ACTIVITY REPORT 2022

ITXPT

ITxPT

INFORMATION TECHNOLOGY
for PUBLIC TRANSPORT

Standard-based Mobility IT

The non-profit association ITxPT enables an open architecture, data accessibility, and interoperability between IT systems. The members of ITxPT develop the IT architecture for public transport and other mobility services together, based on standards and best practices. The specification is publicly available on the ITxPT website.

2022 in numbers

Members from the whole world

In 2022 ITxPT counted 161 members and partner associations from 28 countries. With that, ITxPT is an essential factor in Mobility IT standardization, working to facilitate standardized data and develop innovative open IT solutions.

Members **161**

Countries **28**

Zone	Members
Asia	11
Europe	141
North America	8
Oceania	1
Grand Total	161

Category	Members
IT supplier SME	75
IT supplier LE	37
PTO	18
PTA	15
Vehicle manufacturer	10
Partner association	6
Grand Total	161

Country	Members
Australia	1
Belgium	6
Canada	5
China	2
Czechia	2
Denmark	5
Estonia	1
Finland	3
France	29
Germany	12
Ireland	1
Israel	1
Italy	8
Japan	2
Netherlands	9
Norway	14
Poland	1
Portugal	3
Romania	1
Singapore	2
Slovenia	1
Spain	5
Sweden	22
Switzerland	8
Taiwan	3
Turkey	1
United Kingdom	10
United States of America	3
Grand Total	161

MEMBER OF ITXPT

Meetings and activities

With over 181 official meetings and activities in 2022, the ITxPT collaborative community was highly active in developing new specifications, including the release of version 2.2.0. It included updates and improvements in electric vehicle data, multi-GNSS constellation, and multi-language support.

ITxPT activities	
Members Meetings	4
Executive Board meetings	5
Implementation workshops/Consultant workshops	4
Requirements Committee (RC) meetings	10
Technical Committee (TC) meetings	21
Requirements Working Group meetings	24
Technical Working Group meetings	101
Total	169

Members meeting in Gothenburg.

Label deliveries

The ITxPT label proves that a product is tested by ITxPT and fully compliant with the specifications, and it streamlines the process in a tender for both buyer and seller.

Label delivery increase in 2022: +75%

ITxPT Label delivery							
Label type	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**Grand total**
Module	3	10	24	12	12	15	**76**
Vehicle		4	2	3		4	**13**
Backoffice interface			2	1		2	**5**
Grand total	**3**	**14**	**28**	**16**	**13**	**21**	**94**

Number of labels total increase: +20%

Label type	2017	2018	2019	2020	2021	2022
Module	3	13	37	49	61	76
Vehicle		4	6	9	9	13
Backoffice interface			2	3	3	5
Grand total	**3**	**17**	**45**	**61**	**73**	**94**

ITxPT knowledge center - Wiki

Anyone can register an account in the ITxPT documentation center and find Technical Specifications, the labeling process, and other information. The wiki users are spread worldwide and represent authorities, operators, vehicle manufacturers, IT suppliers, academics, and more.

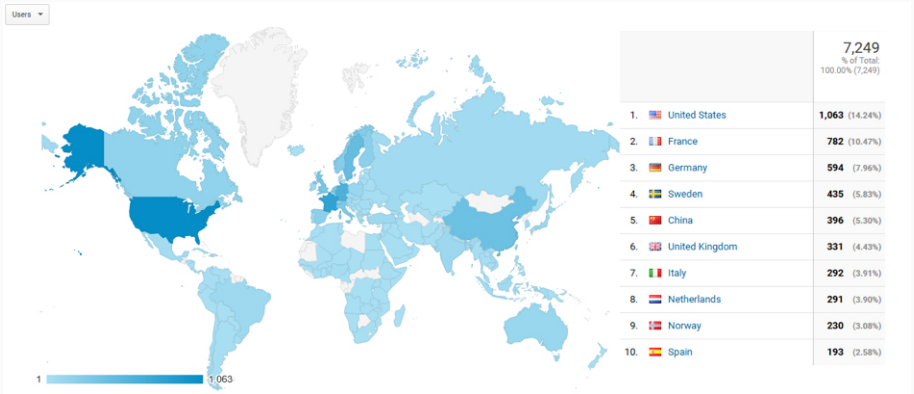
Wiki registrations in 2022:

803

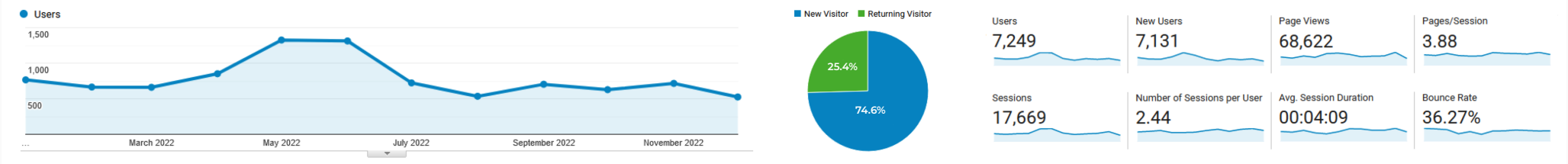
Users per month:

500 to 1300+

Wiki users in 2022



Wiki users



A word from the **Secretary General**

Anders Selling
ITxPT Secretary General

2022 is the sixth year for ITxPT as an association and the year has offered several highlights confirming our positive progress.

Since the start 2016 ITxPT has developed as a collaborative community with established work processes engaging a growing number of members and has become a quite well-known organization among stakeholders in public transport. However, we should not forget that the foundation was laid already during the EBSF projects and also that we next year celebrate 10 years since the agreement to set up an association between the founding members.

The ITxPT specification is the product we deliver, and it represents our core business. In the middle of the year, we released the latest updates with version 2.2.0. It contains several updates and most attention was given to the update of the part specifying data from electric vehicles. The process required extra time, with the contribution from many members, negotiation, cooperation with other associations and efficient decision making by the Executive Board.

In the market ITxPT steadily gains recognition and geographically we see an increase in inquiries from North America and we have also seen the first bus tender requesting ITxPT. It is a recognition for us that buyers increasingly are requesting ITxPT and we are developing and improving our support on how our specification can be used. Moreover, it is encouraging to see that innovative suppliers and vehicle manufacturers have started to develop ITxPT as an ingredient brand of their offers.

It is also worth highlighting that ITxPT is increasingly becoming an attractive partner for European and regional projects. Project activities help us identify priorities for development of the specification, establish ITxPT credibility among corporate and public decision makers and offer opportunities for ITxPT members.

Primary objectives for 2023:

- Set strategy and plan for next versions of the ITxPT specification and how to meet requirements related to various modes of transport, new markets and technology
- Further develop implementation support and promote involvement and networking with PTA/PTO
- Development of ITxPT specification together with and for Heavy Rail
- Respond to ITxPT initiatives globally and especially in North America
- EU and regional projects and strategic partnerships with other associations
- Deliver and develop services related to ITxPT laboratory operation

ITxPT – **a strategic choice**

In a world with continually accelerating IT evolution, it is beneficial to become a strategic or principal member of ITxPT and join the world-leading mobility actors in developing the future of Mobility IT. In all areas of Mobility and smart city solutions, there is a need for sharing standardized data between systems and services, which the ITxPT specifications support.



Photos: Keolis

Access to data – a strategic necessity

Innovative PTAs have expressed that access to their data is critical to their operations and competitive advantage. Interoperable systems with data in a standardized format enable direct access to all data – something proprietary solutions do not provide.

Tenders - streamlined procurement

The ITxPT Specification reduces the time and costs of specifying IT systems during tenders. With the standard-based ITxPT specifications as basic requirements for a tender, the buyer and the supplier can focus on specific services and requirements without wasting time on specifying basic IT functionalities.

Strategic benefits of ITxPT:

- Ensures access to and ownership of data in standard formats
- Enables vendor independence that promotes competition and innovation
- Facilitates shared GPS and connectivity, hardware and software updates, and preinstalled wiring through standardized onboard networks
- Enables standardized hardware and software with cost benefits compared to specialized solutions

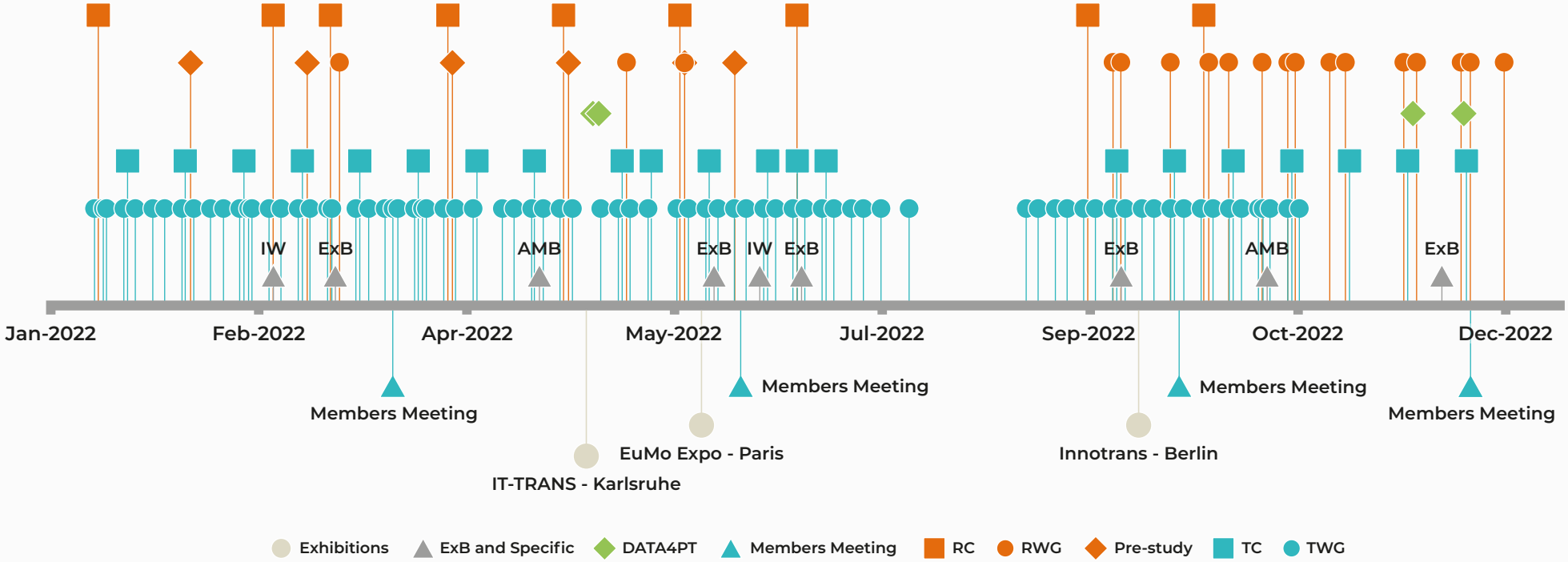
“Keolis has shared the ITxPT approach for many years. We see major benefits for our operations in setting up an interoperable architecture and support the ITxPT implementation in our subsidiaries, both in France and internationally. This vision is shared not only by our subsidiaries but also by our suppliers.

In 2022, we particularly supported and welcomed the work done on the data list for electric vehicles.”

Thierry Gabillard

ITS Center of Excellence manager KEOLIS Group,
ITxPT strategic member since 2017

2022 ITxPT Timeline



Requirement Committee	Technical Committee	DATA4PT
Multi modal integrated ticketing pre-study	Electric vehicle data list	NeTEx validation tool
Cyber security functional requirements	New Sequoia package	Webinars
Demand Responsive Transport	JSON Technical Requirements	
	Passenger Information	
	Login service	

The **Technical Specifications**

The technical specifications are the core of ITxPT - a collection of specifications and best practices for mobility IT and open architecture. It is the result of continuous collaboration between the members of ITxPT. The specifications can also refer to complete or parts of official standards like CEN or ISO.

General content of the Specifications

The ITxPT specifications describe the following:

- physical requirements
- architecture
- generic mechanisms
- communication protocols
- data models for ITxPT compliance

ITxPT specifications version 2.2.0 released in 2022

In 2022, the ITxPT Collaborative Community released version 2.2.0 of the Technical Specifications. The 2.2.0 version is a minor update, which includes new services and functionality without affecting the functionalities of the previous version.

• Several improvements

The 2.2.0 update consists of several new parts that together enhance the readability and usability of the specifications:

- Multi GNSS constellation support (S02P03 GNSS location)
- Officialization of the preview release (S02P04 FMStoIP)
- Multi-language support (S02P07 AVMS)
- Electric Vehicle data specification (S01 and S03P02)

• Feedback from using the specification

The Collaborative Community generated valuable feedback that resulted in the 2.2.0 update. Three main activities created the most input to drive the update:

- The implementation of the specification version 2.1.1
- The use of the specifications in tenders
- The labeling process

The update improves interoperability by adding details and clarifying certain aspects, which minimizes the freedom of interpretation. It also includes additional features. The specification is backward-compatible with 2.1.1, even if updated details might require adjustments. You find more information about the 2.2.0 version in the ITxPT documentation center: https://wiki.itxpt.org/

Electric Vehicle Data

A critical addition in the 2.2.0 release is the Electric Vehicle Data specification. It results from an intense discussion regarding what signals should be made available through FMS to comply with the ITxPT specifications. Thanks to great work by the collaborative community and a close relationship with VDV in Germany, all major vehicle suppliers now support the important standardization work that will continue to evolve.

Rules for creating new specifications

The Technical Committee identified a need for standard design rules and best practices to make it easier to develop new specifications and align them with each other.

- **General Design Rules** - apply to all new ITxPT specifications and technical requirements on a conceptual level
- **Conceptual Design Rules** - describe Data Centric architecture principles and how to work with them
- **Protocol Design Rules,** for example, MQTT - requirements for creating technical specifications using different communication protocols
- **Formatting Design Rules,** for example, JSON

MEMBER OF ITXPT

The **Collaborative Community**

Collaboration between members is the heart of the ITxPT operation, with committees and working groups composed of members carrying out the work. The ITxPT Office supports and leads the processes extending beyond the members.

How do we work?

We work in a straightforward and open collaboration. The small ITxPT team and the Executive Board support a community of members working together to develop new and existing ITxPT specifications. With continuous improvement and iteration of the specifications based on customer needs, the specifications created are always highly relevant.

Committees drive specification development

The ITxPT Collaborative Community drives the specification development through two committees.

- The Requirements Committee collects and defines customer needs.
- The Technical Committee turns the requirements into specifications.

Collaboration beyond ITxPT members

In recent years the interest among external organizations has grown, and the collaborative community has expanded beyond the ITxPT members. Some examples are the German and North American associations of transport companies VDV and APTA, Mobility data (Google/GTFS) through the Data4PT project, EUSPA (Galileo/EGNSS), Smart Ticketing Alliance, and MaaS Alliance.

In ITxPT, we welcome these collaborations as an important way to expand the work for the standardization of Mobility IT.

Members Meeting in Gothenburg

On the 16th of June, ITxPT held the first in-person Members Meeting after the covid pandemic. The 40 participants in Gothenburg had the opportunity to network and enjoy the city in connection to the comprehensive meeting agenda. The intensive meeting day included a general assembly and Members Meeting, a visit to the ITxPT lab, a bus ride on a demo bus hosted by Västtrafik, and several activities with the chance to network.

Working together with members on expos

In 2022, we participated in several expos, spreading knowledge about ITxPT and supporting the collaborative community. Among the attended expos were InnoTrans, European Mobility Expo and IT-Trans.

ITxPT staff members spoke at members' booths to visitors interested in hearing more about ITxPT activities and the specific members' involvement in the ITxPT collaborative community. At IT-Trans in Karlsruhe in May, the French national railway SNCF held a speech every afternoon regarding ITxPT and heavy rail.

Implementation projects drive innovation

As a highly active collaborative community, we are leaders, key contributors, and participants in several projects on the EU and national levels. We help to increase implementation of the ITxPT specifications and support standardization. The projects are funded by the EU and other external sources and the results benefit the ITxPT community.

Data4PT

ITxPT is the technical leader of the EU project Data4PT, funded by the EU funding instrument Connecting Europe Facility (CEF). The project aims to enable union-wide multimodal travel information services and contribute to a seamless door-to-door travel ecosystem across Europe that covers all mobility services.

Therefore, it supports EU Member States in deploying a set of harmonized European public data standards (Transmodel, NeTEx and SIRI) and the implementation of National Access Points.

One of the most important Data4PT deliveries is an open-source tool for NeTEx datasets validation, which enables stakeholders to ensure compliance and interoperability with EU technical standards.

• Greenlight: the NeTEx files Validator

One of the most important Data4PT deliveries is an **open-source tool for NeTEx datasets validation. This tool** enables stakeholders to ensure compliance of their data with EU technical standard NeTEx but also to run consistency and plausibility checks, depending on their own conditions. This tool aims to contribute to the interoperability goal for public transport systems across EU.

The basic check corresponds to XSD validation against the correct version of NeTEx full schema and the European Passenger Information Profile (EPIP) schema, The more advanced checks concern content wise rules, adapted to the profiles and having the possibility to configure values when needed. To access the tool and stay updated visit DATA4PT website.

• Expert webinars

The Data4PT expert webinars build knowledge and capacity in the EU, counting more than 500 participants so far. They were focused on:

- Transmodel : Introduction on standards ecosystem
- NeTEx : European Passenger Information Profile (EPIP) for feeding passenger information services
- SIRI : functional scope and architecture to share real-time information

• Stakeholders' forum

Data4PT has held three events where stakeholders could exchange good practices and get information about new trends and EU requirements. The stakeholders were also consulted on how to proceed in the deployment and could share their needs and feedback on how to improve and enhance current support.

• Standardization activities

The Data4PT experts team initiates and contributes actively to standardization activities like the definition of EU profiles for SIRI passenger information data types and NeTEx accessibility data. They also contribute to updates on existing standards to fulfill new needs and correct/improve existing elements.

All users benefit from the "DATA4PT hotline" where questions and requests can be addressed and answered. Other supporting material is provided through the DATA4PT wiki page, and the github.

• Data4PT benefits ITxPT members

ITxPT leads the technical support and tools development, which benefits the ITxPT members through updates on the latest development, invitations to the training and stakeholders' events and having a direct contact to the implementation support team. As ITxPT specifications are based on Transmodel and most of ITxPT members must implement NeTEx and SIRI or provide services that support implementation, the DATA4PT project increases the value of ITxPT for its members.

Keep updated by following Data4PT on Twitter and LinkedIn!

NAPCORE

NAPCORE stands for the National Access Point Coordination Organisation for Europe. It is a European project with 33 beneficiaries covering 26 EU Member States and 3 associated partners.

The main objective of NAPCORE is to coordinate and harmonize more than 30 mobility data platforms across Europe. Improving interoperability by (further) establishing mobility data standards and recommendations for data exchange, content, access and availability in the mobility domain in Europe at technical level.

As experts in public transport, ITxPT is the activity leader of the sub-working group 4.3, which focuses on multimodal data. Specifically, we are working on the topics of cycling, parking and rail.

In 2022, the sub-working group prepared a study on multimodal data alignment and harmonization and developed links with different relevant organizations.

Stay up to date with the latest NAPCORE news on LinkedIn and YouTube.

Other projects that ITxPT participates in:

- Nordic Way 3 – C-ITS infrastructure and communication (EU)
- BaaS - ITxPT reference installation in a fully electric vehicle (Sweden)
- Connecta3 – alignment between ITxPT and heavy rail train control network (EU Rail)
- Show - interoperability aspects of automated vehicles (EU)
- Stapl – standardization of vehicle data platforms (Germany)

ITS European standardization group CEN/TC 278

ITxPT also participates in the EU standardization work within the CEN/TC 278 group to support the implementation of the EU standardization process. The work of ITxPT affects the EU standardization effort, and the standards are a fundamental base for the ITxPT specifications. It is therefore imperative that ITxPT takes part in the CEN/TC 278 work.

ITxPT **Laboratories and Services**

2022 has been earmarked as the year in which we all got over the pandemic and this of course had a large influence in various areas - public transport was ramping up again, parked tenders got out and more labeling requests reached ITxPT. In the summer the laboratory finally caught up with the backlog of labeling requests. The shortage of components was overcome to some extent and just a few days into the new year 2023 we received the last module that was on hold since April 2022.

Large interest was triggered by our laboratory tours during the members' meeting that for the first time in 3 years was organized as a face-to-face meeting in Gothenburg on June 16th. Feasibility studies of automated tests in the newly equipped laboratory were shown and a Q&A session generated valuable feedback for an even more streamlined labeling process.

Initially starting out with two ITxPT laboratories, December 2022 marks the shift to a single laboratory in Gothenburg responsible overall for labeling processes and research. With a decision purely driven by the difficult labor market the strategy of bringing laboratories and services close to our members continues due to the support offered by SNCF and TPG.

During the first 4 months two interns from SNCF helped in developing processes further and were part of the knowledge transfer to enable the LEF - SNCF laboratory to develop the capability to support ITxPT in the labeling process. From Q2/2023 the Le Mans laboratory will play a vital role in growing the labeling capacities. Meanwhile, TPG in Geneva has been equipping its laboratory facilities which will become a place for shared projects supporting the ITxPT community.

Beside two short internships, the laboratory was for the first time able to give the opportunity for an 8-month long-term internship. Théobald Nutte from ITEEM Lille has enriched our development capabilities and had the opportunity to get an insight into the unique work of the ITxPT laboratory. We are proud to announce that Théobald will continue to work for us during his ongoing studies. Also, a new intern will join the team from May on.

The laboratory will continue the successful strategy of providing a virtual machine for remote labeling sessions and hopes to extend this machine to become a simple test tool in a customer development environment. Supporting proof of concepts and further automation in the labeling process will continue to be in focus for 2023 as well as extending our offer on GitHub.

Gothenburg lab demonstration.

Västtrafik demo bus.

ITxPT members 2022

ARRIVA
ARRIVA TRAINS
ASSTRA
ATB TRONDHEIM
ATRON
AXENTIA
AXIS COMMUNICATIONS AB
BEIJER ELECTRONICS
BELDEN GROUP
BLUEBUS
BUS EIREANN
BUS INFO
BUSTEC
BYD
CANGO
CARD4B
CECCLI
CIBEST
CLEVER DEVICES
CONDUENT
CONNECT BUS
CONSAT
CS GROUP
DAIMLER BUS
DATIK
DE LIJN
DIGIMOBEE
DRESEARCH FAHRZEUGELEKTRONIK GMBH
DTI
EGIS
EQUANS
EUROTECH S.P.A.
EXPLEO
FARA
FLOWBIRD
FOURC
GAIA
GIRO
GMV
GVB
HANOVER DISPLAYS
HELLA AGLAIA
HIKVISION
HITACHI ENERGY
HITACHI EUROPE LTD.
HIVEMQ
HOGIA
HOSTMOBILITY
HSL HELSINKI
ICOMERA
INDRA SISTEMAS
INFODEV
INIT
INTRAFFIC
ISR CORP
IVECO FRANCE
IVU TRAFFIC TECHNOLOGIES
JOURNEO
KENTKART
KEOLIS
KOLLEKTIVTRAFIKKFORENINGEN - PUBLIC TRANSPORT NORWAY
KONTRON
LANTECH
LECIP
LEONARDO S.P.A.
LIT TRANSIT
LTA SINGAPORE
LTG (LUMINATOR TECHNOLOGY GROUP)
LUMIPLAN
MAESTRONIC
MAGNETIC NORTH
MAN TRUCK & BUS
METATRONIX
METRON
METROTEK
MLC ITS EUSKADI
MOVIA
MULTIQ
NAVOCAP
NBMS - SNCB
NEC
NETMODULE
NEWFLYER
NOBINA
NORDLAND CITY COUNCIL
NORLED
OBSERVIT
ORING INDUSTRIAL NETWORKING CORP.
OWASYS
OXYFI
PILOTFISH
PLL FINNISH LOCAL TRANSPORT ASSOCIATION
PPTEXCELLENCE
PSI SOFTWARE
R2P
RATP
REGION STOCKHOLM
RIDANGO
RTM MARSEILLE
RUTER
SCANIA
SEE
SEIPRA
SESALY
SKANETRAFIKEN
SKANTECH
SKYSS HORDALAND AUTHORITY
SNCF
SOLARIS BUS
SPEC
SQUARELL
ST ENGINEERING
STA - SÜDTIROLER TRANSPORTSTRUKTUREN
STIB
STRATIO
STREAMAX
SWARCO
SYNECTICS
TAIT COMMUNICATIONS
TELESTE
TELEXIS
TELIA
TENIX
TEQ
THALES
THOREB
TIDE
TIMESPACE TECHNOLOGY LTD.
TISSEO COLLECTIVITÉS
TP DE LA RÉGION LAUSANNOISE
TPG
TRANSDEV
TRANSPORT FOR LONDON
TRAPEZE
TRIONA
TRONTEQ
TRUNEXA INC
UITP
UNIBUSS
VASTTRAFIK
VDS RAIL
VIX TECHNOLOGY
VOLVO BUSES
VONTAS
VY BUSS
WAVECOM
WESTERMO
XIMEDES
XOVIS
ZF OPENMATICS

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