



Calypso
Networks Association

2016
ACTIVITY
REPORT



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EDITORIAL

PHILIPPE VAPPEREAU CNA CHAIRMAN

CNA has been supporting Calypso for more than 15 years, and has met its commitments to ensure the sustainability of this technology and to foster the setting of a standard. So many things have been achieved during this period, 4 major evolutions of security, mobile ticketing, certification, interoperability with Triangle, and others, driving Calypso to be a major player in smart ticketing sector and deployed worldwide.

In a ticketing environment, more and more complex, with more and more solutions, card centric or system centric, with more and more actors, CNA now intends, not only to develop and promote globally Calypso as it has been used to do it for fifteen years, but also to adopt a new technical and business model, inspired from the Open Source one. This new model has to be fully operational in 2020, therefore 2016 was the year for setting-up a heavy program of transformation.

WHAT WERE THE 2016 MAIN ACHIEVEMENTS FOR CALYPSO?

In 2016, we had to prepare this program of transformation, but also to go on with an important stream of technical work. Among others, we have setup with Paycert, a certification process of RF layer's compliance to the CEN TS 16794 standard; it is available both for cards and terminals, and it answers to the needs of operators to benefit from an end-to-end certification process.

Of course we have dealt with a lot of work about specifications, interoperability with Triangle, but I would like to stress here two main programs launched in 2016, and which will give results in

2017: the realization of a powerful SDK (Software Development Kit), which will be available in an Open Source distribution and will deeply ease the use of Calypso, and the specification of the Calypso Light Application, which will usefully complete the range of Calypso products, answering to the needs of our members. All what we do is always in answer to the needs expressed by our members.

WHAT IS THE CNA INVOLVEMENT FOR THE CALYPSO PROMOTION?

The notoriety of Calypso must be permanently increased, based on its key characteristics of security, interoperability, openness and field deployment. That is why CNA allocates a balanced budget for technical activities and for promotion and communication; 2016 has seen the definition of a completely renewed brand for our solution for interoperability Triangle. We have managed successfully many dedicated events in Doha, Budapest, Paris, Singapore and many others which were true platforms of exchanges between users and providers. Our Awards have demonstrated the vitality of Calypso, with 15 candidates proposing very rich innovations. We have reinforced our relationships with our partners, the Smart Ticketing Alliance, and UITP. Those achievements have been made possible by reinforcing the communication team which, among many other things, allow us to provide you this first Activity Report!

HOW CALYPSO CAN CONTRIBUTE TO THE SMART CITY?

A sustainable mobility in a sustainable city is the main stake for the Smart City. I sincerely think that our Calypso approach for ticketing contributes really to enable a door-to-door mobility for customers. We bring a set of tools and specifications, in an Open Source policy, contributing to standard and interoperability, bringing ease of access to transport, completely in phase with the Smart City concept. Even if we are not, of course, delivering these products directly to the travellers, they contribute strongly to offer them a seamless travel, and integrated with the other services in the city. I would add

"2016, A DECISIVE YEAR FOR THE FUTURE OF CALYPSO"

that the openness that we have been promoted for 20 years, which is now a reality in the field of passenger information, with the open data, and that we are faithfully going on to defend in the next years, is a key for sustainability.

OVER THE NEXT FEW YEARS, WHICH CHALLENGES WILL FACE CALYPSO?

The challenges are numerous and our first duty is to guarantee the sustainability of Calypso to all its users. We needed to increase our ambition; and we did it in 2016. Moving from being only manager of a contactless secure transaction for public transport toward a reference in smart ticketing. Our strategical plan has two main axes: adapt Calypso to the new trends of ticketing in transport, card or system centric, open payment, account based, mobile ticketing, but also update to new available technologies. The second axe is opening Calypso to other sectors of activities where a transaction highly secure and easy to use has a real added value. Our marketing plan reflects these two main axes; our entire work stream program contributes to them and a dedicated team now leads and realizes this program, the best guarantee to succeed.

2016 HIGHLIGHTS

A NEW CNA FOR THE FUTURE OF CALYPSO

2016 has set the basis of a new CNA, ready to adapt Calypso to the evolutions of Ticketing, to guarantee its sustainability and to make it the reference of Open Source Ticketing, and able to ensure its financial autonomy by 2020. A team fully dedicated to Calypso is now operational, with technical, marketing, sales, communication competences. A strategical plan gives the roadmap for the next 3 years, with a heavy work program, which supports the open source strategy. Furthermore, CNA will be more and more in support of Calypso's users, with a full offer of products and services, among them a powerful SDK, a real facilitator for implementing Calypso, but also trainings, expertise, platform of exchanges... It illustrates a new paradigm for Calypso.

And new statutes for a better governance

During the Extraordinary General Assembly held in Cannes on November 30th, new statutes have been adopted. They allow a better-balanced governance between the Founders, the users and the providers and prepare for the future of Calypso based on an open source model.

SDK, AN OPEN SOURCE TOOL KIT FOR TICKETING

The project aims to provide a Calypso SDK, a reference library to facilitate the implementation of a wide variety of applicative software on Calypso terminals. It will be accessible to developers in open source, in Java and C++ versions in a first step. The Calypso SDK is agnostic to the Calypso portable object reader interface; it is usable either in an embedded terminal, a remote web service or a mobile application. Launched end of 2016, the development is in 4 stages, the first one providing authentication as a service, based on Calypso secure portable objects, will be available mid-2017. The last version will deal with a full Calypso transaction, with its session mechanism, and will be available at the end of 2017.

27 APPLET FOR JAVA PLATFORM LICENSES

19 CERTIFICATES PORTABLE OBJECTS & TERMINALS

CALYPSO ADDRESSES NEW MARKETS

MENA is the fastest growing region in the world in terms of infrastructure, including public transport (metro, tram, bus, and rail) both at intra- and inter-national levels. Public transport is seen as a key strategy by the MENA decision makers in order to face increasing environmental challenges and to insure an equilibrated territorial development. For CNA, these huge projects represent strong opportunities for the development of Calypso whose characteristics and performances clearly answer to the needs for an innovative and efficient ticketing. But the notoriety of Calypso has to be strongly reinforced in this Region and a two-days Forum in Doha, main event of the 2016 promotional program, was organized to this end.

28 INTERNATIONAL EVENT PARTICIPATIONS

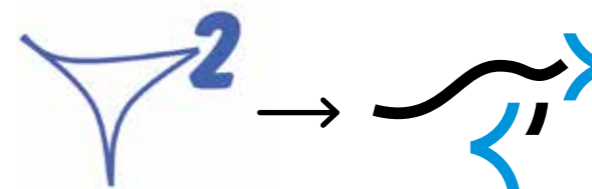
A NEW IDENTITY FOR TRIANGLE

Triangle is one of the major projects related to Calypso, as it is truly customer oriented, offering very added value service to travelers. Its strong promise of a simple interoperability between networks, cities and services must be materialized by a strong identity responding to the following challenges: be visible and recognizable on cards or applications which offer this service, be linked to the Calypso Brand and become the signature of interoperability around the world.

Such an ambitious brand positioning couldn't have been achieved with the first Triangle logo. That is why CNA decided to change the complete identity of Triangle, offering it a new logo and a new name, which will be revealed in 2017. CNA is also going to assist the 31 signatories of the Triangle convention in their communication plan, by providing them all the communication Kit Tool.

And a new governance

The signatories of the Triangle convention named in November 2016, for the first time, an Executive Committee and its President, M. Alain Caffart, from Compagnie des Transport Strasbourgeois.



31 TRIANGLE PARTNERS

A BROADENED RANGE OF PRODUCTS: CALYPSO LIGHT APPLICATION

The Calypso technology is recognized as a high secure solution for ticketing, but sometimes not adapted to the needs of Public Transport occasional users. The existing solutions based on contactless tickets are not functionally compatible with the Calypso commands and need a specific development in the terminals. Therefore, CNA considered that, due to the evolution of the microprocessor components market, there was an actual opportunity to enrich the Calypso range of products by a middle-end card at an intermediary cost.

In a first stage, at summer 2016, CNA launched a RFI (Request for Information) among manufacturers, components and cards providers, to identify possible savings and confirm that the cost target was achievable. After receiving several positive answers to its RFI, CNA started end of 2016 to specify functionally a Calypso Light Application, including several limitations compared to the full Calypso specification, such as fixed file structures, restricted number of contracts, no options and non-supported commands.

127 TRANSPORT NETWORKS USING CALYPSO

150 MILLION CALYPSO CARDS

« OVER 600 MILLION CALYPSO PATENTED OBJECTS SOLD IN 2016 »

31 WORKING GROUPS MEETINGS ORGANIZED IN 2016

60 CNA MEMBERS

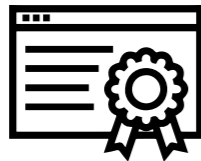
5 NEW MEMBERS IN 2016

TECHNICAL WORKSTREAM

TWO CERTIFICATIONS NOW AVAILABLE

Calypso functional certification process

In addition to the certification of native portable objects, on the track from beginning 2014, CNA is now able to certify Java applet based products. At present, 10 portable objects are certified, 7 with native software and 3 on SIM for NFC phones, running on a Java Platform with the CNA applet. The list is available on the web site.

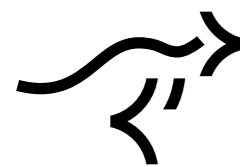


Contactless interface in Public Transport

In the framework of the Smart Ticketing Alliance (STA), through a partnership with Paycert, CNA set up a contactless interface certification which is based on the European specification for transport CEN TS 16794, for portable objects and equipment. This certification is not linked to a ticketing scheme or another, and can apply to Calypso cards as well as other ones. The convergence with NFC Forum is expected mid-2017.

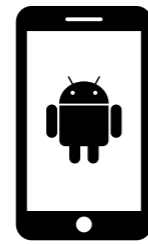
Calypso portable objects now benefit from an end-to-end process of agreement, from the radio frequency low layers to the compliance to the Calypso specifications.

TRIANGLE SPECIFICATION STABILIZED



In 2016, CNA published the revision 2.7 of the Triangle specification. Most of the work consisted in a rewriting of the specification with a better splitting between the requirements and the recommendations as well as an addition of missing details. The core specification is now stabilized for more than two years.

FINALIZATION OF THE HCE SPECIFICATION FOR MOBILE PHONES



CNA published mid-2016 a second version of the Calypso HCE Specification to improve the security requirements while simplifying the cryptographic architecture. This specification is an experimental one, as it gives a sufficient framework to launch pilots. But the overall security of an HCE solution relies on countermeasures based on a constant back-end monitoring, to prevent fraud inherent to the relative HCE security level. Therefore, jointly with AFIMB, CNA launched a security survey made by an independent university, including the definition of minimum-security requirements, to be published mid-2017.

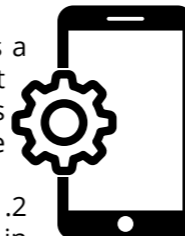
SPREAD AND PERFORMANCE IMPROVEMENTS OF THE CNA APPLET

CNA provides to its members a reference Calypso applet. At the end of 2016, 27 entities have signed the applet license contract.

CNA published the revision 1.2 of the Applet User Manual in 2016. The main modifications with the previous revision are small fixes to get through the Calypso Portable Object evaluation process, and an increased speed of the ID Photo management.

A new revision planned mid-2017 will bring new features expected by the TSM (Trusted Service Manager) such as installation traceability and mobile app notification.

A revision 2 is already in the roadmap for end 2017 to support the features of Calypso rev. 3.2 and a new GlobalPlatform amendment. It will solve the issue of data instance package back-up.



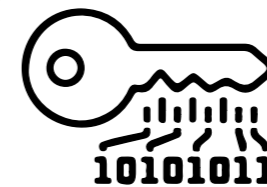
LAUNCH OF ACCOUNT BASED TICKETING (ABT) STUDIES

In the light of new emerging ticketing schemes, it makes sense to investigate Account Based Ticketing to see what part Calypso could and should play. Therefore, at the end of 2016, CNA started a whitepaper which analyses the benefits and drawbacks of ABT and how Calypso could eventually deal with some issues of these schemes. The first version of the document is expected for May 2017. On this basis, a working group will be setup aiming at the realization of a Calypso-ABT specification.



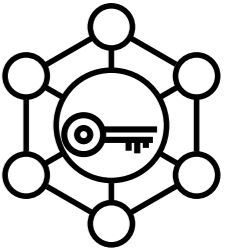
TOWARDS CONVERGENCE OF CALYPSO KEYS CEREMONIES

For many years, there has been an issue for some operators with the two incompatible existing key ceremonies; it is a real obstacle to interoperability and fair competition. Following several meetings which involved Secure Module vendors and their customers, CNA emphasized the need for a generic key ceremony. A dedicated working group has been created in 2016 and the specification is expected in mid-2017.



ASYMMETRIC CRYPTOGRAPHY FOR CALYPSO IN 2017

An important novelty of the Calypso rev. 3.3 will be 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 without Secure Module or delegation of authority without transfer of secrets. The rev. 3.3 specification will be issued before the end of 2017.



TECHNICAL DOCUMENTATION RESTRICTED TO CNA MEMBERS

The CNA Board decided to change the rules of access to the technical documentation, by giving more rights to CNA members. Therefore, the Calypso technical support website (www.calypsostandard.net) has been adapted to consider the specific rights of Calypso Networks Association members. This task was launched at the end of 2016 and the latest version of the technical support website is now operational.

OPEN SESSION & AWARDS CEREMONY



On the 30th of November 2016, the 4th Calypso Awards Ceremony took place in Cannes to reward the best projects that contribute to the innovative development of Calypso.

This year again, numerous different and qualitative projects have been submitted to the jury, which delivered the Best Innovation and the Best Customer Value prizes, paying attention to criteria such as technical and institutional challenges, quality of implementation, innovative or adapted response to new expectations and needs.

OPEN SESSION
Cannes, 2016

WINNERS

Best Customer Value: **WIZWAY**

Wizway Solutions delivers an «NFC ready» infrastructure to Transport Organizing Authorities and transport companies. Fully compliant with NFC (Near Field Communication) standard, and with Calypso ticketing standard, the Wizway solution is interoperable over all transport networks, without any impact on the equipment.

Using mobile devices that are compatible with NFC technology, passengers will be able to purchase all types of tickets - single fares, distance fares, rail cards and many others - anywhere, at any time, with an app provided by the transport operator or authority, and store these tickets securely on their SIM card.



Best Innovation: **OPUS FOR BIXI**



The Société des Transports de Montréal (STM) developed and set up a Web service (API-Application Programming Interface), which enables to read and interpret data within an OPUS card. This Web service is dedicated to the Opus partners, to facilitate them the use and deployment of applications using OPUS cards.

The partners access, through a Calypso compatible card reader, to the commands of the card. Data are transmitted to the STM API which provides to the partner the relevant tariff offer to propose to the customer.

A first application has been tested with BIXI, bicycle sharing service; the regular customers of public transport could benefit of a discount price with their seasonal tickets.



PROMOTIONAL EVENTS

2ND BUDAPEST SMART TICKETING & DIGITAL SERVICES FORUM

30 June-1 July - Budapest, Hungary

The second edition of the Budapest Smart Ticketing and Digital Services Forum with more than 60 participants was held again with success. Being one of the biggest event in the region, participants got first-hand information and project milestones from high-level speakers, panelists and senior experts. For the first time, the event was hold over two days.



MENA TRANSPORT CONGRESS & EXHIBITION

25-27 April - Dubai, UAE

Once more we took part in the successful UITP MENA Congress that was held in co-operation with the Dubai Roads and Transport Authority. As being the largest event for public transport in the region, it gave us the possibility to meet and discuss with representatives from Ministries and relevant players from the sector. It results in an increased notoriety for Calypso in the region where there are so many public transport projects. In parallel, an outstanding VIP evening reception was organized for CEOs and key decision makers from the Middle East.



IT TRANS 2016

1-3 March - Karlsruhe, Germany

During IT Trans, CNA had the opportunity to showcase its own developments in terms of applet deployment and to give an outlook on its technological developments for the upcoming years. The event gave a good opportunity to update and consolidate our relationship with the various industry players active in the smart ticketing eco system.

PLUGFEST NFC FORUM

30 August-1 September - Berlin, Germany

CNA, together with AFIMB, from the French Ministry of Transport, was one of the leading partners in the world's first successful large scale plugfest event in Berlin. Organized in Berlin by the German transport operator's association VDV, the event received large international momentum with several technology suppliers and handsets from different manufacturers involved in successful demonstrations of mobile phones used on public transport validators.



SALON EUROPÉEN DE LA MOBILITÉ

14-16 June - Paris, France

Paris was this year's location for the European Mobility Exhibition where CNA showed its recent technology developments. The event gathered more than 250 exhibitors and attracted around 10.000 highly-qualified professionals from more than 50 countries.

LTA - UITP SINGAPORE INTERNATIONAL TRANSPORT CONGRESS AND EXHIBITION (SITCE)

19-21 October, Singapore

In October, CNA attended the LTA-UITP Singapore International Transport Congress and Exhibition 2016 (SITCE). During the three days' event, the CNA booth had many visitors, extending our contacts network in the region. Further, a Calypso VIP evening reception was organized in one of the leading hotels in the world.



1ST QATAR SMART TICKETING & DIGITAL SERVICES FORUM

17-18 February - Doha, Qatar

CNA organized a two days Forum in Doha strictly dedicated to digital services and ticketing. Over 50 highly qualified public transport key players from international companies and decision-makers from Middle East transport authorities debated and discussed about challenges and how to facilitate the emergence of innovative solutions customer oriented. It has been a unique opportunity to discover the last developments in these matters, such as Account Base Ticketing, mobile solution interoperability, security, certification and new tools for Customer Relationship Management.





AN AMBITIOUS WORK PROGRAM

CNA has built for the next three years an ambitious work program answering to its strategical objectives.

All these objectives are oriented towards two main stakes, **guarantee sustainability of Calypso to its users**, and **be the reference of open source ticketing**.

CUSTOMER ORIENTED OBJECTIVES

To develop and promote Calypso, CNA intends to adapt it to the emerging ticketing schemes, to target other markets than transport, mainly access control, multiservice, and therefore to increase the worldwide deployment of Calypso.

To meet the market expectations and users' needs, the main actions are to set up a true brand based on a strong certification policy and a reinforced notoriety, to maintain the high level of performances of the Calypso specifications, to commercialize an offer of products and services helping Calypso use and implementation.

CNA also intends to be a more active platform of exchanges, for users to share together their experiences, needs and issues, and also between users and providers.

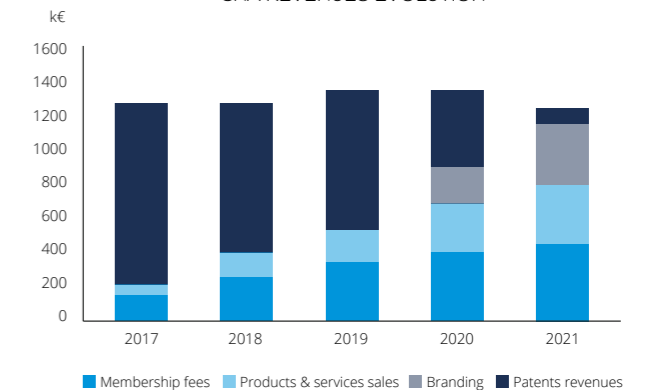
ADAPTED MEANS AND PROCESSES

The means and processes must be adapted to the stakes. A dedicated staff is operational to manage the work program; the cooperation between experts from different countries will be reinforced. A better governance has been set up with Internal Regulations, a Steering Committee and an Editorial Committee. The existing technical, promotional, financial, of communication processes will be consolidated, and new processes for service and product commercialization, and open source community management, will be established.

FINANCIAL OBJECTIVES

CNA must ensure a full financial autonomy, non-dependending on the present revenues from Calypso patents, before 2020. In this objective, CNA will diversify its incomes in three directions: the membership, the commercialization of its products and services, the valorization of the Calypso brand. A roadmap towards this target is defined.

CNA REVENUES EVOLUTION



OUR MEMBERS

THE FOUNDERS

Landkreis Konstanz
OTLIS
RATP
SNCF
STIB

THE MEMBERS

5T	Paycert
AEP	Pesamax
Arjosystems	Phaymobile
ASK	Pluservice
Azienda Napolitana Mobilita	Novabase
BMC	Microsafe
Bluenet	Ministry of transport Israel
Card4B	Morpho
Carene – Saint-Nazaire Agglomeration	Oberthur
CIE Transports Strasbourgeois	Orange
Digimobee	Parkeon
Elitt	Postemobile
EM Microelectronic	Prodata
Entreprise Metro Alger	RIGAS KARTE
Fime	Scheidt & Bachmann
Gemalto	SIA SPA
GMX	Siemens
HB Technologies	Société de Transport de Montréal
HighQ Professional Services	Sopra
Interparking	Spirtech
Into it	Start Romagna
Jm Asesores y Servicios	STMicroelectronics
Kaiser Services	Thales
Keolis	Vix Technology
Link consulting	Watchdata Technologies
MTA	Wizway
Opentech	Xerox/Conduent
Ort	

THEY JOINED CNA IN 2016

Carene - Saint-Nazaire Agglomération
Wizway
Bluenet
Pesamax
Xerox/Conduent

OUR PARTNERS

UITP

Since many years, CNA is interlinked with leading bodies from transport sector like the UITP and the STA. CNA takes part in most international and regional events organized by UITP emphasizing our strong commitment towards this association. Deep exchanges with other members of the UITP and the set-up of policies in ticketing and information are done in the frame of the IT&I Commission of UITP which we are member of.



CITYZEN MULTISERVICE APPLICATION (CMA)

Another strong partnership of CNA is with CMA in France. CMA is a multi-service standard based on Calypso, and following the examples of Rennes and Bordeaux many regions announced projects based on this standard: Île-de-France, the Lyon metropole, Normandy, Strasbourg and others. Key target in these regions is to provide one single card to all local citizens, which includes a transport application and an CMA application to facilitate access to public transport together with access to services in the City, libraries, events, museums, student, cards, etc.



SMART TICKETING ALLIANCE

To strengthen the position of the transport sector in the changing world of business rules and new players in the ticketing eco system, Calypso Networks Association (CNA) co-founded with AFIMB, ITSO, VDV ETS and UITP the Smart Ticketing Alliance (STA). This Alliance targets the creation of interoperable smart ticketing in Europe and elsewhere by setting respective functional and technical requirements. Consequently, one of the mayor milestones 2016 was that CNA, in partnership with Paycert, has been officially accredited by the STA as first certification authority. This is part of a strong contribution to compatibility of European e-Ticket infrastructure.



The certificates delivered by CNA-Paycert ensure that the contactless infrastructure deployed on a transportation network will be compliant to the CEN/TS 16794, which implements the ISO 14443 standard in transport ticketing environment. So, it ensures technical compatibility with any other certified e-ticketing system, allowing interoperable use and cross-border travel.

For many years, CNA has been strongly working in favor of standardization which is an essential key to interoperability and openness. It will lead ticketing in transport to a level of maturity that the bank sector has from a long time implemented.

OUR TEAM



CEO
Philippe Vappereau



Promotion and Relation Manager
Ralph Gambetta



Marketing &
Communication Manager
Valentina Zajackowski



Communication and
Administrative Officer
Manon Chaix



Technical Coordinator
Philippe Guillaumin



Technical Manager
Nicolas Generali



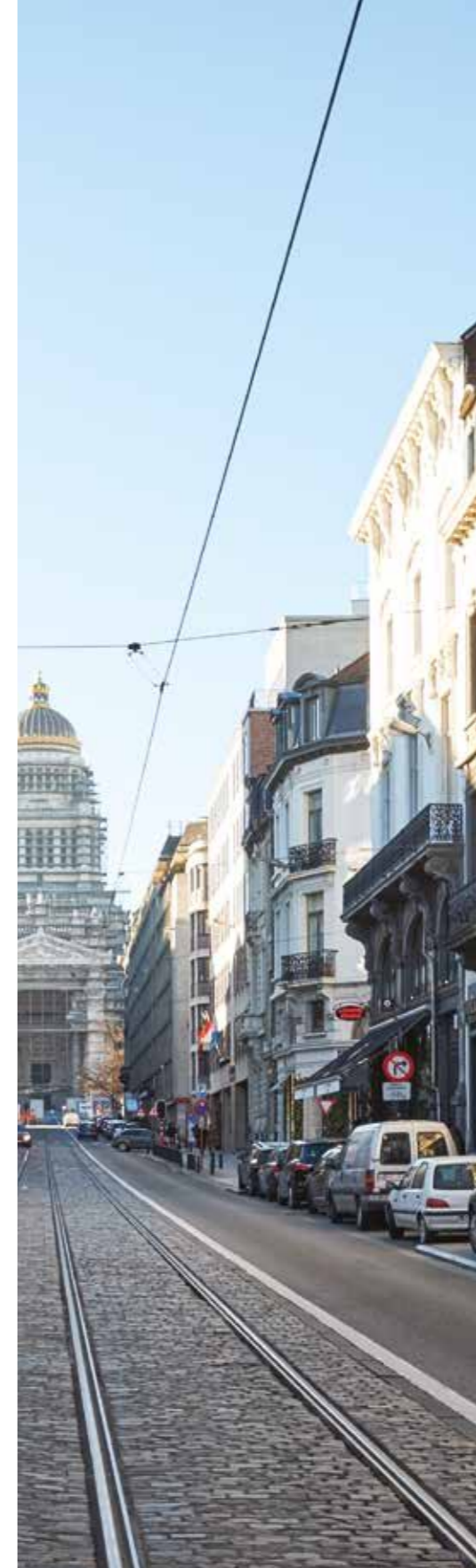
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Calypso

YOUR KEY FOR MOBILITY
DESIGNED FOR THE SMART CITY



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