Calypso
Networks Association

ACTIVITY
REPORT
2018

CONTENTS

EDITO

After two years spent designing and preparing the future of Calypso, I am delighted that the two pillars of our strategy, Open Source and Brand Policy, are now firmly rooted. They are the basis of all our activities in the next years to come.

Our Open Source SDK, Eclipse Keyple™, is now available to all. It showcases our determination to bring ticketing to fully open solutions, at each level of the system, and to hand over control to users. Keyple is the most simple, reliable and flexible solution for managing Calypso and other ticketing technologies. Keyple brings Calypso's feature-set to developers who address integrated mobility, public transport, event management and venue access.

A new Brand Policy has been set up; it relies on the thorough certification of products and on a new license, available from the 1st of January 2019, which represents a contribution from manufacturers to the sustainability of Calypso. This license replaces the previous one, which was based on patents, to ensure both to users and providers, that after the termination of patents, Calypso will keep its core commitment on security and interoperability and will remain a guarantor of fair competition.

Keyple and the Brand Policy are the two cornerstones of the CNA strategy, which is shared by many actors, as evidenced by the number of CNA members which reaches now 100, an increase of more than 25% and which are more active than ever.

But other indicators make us confident in the success of our approach: nine Calypso products have been certified in 2018, among which two cards that are compliant with the new Calypso Light Application, which bears testimony to its success, less than one year after the finalization of the specifications by the Working Group. Other CLAP cards are now in the process of being certified. I would like to thank in particular all the manufacturers for their strong implication towards CLAP, allowing CNA to address market needs with a Calypso mid-range product at an affordable cost while maintaining its security level.

One of CNA's great strength is probably bringing together the major players in ticketing to offer solutions best suited to operators' needs. Working Groups are active on topics such as Account Based Ticketing, guidelines for Mobile HCE, improvement of the applet for Javacard, etc. Calypso will remain a platform for the exchange of knowledge, best practices and expertise, by organizing workshops, conferences and dedicated events for networking between users.

I think that collectively we can be proud of these achievements, and I would like to thank all contributors, CNA members, the Board of Directors and of course, our in-house team that has worked hard to reach the objectives that we set two years ago.
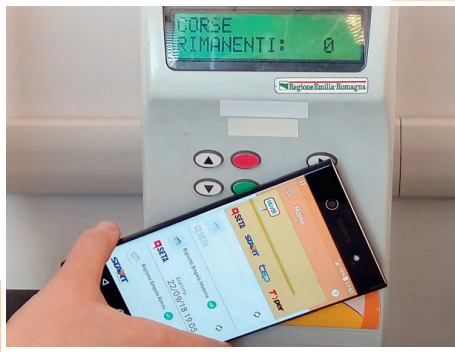
MAIN ACHIEVEMENTS

Calypso has been deployed by **Thales** and **Flowbird** in
DAKAR - SENEGAL
CARACAS - VENEZUELA
NOUMEA - NEW CALEDONIA

HCE Calypso in **BOLOGNA**
NICE and **TOULOUSE**
with **Spirtech, Digimobee**
and **Paragon ID**

First Certified
CLAP products by
HID Global and **Selp**

CNA launched its **TRAINING PROGRAM**

With various modules about "common culture and vocabulary", "functions and technical principles" and "technical expertise", the training program offers contents adapted to four main categories of audience: decision makers, project managers, software developers and technical support.

9
New Certified Portable Objects

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MEMBERS

28
NEW MEMBERS

Interparking integrates **HOPLINK** in its PCard+

Interparking is one of the major players in the field of off & on-street parking in Europe. It is going a step further with interoperability, including natively Hoplink, the application for interoperability, into all its Pcard+. This means that a Pcard+ holder has access not only to Interparking car parks from other countries, but also to other transport networks equipped with Hoplink.

IDFM launched the **MOBILE TICKETING PUBLIC EXPERIMENT** in the Paris region with **Wizway, Dejamobile, RATP** and **SNCF**

MEMBERS FROM ALL AROUND THE WORLD

One main characteristic of the new members that joined CNA in 2018 is the variety of their background, both in geographical terms and in terms of business activity. This diversity translates 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.

399 PROJECT DEVELOPMENT	DIGIMOBEE
5 T	DIGITAL PEOPLE
ABD SYSTEMS	DIRECTORIO DEL TRANSPORTE PUBLICO METROPOLITANA
ACTV	DUALI
ADCET	ELATEC
AEP TICKETING SOLUTIONS	ELITT
AXIOCOM	FAMOCO
AZIENDA NAPOLETANA MOBILITA	FIME
BARNAY	FLOWBIRD
BILLETTIQUE SERVICES	GALITT
BLUENET	GEMALTO
BMC	GIESECKE & DEVRIENT GMBH
BROXEL	GRAND AVIGNON
CAPGEMINI TECHNOLOGY SERVICES	GSD PLUS
CARD4B	HB TECHNOLOGIES
CARENE – SAINT NAZAIRE AGGLOMERATION	HID GLOBAL
CDMX - SISTEMA DE TRANSPORTE COLECTIVO METRO	HIGHQ PROFESSIONAL SERVICES
CIE TRANSPORTS STRASBOURGEOIS	IQUANTICS
COMUTITRES	IDEMIA
CONDUENT	INFINEON
CONSORTIUM CB	INGENERIA Y SERVICIOS ADM
CUBIC	INMEDIA TECH
DEJAMOBILE	INTERPARKING
	ITSO
	JM ASESORES Y SERVICIOS

LANDKREIS KONSTANZ

LINK CONSULTING

LIT TRANSIT

METROBUS

MK SMART JSC

MOOVEL GROUP

MPESO

MYCARD

NAGELS DRUCK GMBH

NEXTGEN TELESOLUTIONS PVT

NOUVELLE AQUITAINE

NOVABASE

ONEWAVE

OTLIS

PARAGON ID

PASS & MONEY NFC

PAYCERT

PLUSERVICE

POSTEMOBILE

RATP

RATP SMART SYSTEMS

REGION NOUVELLE AQUITAINE

SELP

RIGAS KARTE

SIA SPA

SIGMA SPA

SMTAG – SYNDICAT MIXTE DES TRANSPORTS ARTHOIS – GOELLE

SNCF

SOCIETE DE TRANSPORT DE MONTREAL

SPIRTECH

STE CDMX

ST MICROELECTRONICS

STIB

SRWT – GROUPE TEC

TELEMATICA

THALES

THE MOBILE KNOWLEDGE

TISSEO

TPR SERVICE

TRANSDEV

UBITRANSPORT

VITALIS

VIX TECHNOLOGY

WATCHDATA TECHNOLOGIES

WIZWAY

CNA BOARD OF DIRECTORS

Calypso Networks Association is managed by a Board of Directors appointed by the General Assembly and currently composed of eleven members.
During the General Assembly held in Strasbourg on the 16th of May, two new Directors have been elected to the last two vacant positions:

• **5T** is a joint-venture company from the City of Turin, Gruppo Torinese Trasporti, Piemonte Region and Città metropolitana di Torino in charge of managing technological systems and mobility services, traffic management, info mobility, ticketing in Turin and Piemonte.

• **GIE Cartes Bancaires**: Founded in 1984, GIE-CB is a French Economic Interest Group (EIG) consisting of about 120 establishments that provide payment services. The Group's missions include the governance, security and promotion of the CB system as well as the development of products and services and innovation in the field of payment.

2018 BOARD OF DIRECTORS

• **ACTV** Azienda Consorzio Trasporti Veneziano, Vice-President, in charge of promotion and marketing activities represented by *Gianluca Cuzzolin* and *Morgan Chirici.*
• **CTS** Compagnie des Transports Strasbourgeois, in charge of the governance of the Hoplink scheme of interoperability, represented by *Alain Caffart.*
• **GIE CB** Cartes Bancaires, represented by *Pierre Chassigneux.*
• **INTERPARKING** represented by *Roland Cracco.*
• **LANDKREIS KONSTANZ** General Secretary, represented by *Frank Hämmerle.*
• **OTLIS** Operadores de Transportes da Regiào de Lisboa, Vice-President, in charge of Open Source development, represented by *Fausto Sá-Marques.*
• **RATP** chairman, represented by *Philippe Vappereau.*
• **RIGAS KARTE** represented by *Aleksandr Brandavs.*
• **SNCF** Vice-President in charge of the industrial strategy, represented by *Joel Eppe.*
• **STIB** represented by *Jean-Luc Van Ginder Deuren.*
• **5T** represented by *Claudio Giaccobe.*

2018 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 island of la Réunion, and its members are at your disposal.

CEO
Philippe Vappereau

General Secretary
Ralph Gambetta

Technical Coordinator
Philippe Guillaumin

Marketing and
Communication Manager
Valentina Zajackowski

Technical Manager
Nicolas Generali

PR & Event Manager
Manon Chaix

Finance Officer
Françoise Chantren

Technical Expert
Paulo Barreto

Treasurer
Erik Baele

Technical Expert
Pierre Terrée

MANY WAYS TO MEET US

All Calypso members benefit from fruitful exchanges with other members, between users and providers, in an international context.

In 2018, CNA organized six ticketing events and participated as exhibitor and speaker in major international events such as Transport Ticketing Global London, Mobile World Congress, IT Trans Karlsruhe, Innotrans, the European Mobility Exhibition and the Paris Open Source Summit.

OUR EVENTS

> CNA Welcome Day

The 11th and 12th of April 2018, Milan / Turin

Reserved to CNA members, the main objective of those 2 days was to showcase Calypso, the main CNA projects and Technical Working group updates. It was also a moment of fruitful exchanges between members and Calypso experts and the opportunity to be invited by the Milan and Turin networks for a technical visit.

> 4th edition of the Smart Ticketing & Digital Forum

The 31st of May & 1st of June 2018, Budapest, Hungary

More than 70 participants took part in the two-day event dedicated to smart mobility, ticketing and digitalization. Once again, the forum confirmed its leading position in the CEE region.

> Calypso Partners Day

The 21st of June 2018, Lyon, France

The traditional annual meeting between CNA and its industrial partners to share field experience and information.

> Calypso User Day, co-organized with ACTV

The 27th & 28th of September 2018 in Venice

About 90 participants from authorities, operators and manufacturers participated in these two days of conference dedicated to ticketing. Mobility as a Service was the main topic on the agenda with a focus on Mobile Ticketing projects, Account Based solutions and Open Schemes.

> Calypso Open Session

The 28th of November 2018, Cannes, France

The Open Session was the occasion to renew the experience of Technical Workshops with exchanges about ABT, Mobile NFC - HCE, Open source SDK, followed by the Calypso Awards Ceremony and an evening of networking with all Calypso members, users, partners and friends.

The Open Session was also the occasion to reward Regina Ferreira and Antonio Proenca, from Otlis Lisbon, for their 20 years permanent and loyal contribution to the development of Calypso worldwide. The CNA Directors strongly thank them for all what they have brought to Calypso.

CALYPSO AWARDS CEREMONY

On November the 28th, the 6th Calypso Awards Ceremony was held in Cannes during the traditional Calypso Open Session, with 14 projects in competition. In front of over 120 participants, the Best 2018 Innovations and Customer Services were awarded. CNA rewards those that best contributed to the promotion and development of Calypso.

BEST INNOVATION AWARD

Dedicated to suppliers that are CNA members, service providers, integrators, etc. this award covers hardware, software or services.

> Winner: HID Global with Soma Atlas CLAP Operating System

Soma Atlas CLAP Operating System from HID Global is the first certified implementation of the CLAP specification based on the Infineon SLE77 platform ISO 14443 type A & B.

> Nominee: Famoco with the FX920 Validator

The FX920 is the first validator that includes the open source Eclipse Keyple SDK developed to enable new Calypso applications in many sectors.

> Nominee: SELP with the Elipse Calypso Card

Elipse Calypso by SELP is the second certified CLAP product and is remarkable in that it is based on a full ISO 14443 type A technology, the NXP E201382 EMBRACE component.

BEST CUSTOMER SERVICE AWARD

This prize rewards the best added value service for the custommer, proposed by users of Calypso: local authorities, transport and services operators, associations, etc.

> Winner ex-aequo
TPER with the MUVER project
The project allows for the first time regional ticketing interoperability using mobile phones in Italy based entirely on the Calypso standard.
Ile de France Mobilités with the Calypso Mobile ticketing for Paris Region
Calypso mobile ticketing is about to be rolled out on the whole public transport network of Ile-de-France (Paris Region). The experiment started in July 2018 and the commercial launch will take place in 2019.

> Nominee: OTLIS with the Viva Kiosk
VIVA Kiosk, launched in September 2018, allows users to request and receive, within one minute, a Calypso smartcard ready to be used in Lisbon Public Transports.

> Special Prize from the Board
In 2018, a Special Prize from the Board has been created in order to reward the effort to promote Calypso in new regions of the world. The Flowbird Group received this prize for its contribution to the deployment of new Calypso-based ticketing systems.

CALYPSO BECOMES A BRAND

In 2018, CNA has made great strides in defining the new brand policy to ensure the sustainability of the Calypso technology in the future, while being financially attractive to manufacturers and operators.

Calypso is based on patents that will expire in 2022. These patents give rise to non-discriminatory and reasonable licenses. The Calypso technology prevents vendor-locking and allows manufacturers to compete against each other. For more than twenty years, it has enabled interoperability between networks without ever suffering any security failures.

These results were achieved thanks to the commitment of transport operators that got together within the Calypso Networks Association, and also thanks to the patent-based license, which provides a necessary regulation. Signing a license by manufacturers makes it possible to enforce:
  • compliance of product specifications with the Calypso reference specifications,
  • compliance with safety rules,
  • respect for international standards.

The revenues associated with this license make it possible to finance the maintenance and the evolution of Calypso, to remain constantly in line with market requirements state of the art technologies by pooling development costs. Therefore CNA is able to:
  • guarantee the uniqueness of the serial numbers,
  • run working groups to meet the needs of operators,
  • regularly update the specifications to take into account new functional requirements,
  • develop technology to adapt to new uses, mobile, mid-range products, ABT, etc.
  • set up hardware and software certifications,
  • provide expertise to give support and training,
  • manage a community of users and promote the sharing of experience,
  • defend the interests of operators in international bodies,
  • promote Calypso® to manufacturers and operators.

All these missions guarantee the durability of the Calypso standard.

> The end of the current patent license scheme could have represented a major risk for operators. Without self-regulation and without revenue Calypso would eventually lose its benefits 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.

This is why CNA, the guarantor of the durability of the Calypso® technology, has decided to anticipate these issues for its users and members, and is implementing a brand policy based on product certification and a new license agreement that applies from January 1, 2019.

Calypso®

NEW CALYPSO BRAND POLICY

As of January 2019, Calypso becomes a registered trademark that can only be used for products certified by Calypso Networks Association.

CNA is responsible for licenses signed by manufacturers and has delegated its management to its service provider Innovatron.
The certification process is based on independent laboratories and certification bodies.
The complete and up-to-date list of certified products and laboratories is permanently available on the calypsonet-asso.org website.
The use of this license translates into a cost per product that is four to ten times lower than the original patents. The prices are public and can be consulted on calypsonet-asso.org.

Insofar as the creation of Calypso products is non-discriminatory and complies with the public procurement code, it is possible to explicitly request Calypso certified products in calls for tenders.

> **For buyers, asking for Calypso certified products is:**
1. ensuring the compliance with the Calypso standard in terms of performance, safety and interoperability,
2. not needing to perform Calypso acceptance tests for portable objects,
3. benefiting from a range of trusted suppliers.

> **For suppliers to offer certified products Calypso allows:**
1. avoiding unfair competition from uncertified products claiming wrongly to be Calypso-compliant,
2. access to public procurement on a level-playing field,
3. access to a community of ticketing experts.

CNA, as the owner of the Calypso brand, will ensure its protection by using legal means available. With this new license, CNA's objective is to guarantee the durability of Calypso® for the benefit of all, through a continuous process of improvement and modernization.

WORKING GROUPS AND TECHNICAL WORKSTREAM

For many years CNA has achieved many 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 contributions of members. Discover the technical advances of the working groups, the publications they produced and the technical updates of 2018.

HCE – HOSTED CARD EMULATION – ADAPTED TO CALYPSO

HCE security principles in a Calypso environment

On the 12th of March 2018, CNA published the final version of the specification of a Calypso HCE application based on several pre-requisites:

1. being compatible with the Calypso 3.1 command set,
2. being compatible with existing ticketing systems without requiring major evolutions of legacy equipment,
3. guaranteeing a security level on par with the current Calypso systems,
4. guaranteeing a reasonable level of security when compared with state-of-the-art Calypso security.

HCE Calypso security requirements

Beyond the security features brought by the HAM for the exchanges between a Mobile phone and the servers of the HCE Calypso eco-system, CNA has enforced some security rules: triple DES cryptographic algorithm mandatory for validation, thus in the validators.

Frequent, at least every three days, renewal of the Calypso Serial Number of the HCE application, as well as its debit key and signature of the contracts including the Calypso serial number, in full.

### A new version of the HAM for HCE ecosystem

The HAM - HCE Security Module - is the linchpin of the security architecture used by the Calypso HCE solution. The HAM version two has been released: it is nearly twice as fast as version one and supports all SAM-C1 features.

MOBILE EVOLUTION ON THE CNA CALYPSO APPLET

In August 2018, CNA released the version 1.3.6 of the Calypso Applet, including packages dedicated to contactless multi-application cards. This latest version also reduces the consumption of transient memory to improve the compatibility of the applet on platforms with limited memory capacity.

Another update enhances the compatibility of Java Card 3.0.4 and 3.0.5 platforms, by removing the dependency on the Signature API which has evolved in the latest Java Card specification.
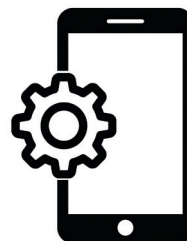
Account Based Ticketing

Following the publication of the ABT White Paper in September 2017, CNA set up the WP13, a Working Group on ABT, to define the basis of an ABT system based on the Calypso standard.

The group is composed of transport operators, SNCF, OTLIS, BMC and suppliers that participate actively, like RATP Smart Systems, Thales and lead by Cubic which brings its experience in implementing ABT systems in large public transport networks. The main objective of the working group is to publish a document that will propose "guidelines" for the implementation of ABT in a Calypso-based ticketing system.

Those guidelines will focus especially on security, compliance with GDPR rules and on the definition of the data to store in a Calypso card to improve the performance and reliability of Calypso ABT ticketing systems and to minimise the "first ride risk". A first draft of these guidelines are being finalized and the working group plans to publish the final version of the document during the second semester of 2019.

TECHNICAL DOCUMENTATION ACCESSIBLE TO ALL CNA MEMBERS

The CNA Board changed the rule for allowing access to the technical documents by giving more rights to CNA members.
As a consequence, the technical support website, calypsostandard.net has been adapted to consider the specific rights of CNA members.

CERTIFIED PRODUCTS

In an open environment, certification is the main key to ensure the reliability and efficiency of ticketing. A growing number of transit authorities and operators require products to be certified to guarantee the sustainability of their investment. CNA has a full set of certifications for portable objects and terminals, at different layers of a transaction, to guarantee end-to-end compatibility. The full list of certified products is available on the CNA website. For each certified product, you can download the official certificate delivered by CNA. These certificates can be used both by manufacturers and buyers of Calypso products.

Date	Specs	Type	Company	Product Name
2018	CLAP V.1	Contactless Native Card	SELP	Elipse CLAP V1
			HID GLOBAL	SOMA Atlas CLAP V1
	CALYPSO REV 3	Dual Interface Java Card with CNA Applet	IDEMIA	Cosmo Fly v6.0
		Java Card for NFC mobile with CNA Applet	MOBILE KNOWLEDGE	PN81T
			IDEMIA	PEARL v5.0
				PEARL 800K Classic 4.0+
			MOBILE KNOWLEDGE	PN67T
			GEMALTO	UpTeq NFC 4.1.1 v1.1
				UpTeq NFC 3.1.2_eSE v2.0
2017	CALYPSO REV 3	Java Card for NFC mobile with CNA Applet	GEMALTO	UpTeq NFC 4.1.1 v2.0
				UpTeq NFC 3.1.2_eSE v3.0
			MOBILE KNOWLEDGE	PN80S
				PN80T
2016			IDEMIA	DragonFly v4.0
			GEMALTO	UpTeq NFC 3.2.2_VFG
				UpTeq NFC 3.2.2_Generic v1.0
		Dual Interface Native Card	HID GLOBAL	SOMA Atlas V1
			PARAGON ID	TanGO Flash v1
				TanGO v1
2015			WATCHDATA TECHNOLOGIES	TimeCOS DI Calypso version 1.0
2014			STMicroelectonics	CD21 Rev3.2
			PARAGON ID	Tango MultiApp v3.0
			GEMALTO	CELEGO CALYPSO G1 v1.0

ECLIPSE KEYPLE, THE OPEN SOURCE SDK BY CNA

The main goal of Calypso Networks Association has always been to ensure the openness of the 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 not enough to avoid proprietary and closed solutions. That is why CNA decided to push the concept of openness further in the ticketing world and to move from an open standard to an Open Source model with its Open Source Software Development Kit (SDK) called Eclipse Keyple.

The main scope of Keyple is to allow developers to develop applications that communicate with Calypso portable objects, without requiring the development of the Calypso layer, which requires a significant investment in time and expertise.

In 2018, CNA released the first version of the code in a beta test version, which immediately aroused the interest of some ticketing stakeholders.

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

Discover Keyple on keyple.org
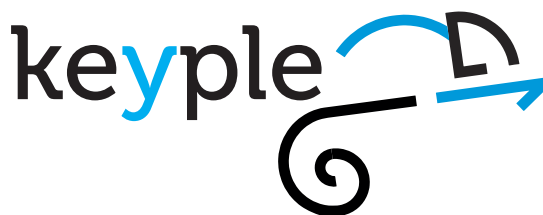
MORE INTEROPERABILITY WITH HOPLINK

A ticketing solution that facilitates interoperability between transport networks.

Hoplink enables interoperability between transport networks without requiring prior commercial agreements. To ensure the smooth operation of this service, a governance has been put in place that defines the rules that signatories commit to by signing a charter. The Hoplink Alliance ensures its governance, defines and controls business rules and ensures that security principles are complied with. Today, many signatories have opted for Hoplink and have chosen to accept all other Hoplink cards in exchange of their own users being able to use their cards on all other Hoplink networks.

DISCOVER THE MEMBERS OF THE ALLIANCE:

- AFIMB
- Amiens Métropole
- BMC Bordeaux Métropole
- Brest Métropole Océane
- Carene Saint-Nazaire
  Agglomération
- Communauté d'agglo.
  Pays Basque
- Communauté Urbaine
  de Dunkerque
- CTS Strasbourg
- De Lijn
- Grand Angoulême
- Grand Avignon
- Grand Besançon

- Grand Chalon
- Grand Dijon
- Interparking
- Lille Métropole
- Lorient Agglomération
- Nantes Métropole
- Nîmes Métropole
- Quimper Communauté
- Région Auvergne
  Rhône Alpes
- Région Basse
  Normandie
- Région Bourgogne
- Région Bretagne
- Région Grand Est

- Région Nouvelle Aquitaine
- Rennes Métropole
- Saint-Brieuc
  Agglomération
- SMIRT
- SMT Arthois Gohelle
- SMTC TISSEO
- SNCB - NMBS
- SNCF
- SRWT- Groupe TEC
- STIB - MIVB
- TCRM Metz
- Vectalia Cambrai
- Vitalis Grand Poitiers
- Wizway Solutions

Success of the brand in the communication field

The important work of redesign of Hoplink's brand has been rewarded by professionals from communication and advertising. It received two prizes and has been referenced more than 30 times by specialised media in communication.

**For further information or support, the CNA coordination team is at your service.
Contact: Hoplink@calypsonet-asso.org**
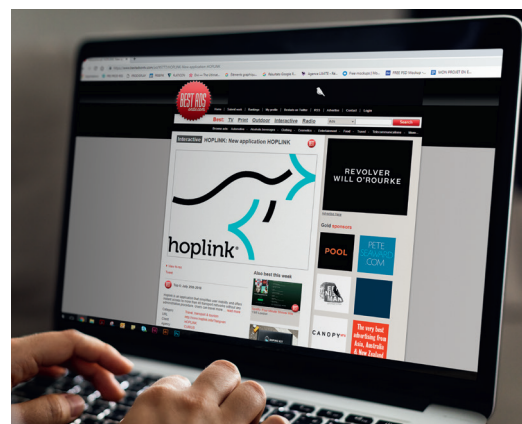
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🐦 @calypsonet_asso

in /company/calypso-networks-association

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