operator of Brussels
Represented by Jean-Luc Van Ginder Deuren

5T-TORINO
Represented by Massimo Cocozza

Infineon - Gold Member of CNA

Infineon, one leading industrial player worldwide, has become a gold member of CNA in 2019 and subsequently been joining the board of directors of CNA.

Katja Kienzl, Partnership & Ecosystem Management at Infineon Technologies

«The CNA membership underlines Infineon's commitment to provide a comprehensive transport ticketing portfolio based on open standards.»

They left the CNA Board in 2019

The directors would like to thank Frank Hämmerle, Landkreis Konstanz and Claudio Giacobbe, 5T very warmly for their strong involvment in the development of Calypso and all their work within the Board for many years.
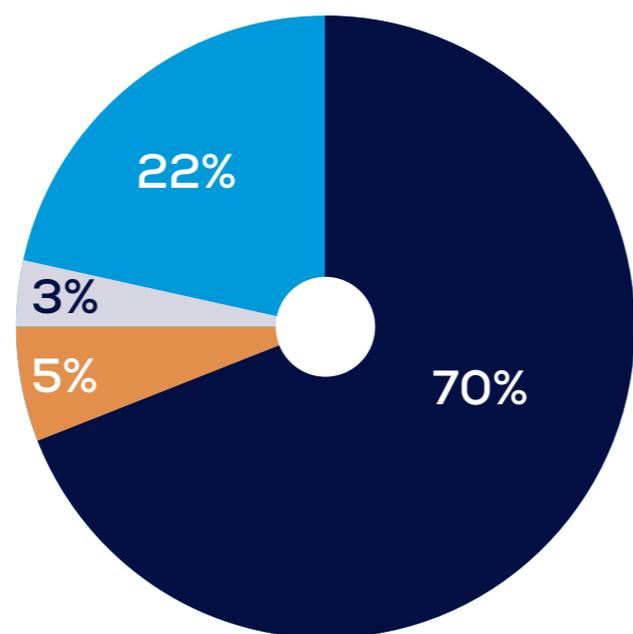
Members

From all around the world

One main characteristic of the new members that joined CNA in 2019 is the variety of their background, both in geographical terms and in terms of business activity. This diversity reflects the CNA ambition to be a major player in Mobility as a Service, but also fits with its main objective to extend the deployment of Calypso further afield.

- Authorities, Operators, Associations
- Cards and terminals providers
- Consultants and software providers
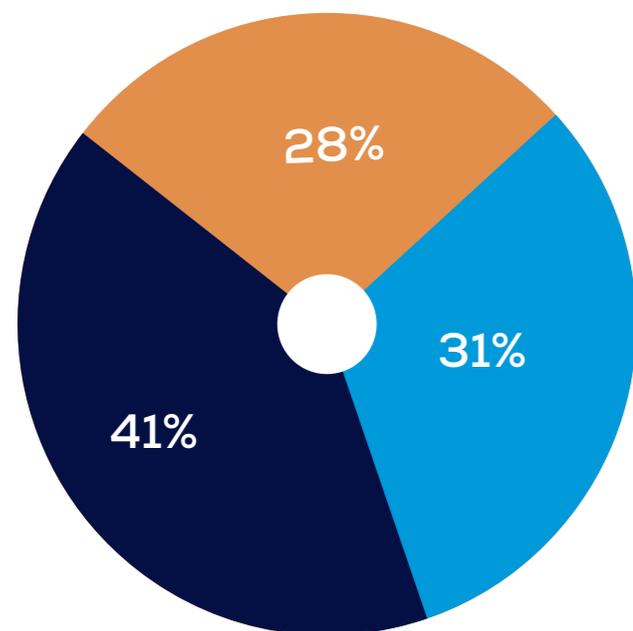
Europe
Americas
Asia
Africa

28%
31%
41%

22%
3%
5%
70%

List of 2019 active members

5T	GIESECKE & DEVRIENT	OTW - WALLONIA
ACTV	GRAND AVIGNON	PARAGON ID
ADCET	GSD PLUS	PASE EXPRESS
ADVANCED CARD SYSTEMS	HB TECHNOLOGIES	PAYCERT
ADVANIDE	HID GLOBAL	PLUSERVICE
AEP	HIGHQ	PW CONSULTANTS
AGILTECH	ICARDS	QILIUM
ATM - MILAN	IDEA PARTNERS	RATP
BILLETTIQUE SERVICES	IDEAR ELECTRONICA	RATP SMART SYSTEMS
BLUENET	IDEMIA	REDSYS
BMC	IDENTIV	SELP
BROXEL	IDFM - PARIS REGION	SEMOVI
CARD4B	INFINEON	SIA RIGAS KARTE
CETUD	INGENIERA Y SERVICIOS ADM	SIGMA SPA
CTS - STRASBOURG	INTERPARKING	SIMA ITS
COMUTITRES	INZIGNIA	SMTAG
CONDUENT	IQUANTICS	SNCF
CONFIDEX	ITSO	SP TRANS
GIE CB	JM ASESORES	SPIRTECH
CUBIC	LANDKREIS KONSTANZ	ST MICROELECTRONICS
DIGITAL AFRIQUE TELECOM	LIGURIA DIGITALE	STIB
DATARAXYS	LINK CONSULTING	STM - MONTREAL
DEJAMOBILE	LINXENS	TEKNEI
DIGIMOBEE	LIT TRANSIT	TELEMATICA
DUALI	LS CARD	TGS CARD SOLUTIONS
DYNTRA	MICROSAFE	THALES & GEMALTO THALES
EASYWAY	MINISTRY OF TRANSPORT ISRAEL	MOBILE KNOWLEDGE
ECL INTERNATIONAL	MK SMART JSC	TISSEO
ELATEC	MOOVEL	TRANSDEV
ELITT	MYCARD	UBITRANSPORT
FAMOCO	NAGELS	VITALIS
FIME	NOUVELLE AQUITAINE MOBILITÉS	VIX TECHNOLOGY
FLOWBIRD	ONEWAVE	WATCHDATA
GALITT	OTLIS	WIZWAY

Calypso, a brand and a range of certified
Products

Publication of a brand policy

As of January 2019, Calypso became a registered trademark that can only be used for certified Calypso products.

This brand policy is CNA's tool for regulating Calypso, *i.e.* guaranteeing its performances to users and fair competition to manufacturers.

Renaming of the Calypso technology offering

In order to enhance the Calypso specifications as a coherent whole within a product range, CNA has decided to rename the Calypso 2.4, 3.1 and 3.2 products as Calypso Prime, CLAP as Calypso Light and the new low-cost product to come : Calypso Basic.

Strengthening the certification program

The certification of portable objects is the cornerstone of the brand policy. The certificate of conformity to Calypso specifications is now mandatory to market products under this name.

This confirms the integrity of the Calypso product framework, by validating that products will perform as stated and adhere to the standards the ticketing industry expects.

RANGE OF PRODUCTS

SECURE
INTEROPERABLE
MULTISOURCE

Calypso® *Prime*

Designed for transportation and multiapplication, ready for multiservice and mobile

Calypso® *Light*

Focused on transport, perfect for both media based and ABT systems

Calypso® *Basic*

Contactless paper tickets done right, at the lowest cost

COMPATIBLE WITH
ALL CALYPSO SYSTEMS
ONE SOFTWARE FOR ALL

Calypso New License

In 2019, a trademark license replaces the previous patent license.

The end of the patent-based license in 2022 would have represented a major risk for operators. Calypso without regulation nor revenue would quickly loose all its performances and characteristics: safety, interoperability, competition.

Without alternatives to this license and the associated revenues, CNA would no longer be able to guarantee the sustainability of Calypso.

For industrialists, the end of patents could have meant unfair competition from new players offering «Calypso like» solutions.

This is why CNA, guarantor of the sustainability of Calypso technology, has decided to anticipate these issues for its users and members, and has implemented a brand policy based on product certification and a new license, applied on January 1, 2019.

Certification
Process

Certification, in an open environment, is the main key to ensure the reliability and efficiency of ticketing. Transit authorities and operators more and more require it to guarantee the sustainability of their investment. CNA has a full set of certifications, at each layer of a transaction, for portable objects, to guarantee an end-to-end compatibility.

For each certified product, you may download its official certificate delivered by CNA. These certificates are usable both by manufacturers and buyers of Calypso products.

In 2019, in order to make the certification process more transparent and to allow all buyers to request Calypso certified products in their tenders, CNA has decided to revise the certification process by integrating a specialized independent player, Paycert, as Certification Body.

CNA provides the certification scheme for compliance of a portable object (PICC) with the Calypso ticketing application specifications and Paycert delivers certificates of compliance on the behalf of CNA.

Products certified in 2019

Company	Product Name	Compliance
MOBILE KNOWLEDGE	SN110T + CNA Calypso REV3.1 Applet v.1.3	Prime v3.1
	MF3P81C0 + CNA Calypso Rev3.1 Applet v.1.3	Prime v3.1
PARAGON ID	TanGO CLAP V1	Light v1
	TanGO + Flash	Prime v3.2
ST MICROELECTONICS	CD21 Flash Rev3.2	Prime v3.2
	CD21 Flash CLAP	Light v1
	STPAY Tiger v1.4 v1.0 + CNA Calypso REV3.1 Applet v.1.3	Prime v3.1
THALES DIS	CALYPSO G-CLAP1	Light v1
WATCHDATA TECHNOLOGIES	TimeCOS CLAP	Light v1
	TimeCOS DI Calypso version 1.1	Prime v3.1

Eclipse Keyple

Open Source API by CNA

The main goal of CNA has always been to ensure the openness of Calypso Standard and its adoption by many industrial partners, in order to guarantee a fair and attractive competition for users. However, open standards and specifications are necessary, but are not sufficient to avoid proprietary and closed solutions. That is why CNA decided to push further the concept of openness in the ticketing world and to move from an open standard to an open source model with an Open Source Software Development Kit (SDK) called Eclipse Keyple.

The main scope of Keyple is to allow developers to create applications that communicates with Calypso portable objects, without requiring to develop all the Calypso commands and proccessing, that requires a lot of investment, time and expertise.

CNA strongly believes that Keyple will deeply modify the panorama of ticketing in the next years, as the Open Data has strongly enriched the field of Passenger Information.

First integration of Eclipse Keyple on the field

After 2 years of collaborative work, the first version in Java of Keyple has been released on the Eclipse Github in 2019. It is now available to everyone on the 0.8 version.

RATP Smart Systems has integrated in 2019 Keyple into the new retail shops reloading system of RATP in Paris Great Region. 1800 Android terminals from Coppernic to retaillers has been deployed.

These slave ticketing terminals using Keyple are remotely managed by a cluster of ticket reloading servers interfaced with redundant Calypso HSM.
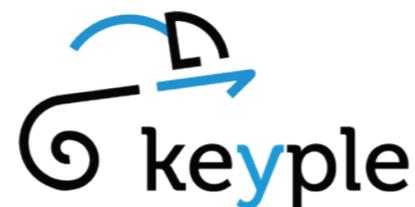
keyple

Discover more on keyple.org

International Presence

CNA organized eight ticketing meetings and also participated as exhibitor and speaker to major international events such as Transport Ticketing Global in London, Mobile World Congress in Barcelona, UITP Global Public Transport Summit in Stockholm, EclipseCon in Germany and RNTP in Nantes, for a total of eleven.

CNA Events

First Smart Ticketing, the Key for Mobility Forum in São Paulo
6th of May

In the context of the creation of an office in Brazil, CNA organised a day of exchanges with more than 40 local and european transport authorities, operators and mobility stakeholders. Interoperability was at the heart of the subject and CNA had the honor to welcome Paulo Galli, Executive Secretary of São Paulo Transport.

Fifth Smart Ticketing & Digital Services Forum in Budapest
31st of May & 1st of June

Those 2-day conference aims at shaping the future of ticketing with an additional focus on European cities. With more than 90 experts from over 20 countries, this great participation confirms the leading position of this dedicated event to Ticketing in the Central Europe Region.

Golden Rules for Smart Ticketing Systems Seminar in Paris
5th of September

CNA took advantage of the publication of its White Paper «Ticketing at the service of MaaS» to present it to French institutional public transport stakeholders and organized a moment of exchanges and discussion between experts of ticketing.

Calypso User Days, co-organized with AVM & ACTV in Venice
28th & 29th of September

About 120 participants from authorities, operators and manufacturers participated to these 2 days of conference dedicated to ticketing. Mobility as a Service was at the heart of the exchanges with strong highlights on Mobile Ticketing projects, Account Based solutions and Open Schemes.

First Eclipse Keyple Meet Up in Paris
17th of October

CNA wanted to bring together the main players who have supported the Keyple project, whether they are prescribers, developers or authorities. 35 participants came to exchange with IDFM, RATP Smart System, Eclipse and Inno3.

Urban and sustainable Mobility Seminar, co-organized with the CCIFEC and AFD in Quito
23rd of October

This Seminar was the opportunity to analyze Ecuador's commitments, progress and challenges regarding urban transport and sustainable mobility, as well as to exchange information and proposals for the main actors in the sector.

Calypso Open Session & Calypso Partners Day in Cannes, France
The 27th of November 2019

Calypso
Awards Ceremony

On 27th of November was held in Cannes the 7th Calypso Awards Ceremony during the traditional Calypso Open Session. In front of over more than 140 participants, the 2019 Best Innovations and Best Customer Services have been rewarded.

Best Innovation Award

The Best Innovation Award rewards the providers of Calypso who have developed and setup a new Calypso product, component, software or process which enriches the Calypso offer and contributes to the worldwide development of the Calypso standard.

Winner: One Wave

An innovative and connected Calypso card which includes Bluetooth and built-in screen, for a better customer experience.

Nominees:

AEP Ticketing Solutions with ET -BLU
A remote server and set of web services that allow to easily add third party vending terminals to an existing Calypso ticketing system.

RATP Smart Systems with TCT
The first commercial deployment of a ticketing system based on an open source software, the Eclipse Keyple SDK, for the RATP retailer's sale network.

Best Customer Service Award

This Award rewards the Users of Calypso who propose to their customers an innovative service enabling an easier access to public transport, which promotes sustainable mobility, which highlights the Calypso performances.

Winner: Card4B with ANDA™

The combination of Calypso Bluetooth and HCE for a seamless travel for the customer, in whatever tarification scheme.

Nominees:

Samsung with Samsung Pay - Transit Add-on
Calypso application embedded as an add-on within Samsung Pay, for an optimized and seamless use of mobile ticketing.

Unico Campania with Multiprofile Card - Jamme Card
A multi-profile and multi-protocol card for a smart and smooth transition from oldest Calypso releases to the most recent ones.

New
Collabo-
rations

CNA & OSPT announce their convergence

CNA has shown strong determination to lead the ticketing ecosystem towards fully open solutions. To successfully extend this policy, our association has partnered up with OSPT with the intent to strengthen our common drive in the adoption of open standards in transport ticketing. The first decided milestone of this partnership will be the careful evaluation of convergence scenarios between the respective open standards CALYPSO® and CIPURSE™. With an aligned set of values and objectives this cooperation will clearly promote the benefits of open standards over proprietary solutions. As a result, great benefits for the community of Transport Authorities and Operators can be expected as it will facilitate their work when implementing future proof smart ticketing schemes, by providing relevant time and cost efficiencies. CNA expect a real step forward to simplify the market complexity that limits currently the development of open solutions.

Blockchain: CNA participate to the Tangle EE Working Group

CNA is one of the founding members of the Tangle EE Working Group, a project supported by IOTA and Eclipse foundation. Its goal is to overcome the inefficiencies of current Blockchain designs by introducing a new way of reaching consensus in a decentralized peer-to-peer system. Therefore, for CNA, Tangle could play a major role in the field of ticketing as an alternative to centralized architectures.

CNA is also member and an active contributor to the following associations:
ADCET, ATEC ITS, Club Italia, ITSO, MEDEF International, STA and UITP.

Last CNA
White paper

Ticketing for MaaS, best practicies for durable systems

Ticketing, beyond its original function of collecting transport revenues, is now considered to be the «armed arm» of MaaS. Ticketing is crucial for the creation of a full end-to-end transport offer to passengers. This new ambition of ticketing will only be possible based on well-designed and highly scalable systems.

CNA worked with ticketing experts to collect recommendations for those who wish to install a new ticketing system or adapt their existing system to meet these challenges of MaaS. The result is a white paper, published in 2019, which intends to cover all the conditions for mastering a ticketing system.

Therefore six "Golden Rules" have been identified by the group of experts, as best practices to apply for a ticketing system to be a real tool in the hands of transport authorities and operators to develop their mobility policies.

CNA regularly publishes white papers and guidelines to share the expertise of its members, operators and solution providers: ABT white paper and guidelines, HCE guidelines, Best Practices for an efficient ticketing system...

- Reliying on open standards
- Requiring dual sources at all levels of the system
- Relying on a modular architecture and API
- Mastering and owning data model
- Owning and managing cryptographic keys
- Using open source software

This white paper is available free of charge in French, English, Italian, Spanish and Portuguese.

Technical

Groups and Workstream

For many years CNA has achieved a lot of developments which have enriched the Calypso offer and maintained security at its highest level. This is the result of working groups that have been managed in a collaborative way and thanks to the members contributions, particularly media and terminal providers. Discover the technical advances of the working groups, the resulting publications and the technical updates of 2019.

Calypso Terminal Certification

At the radio frequency (RF) layer, all products refers now to the standard CEN/TS 16794, derived from the ISO 14443 for contactless interface in Public Transport applications, and promoted by the Smart Ticketing Alliance.

In order to help the contactless ticketing ecosystem, which will find it increasingly difficult to test the compatibility of all media, CNA has decided to go one step further by offering a terminal certification. A working group has been launched in 2019 and most major integrators participated to it. An initial orientation has been decided: to base this certification on the definition of the Eclipse Keyple interface, for all validators, even if they do not integrate Keyple software.

Calypso Prime 3.3 - PKI

Launched in 2017, an important novelty of the Calypso Rev3.3 is the introduction of PKI mechanisms. The objective is to manage use cases such as data authentication without Secure Module, dynamic authentication of the portable object with no Secure Module or delegation of authority without transfer of secrets. This revision 3.3 is very interesting for new mobilities modes, such as electrical scooters, bicycles in free floating, car sharing, etc., which cannot integrate Secure Module for their unlocking system on the field.

Calypso Basic

Following the successful creation of a new product, Calypso Light, CNA was asked by its members to complete the range with an equivalent to the contactless ticket. That's why a working group has been launched in July 2019 to define a low-cost multi-source Calypso product, still based on a microprocessor component and compatible with Prime and Light, because managed by the same software in the terminal. This group was successful as, at the end of 2019, the Calypso Basic specification has been published. Calypso Basic uses the same functional security as the other Calypso product, not mandating however the need for the chip to be EAL4+certified, and supports only one contract.

CNA Applet

A new version of the Calypso Rev3.1 applet has been released to improve the compatibility with various platforms:
Javacard 3.1.0, NFC Notification, NFC Forum Tag Type 4. This version integrates a new activation process allowing to activate the Calypso package independently from the personalization of a ticketing instance. CNA also worked on an implementation of a Calypso REV3.3 applet prototype supporting PKI.

Account Based Ticketing

In November 2019, CNA released the first version of the Account Based Ticketing - Calypso guidelines. Those guidelines provide a framework to implement an ABT system by taking advantage of the offline capabilities of Calypso in order to mitigate the shortcomings of A BT such as the limitations of telecommunication networks.

For instance, this document explains how the secure storage of data in the medium allows to perform limited off-line transaction in case of telecom network's disruption. And it also improves the quality of service to travellers, and for transport operators, it protects their revenues. This mechanism takes care to limit as much as possible these ABT data in the medium, in order not to fall back into a media based architecture.

Calypso HCE

In order to harmonize the security level of Calypso HCE applications, CNA has defined a set of high-level recommendations and requirements, that leads to a self-declared compliance procedure: the commitment of the HCE application providers to follow the specifications and the rules of the HCE guidelines.

To meet the needs of its members, CNA works now on a state-of-the art security reference framework for Calypso HCE solutions. This represents a first step towards a scheme to evaluate and certify these applications. The major concern for CNA is to ensure the relevance and the feasibility of this future reference scheme, and to evaluate its impact on Calypso stakeholders in terms of security development and evaluation.

GET ACCESS TO THE CNA DOCUMENTS AND WORKING GROUPS

Participation in working groups and access to all Calypso documentation produced by them, as well as technical specifications and guidelines, are reserved exclusively for CNA members. Being a member gives you also access to our ticketing experts who can help you when facing issues.

A Worldwide
Deployment

150 million
Calypso cards

160
Networks and cities

25
Countries

500 000
readers

New by-laws
for CNA

The Extraordinary General Assembly in Cannes on November 26, 2019 voted to adopt new by-laws for CNA.

These new by-laws address a threefold issue:

- To comply with the new Belgian law on companies, including non-profit associations,

- To provide a stable legal framework for the business activities carried out by CNA, in particular the new brand license,

- To make some improvements to the governance of the association.

The new Belgian law allows non-profit associations and foundations to carry out unlimited activities of a commercial nature, whereas these activities were previously limited to 10%. Of course, the company tax applies in this case.

The new law therefore perfectly meets CNA's needs related to the implementation of the trademark license.

These new statutes are also an opportunity to give more space on the Board to operators and transport authorities (7 seats).

With these new statutes, CNA has the structure and the legal framework to ensure its development in the years to come.

New branch
in Paris

The Board of Directors decided the creation of a branch in Paris to give more flexibility and efficiency to the works of the permanent team. Indeed, with the large majority of activities, orders, invoices, realized from Paris and the planned increase of commercial activities, it became necessary to have a legal structure established in France. This new structure has also the ability to hire staff.

Practically speaking, all activities regarding the management of members and support activities will be dealt with by CNA Brussels.

All development, promotion, marketing and communication (WG1, WG3 and WG4) activities will be taken in charge by the Paris branch.

Revenues coming from members, as non-commercial, whether yearly fees or specific contribution linked to the application of the article 6.4.3 of the statutes, are dedicated to CNA Brussels, when the revenues coming from product & services sales and brand license will be managed by CNA Paris.
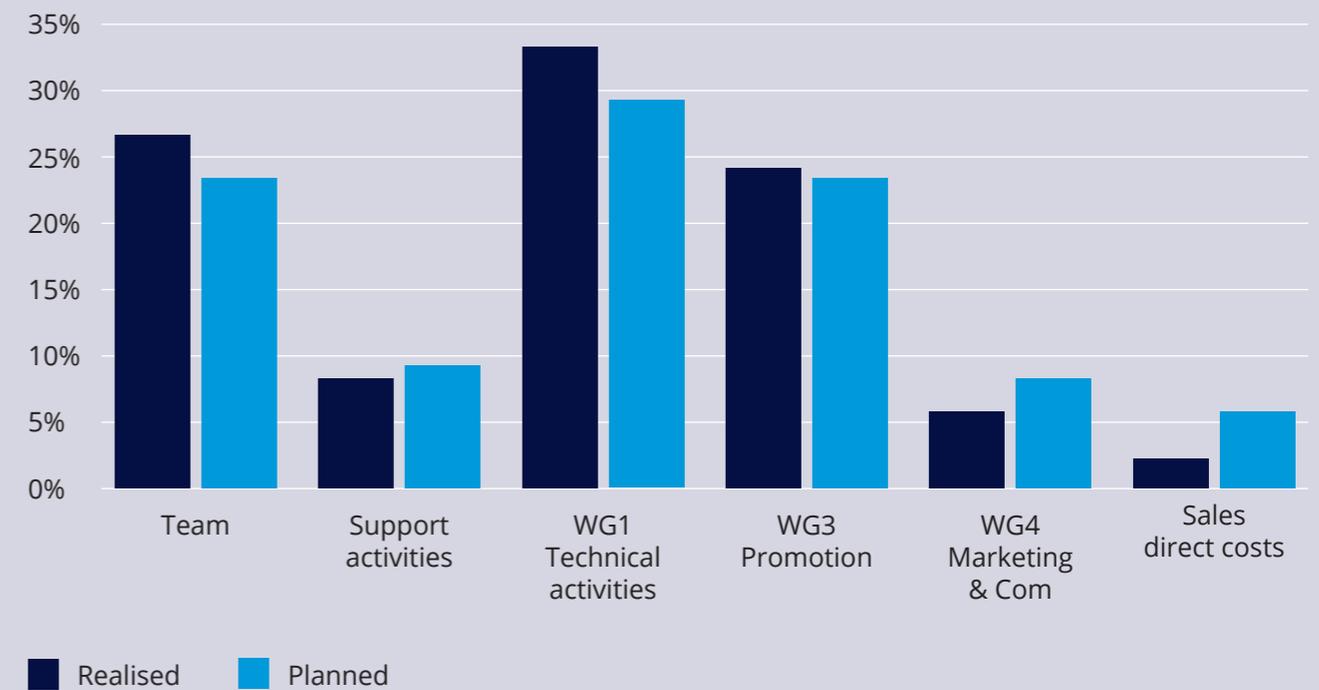
Financial
results

2019 Main Figures	Budget	Realised
Incomes	1 650 200 €	1 654 441 €
Expenses	1 742 250 €	1 557 354 €

2019 Incomes

Realised   Planned

2019 Expenses

Realised   Planned
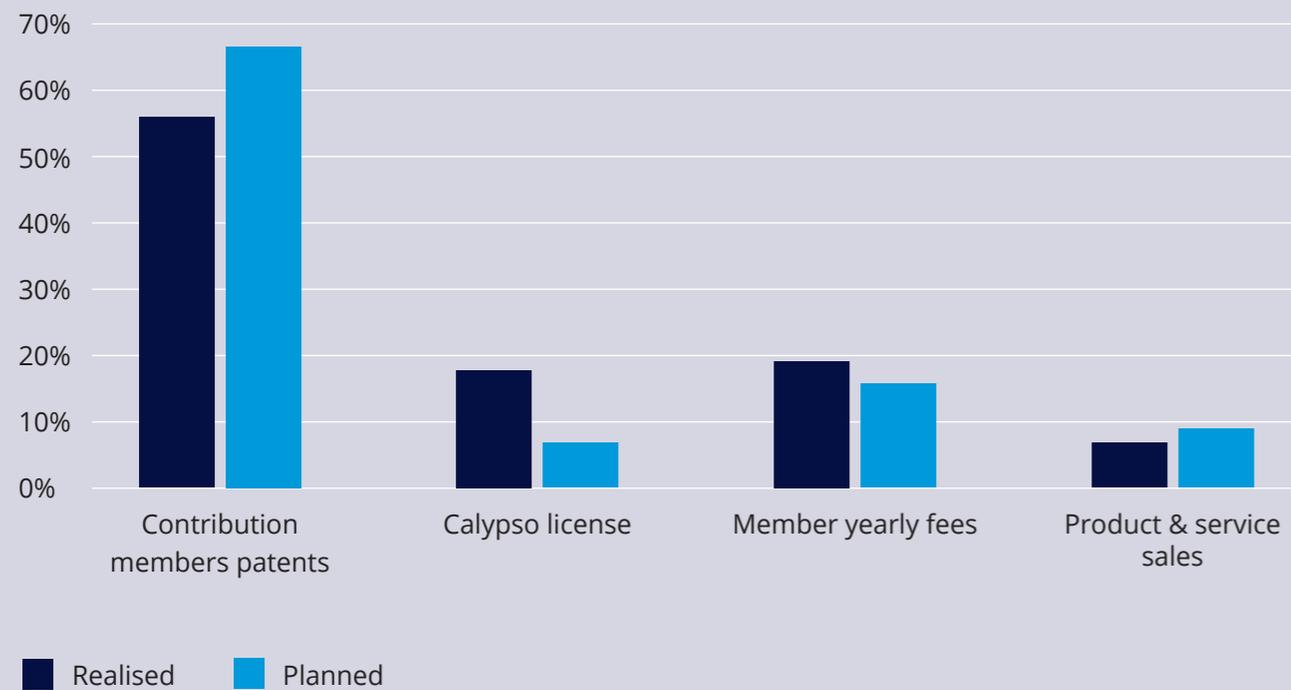
For the first time in 2019, CNA incomes include revenues from the new branding policy that was implemented on January 1, 2019. Revenues are higher than forecast due to the fact that the manufacturers gradually adopted it during the year and that the new lower price list therefore gradually replaced the previous one.

2019 expenses are in line with forecasts, with a 93% completion rate excluding direct cost of sales.

Calypso dedicated
Team

A dedicated team has been set up in 2017 in order to ensure an efficient management of Calypso and the follow-up of CNA members' requests, from technical support to communication.

This team operates from Paris, Brussels, Lisbon, Konstanz and the Island of la Réunion, and its members are at your disposal.

Chairman
Philippe Vappereau

Marketing & Communication
Valentina Zajackowski

Technical Manager
Philippe Guillaumin

Calypso Range of Products
Paulo Barreto

Open Source & Applet
Pierre Terrée

Certification & Mobile
Ludovic Teixeria Costa

Treasurer
Erik Baele

Promotion
Ralph Gambetta

Public Relations & Events
Manon Chaix

Technical Expert
Nicolas Generali

Finance Officer & Assistant
Neide Ohira

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Your key for mobilty

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