SOFTWARE AEP
for Electronic Ticketing System
Core activity

ONLY DO THIS

FROM TWENTY YEARS
For the past twenty years, AEP has focused exclusively on the Electronic Ticketing for Public Transport. We only do this and try to do it in the best way, with concrete commitment and the will to innovate, without losing our energies, ready to offer operators in the neighbouring sectors the structural openness of our systems.

COMPLETE SYSTEMS
The great strength of AEP are the complete systems, not only those that manage millions and millions of daily transactions, but also those of medium and small companies that can access, at reasonable costs, a wealth of knowledge and deep and consolidated experience where AEP software and AEP equipment merge and integrate to be the ideal solution for every electronic ticketing requirement.

On the left, a tram in service in the city of Katowice, equipped with the AEP CDB-6 Multifunctional Unit, integrated into the great ticketing system of the Silesian Region (Poland), created by AEP.
AEP Software

AN HUGE HERITAGE

BIG INVESTMENTS
We have developed software to meet the needs of big cities such as Milan, Turin and Astana.
We have developed software to meet the needs of important regions such as Piedmont, Tuscany and Silesia (Poland).
We have become one of the leading players in the French Electronic Ticketing market, one of the most advanced and demanding.
We have in fact made investments for tens of millions of Euros.

GREAT SOFTWARE
Today this huge heritage is at your disposal: the AEP software, based on the suite of ET the heavy duty ticketing modules, represents today the state of the art in the world of electronic ticketing and the benchmark of international competition.
The AEP software is so wide and extensive that it not only covers every area of electronic ticketing, but also offers more types of solutions, to adapt perfectly to the specific application and size of the user company.
INNOVATIVE
The AEP software offers innovative technical solutions that represent today the state of the art in Electronic Ticketing Systems and constitutes a SOA platform for the construction of systems, not a rigid software package with a closed set of functions and interfaces.
Wide use is made of standardized components with lower costs, less maintenance, and greater stability, and the basic functions are all already present; the customization operation therefore consists, to a maximum extent, in their composition and configuration.

POLYGLOT
The AEP software is designed for the world and can be configured for any language, even using non-Latin alphabets, but this is not enough. The policy of AEP is to also offer support in the languages of the destination countries. Today AEP supports, in addition to Italian, French, English, Russian, Romanian and other languages.

RELIABLE
The AEP software it is used in many countries by important transport companies and therefore offers verifiable references, consolidated over years of operation.
The AEP software interfaces have been carefully studied from an ergonomic point of view and are all perfectly consistent with each other.
SCALABILITY

Difference between a non-scalable centre (on the left) and a scalable AEP centre. In the non-scalable one it is necessary to use a bigger and bigger horse to transport a greater number of people (transactions), but nature has a limit! In the scalable one, on the other hand, it is enough to add more horses of the normal type to multiply the potential of the system.
The largest Corporate Control Centre created by AEP is certainly that of ATM company and Trenord in the city of Milan, where AEP has also provided many other software modules, such as the communication and concentration system covering more than 200 subway stations, the robotic centre for the production of the tickets, the system of supervision of the installations, the Business Intelligence finalized to the control of the frauds and more.
DATA & INFORMATION
One of the greatest advantages offered to the Electronic Ticketing is the huge amount of data that they produce, which contain precious knowledge for the profitable management of the Company.

But how to transform simple data into knowledge?

The AEP software offers two very important tools for data analysis: traditional reporting, which allows producing many types of printouts in predefined formats and business intelligence.

DISSOLVE THE FOG
However, important information is well hidden in the mass of data, as if they were shrouded in fog. In the traditional approach, the managers of the Company develop strategies to understand the reality of the facts and require from time to time new elaborations to the IT sector, which provides to produce them in possible ways and times, often after days.

The AEP software for Business Intelligence on the other hand, it provides the manager with an easy-to-use tool that makes it possible to produce reports, statistics, indicators and graphs very easily and almost without any specific training.

An idea can then be followed, turning data into information and information into knowledge, through rapid and intuitive processes, producing plans capable of guiding the decision-making process in the various levels of the organization.
The tools of Business Intelligence are based on Data Warehouse and allow dissolving the fog that surrounds the vast masses of data, having a clear vision of the development of business processes. AEP has created software specifically designed for Public Transport applications and also allows connection with market-based BI tools, such as, for example, SAP Business Objects.
PAY DOUBLE?
It is a simple observation: fleet monitoring (AVM/SAE) can be performed in many cases by the same equipment as the Electronic Ticketing. The doubling is therefore more than disadvantageous: not only you have to buy a second kit, but you must also install it, finding a place for a new console, and forces the driver to have to focus his attention on two systems.

AEP ON-BOARD AVM
In fact, the AEP software allows the Multifunctional Units (eg CDB-6 PLUS and CDB-4 PLUS) performing multiple on board AVM/SAE functions, locating the vehicle, communicating with the centre and signalling the driver anticipations and delays, while continuing to perform the normal functions of ticketing.

AVM CENTRE
AEP software now includes its own solution for the AVM centre, as well as allowing the integration, with its own Corporate Control Centres, of the AVM Centres of third-party suppliers. In the case of consortia or Regional Supervision Centres it is even possible to integrate several centres of different suppliers, in accordance with the opening policies that have always characterized the commercial strategy of AEP. The integration naturally includes data from third-party software for service planning.

STANDARDISATION
AEP software offers numerous functions for data standardisation that define the transport network and those of the exercise. In this way, whatever AVM centre is used, the data always has the same format and can be exported with standard protocols, such as Netex or InterBOB and interrogated through BI tools.
SERIES PRODUCTION

Smart cards are normally issued individually in real time at ticket desks, using bench-top thermal printers.

However, when the number of cards to be issued is very high, the massive emission centres are used, which are equipped with special industrial printers capable of mass-producing cards and also stacking them in order to be able to handle them more easily.

This type of solutions are becoming more and more established in parallel with the evolution of e-Commerce portals that allow remote subscription of personal subscription cards.

The cards produced can be sent by post or collected at the ticket offices/retails of the Company.

AEP SOLUTIONS

The AEP software allows the complete integration of the massive emission cycle within the Electronic Ticketing System through:

• the collection or entry of requests for the cards to be produced;
• the validation of the data contained in the requests;
• the real mass production of the cards.

The qualified operator can examine the requests status, change the order of the batches to be produced, start the production cycles and monitor their progress.

All production data are properly recorded and sent to the Company Control Centre for further processing.
PHYSICAL SUPPORTS
Even in the most advanced Electronic Ticketing Systems, there is still the need to adequately manage the supply and distribution of physical supports, such as:
- smart card;
- chip-on-paper;
- magnetic tickets;
- paper tickets;
- etc.
The AEP software allows management of suppliers, central warehouse, distributors and retailers.

COMPLETE INTEGRATION
All operations performed in the system are correctly accounted for and managed automatically, without the need to double-enter data.

INNOVATIVE TITLES
The AEP software also provides for the correct management of the new Optical Reading Travel Tickets, with the possibility of carrying out their activation at the time of distribution, by reading the codes shown on the packages, by means of a scanner.
TICKET OFFICES

The ticket office is still today the point of elective contact between users and the Company. At the ticket office, primary services are provided to customers, such as, for example, the issue of personal subscriptions.

The **AEP ticket offices** represent the most complete today the market can offer, with advanced solutions, such as the possibility to manage cards of all the members of a family, to allow forms of complex and shared payment (e.g. fees paid to the employers, social institutions ...), manage after-sales services, in complete integration with company accounting and warehouse.

RETAILS

The retails are typically small activities such as newsagents, tobacconists, bars etc. which in some cases however produce a truly significant sales volume. Because of their particularities, they require specific solutions, not only for equipment that must be very compact, but above all because their management, which must necessarily be carried out at a distance, requires special attention, representing them as important economic interests of the Company.

Today **AEP software** manages networks with thousands of retails and allows a complete and detailed analysis of all the operations that they carry out.

An AEP CDB-4 PLUS in a “boulangerie” in the city of Le Mans, French city known for the famous automobile circuit.
Ticket counters in CAP (Prato), one of the best known transport companies in Tuscany.

To date, Cap has a fleet of more than 200 buses and is the reference partner of CTT, which covers all of western Tuscany with its transport service.
BEYOND THE SALE

The introduction of automatic machines in the transport network is consistent with the general trend of cost reduction and extension of service hours for branches open to the public.

The AEP software has undergone great changes in recent years and transforms the automatic self-service machines into a true service point dedicated to customers. With them it is in fact possible to carry out not only the normal purchase transactions with coins, banknotes and bank cards, but also examine the content of your card, examine the historical list of purchases made, pay fines, use coupons and much more. And all this with complete integration into the system also at the accounting and administrative level.

COMPLEMENTARY INTERNET SERVICES

The AEP software allows going even further: you can use some types of self-service to produce personal smart cards purchased via the Internet. That's right: the customer orders their card through the portal, uploading their photos and their certificates. The request passes through the authorization processes envisaged by the Company and becomes available to automatic machines, where the card can then be produced independently using a single-use code sent by e-mail.

ALSO FOR DRIVERS

The AEP software also allows the use of special self-service dedicated to drivers, to provide them with sales support, money for the remains and to automatically collect the collection of the on board sale.
In the city of Florence alone, almost 80 AEP RTVM-I vending machines are installed. Of these, 65 are present at the stops of the GEST tramway (subsidiary of RATP Dev, France).
THE TICKET OFFICE ON THE SOFA

Even the Electronic Ticketing can avail itself today of the enormous advantages of the Internet, combining the interest of the Company with advantages for the Customer, who can perform from the sofa of his/her own home operations hitherto possible only at the company ticket offices.

For example, the AEP software allows requesting a new personal card, changing your profile, purchasing travel tickets for yourself and your family and making payments, including those relating to any fines, all from the Company portal, with total integration with the Electronic Ticketing System, with the massive issue stations and with the company accounts.

THE TICKET OFFICE IN POCKET

And when you’re out, the AEP software also allows buying the Travel Tickets with just a few taps directly from your smartphone, through secure processes that guarantee the Company against fraud, thanks to the exclusive VTS technology introduced by AEP, based on HCE, QR-code, SAM and HSM modules. You can also validate on board or at the turnstile, just like with traditional cards.

In the picture, the NFC TO Move App created by GTT Torino based on AEP’s VTS technology was an immediate success, with over 10,000 downloads in just the first three days.

Turin’s NFC ecosystem, equipped with thousands of AEP validators, is certainly the largest in Italy and one of the largest in Europe.
BEYOND THE TICKETING

The multifunctional AEP units, such as CDB-6 PLUS and CDB-4 PLUS, allow concentrating in a small space a real service centre for customers and for the driver, as they allow, in addition to the sale, also the validation, supervision of the on-board system, communication with the centre via Mobile Data Network or Wi-Fi. With these it is also possible to carry out many fleet monitoring functions, with localization, assessment of advances and delays and management of shifts and trips.
ON BOARD SALE

A TRAVELLING TICKET OFFICE

The on board sale is now the rule within many Transport Companies, as it allows satisfying the request of many travellers who have failed to obtain the ticket, and in many cases offers the driver the possibility of an additional income.

The AEP software offers great ease of use, thanks to the use of the touch screen, and allows the sale of paper tickets with QR-code or chip-on-paper as well as that of refills and renewals on the customer's card.

All transactions are sent to the centre for complete integration of the on-board system in the Electronic Ticketing System and accounting.
VALIDATE ALL
Decree 255 of 27 October 2016 establishes the obligation of mandatory validation on public transport vehicles, thus recognizing the enormous advantages of social control in the fight against fare evasion. The AEP software, present both on the systems side and on the equipment side, makes it possible the real validation on the validator of all types of tickets, thus allowing us completely fulfilling this obligation, which also benefits the Company.

ALSO THE QR-CODE
In fact, the AEP software also allows real validation not only of contactless supports, EMV bank cards, NFC phones and magnetic tickets, but also QR-codes on smartphones and new paper tickets, just as if they were a electronic title, with the relative expiration date and possibility of verification by the inspection staff!
The AEP policy is that of openness. In the picture the demo App contained in the Software Developer Kit of AEP, which allows external software houses realizing applications perfectly integrated in the AEP software.
ACCOUNT IN THE CLOUDS

In traditional systems, the information necessary for validation, and therefore for access to transport networks, is contained in smart cards and processed locally. For this reason, they are called Card Based Ticketing (CBT).

With the improvement of communication networks, different techniques have become possible, called Account Based Ticketing (ABT), in which the data are stored in a client account of the central system, called back-office, residing in the cloud; the cards are used only to identify the holder and do not carry other information. The process also takes place in real time in the central system and no longer locally.

Mixed techniques are also possible, where the process is still carried out locally, thanks to the verification of the presence of the card on an enabling list.

ABT OR CBT?

At the current state of the art, ABT systems are mainly used on ground networks (e.g., metro) where, unlike buses, you can count on a stable and reliable communication system, but they are also proposed as a completion of the classic solutions CBT. It is thus possible to use cards distributed for other purposes (bank cards, health cards, loyalty cards, etc.) as well as accepting the subscribers of other neighboring networks without having to implement all the complexities of a smart card. AEP has introduced the exclusive VTS technology that combines the advantages of ABT and CBT, using HCE techniques, QR-codes, SAM and HSM modules, and thus achieving high performance and levels of security appropriate to the requirements of public transport.
PISAMOVER is the shuttle that unites Pisa with its airport and uses an ABT system created by AEP. In it, validators can accept optical reading travel tickets produced by self-service, parking system and even directly Trenitalia tickets.
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INTEGRATION

NO SYSTEM IS AN ISLAND

If once the integration was considered an exception, today it can really be said instead that there is no Electronic Ticketing System that should not in any way interact with other systems: to process the cards of other companies, to transfer the information to the Centres of Supervision of the Regions, to pass the movements to the corporate accounting, and to link the ticketing to other services, whose list is really very wide and in continuous growth.

Again, AEP software, is at the forefront, thanks to the experience gained in the French market where each region has promulgated its Card Data Model, its integration standards, to which all suppliers must comply before bringing their systems into the field.

AEP has also introduced the exclusive VTS technology that allows the realization of applications independent of a specific ticketing system and that has already been used successfully in various real applications.

INTEGRATION FOR QUALITY OF LIFE

Integration is perhaps one of the parts of our work that produce more appreciation from customers, such as parking, bike sharing and car pooling.

Photo on the left: sometimes even a modest effort is enough to get great results. On the left is the detail of a Park & Velo in the city of Angoulême (France), where the subscribers can access thanks to the smart card of public transport and leave their bikes in a safe place protected from the rain.

Large photo on the right: the Torino Porta Susa station. The GTT and Extra.TO system (Turin) is the largest one realized by AEP and includes over 7,000 on-board equipment. It integrates about 22 transport companies, the pre-existing light subway and integrates in turn with the CSR of the Piedmont Region.
COMPLEX PROBLEMS
Managing a device is relatively easy. Managing dozens of devices is more difficult. Managing hundreds or even thousands of devices spread throughout the territory is very difficult, not least because all the buses return to the warehouse and the retails are sometimes scattered even in places that are difficult to access.

NEW INSTRUMENTS
The AEP software has been the subject of important innovations in this area and today offers specialized tools among the best in the market. It is possible with them to keep track of every operation performed by the system and to reconstruct in detail events that took place after months.

A large number of pre-defined analyses are prepared: on-board systems, functionality indices, behaviour of automatic machines and retails, concentrator supervision, sales trends, etc.

When necessary, it is also possible to add new measurement points, aimed at carrying out specific analyses, for example to trace anomalous behaviour, even in a geo-referenced form.

METRO STATIONS
Specific AEP software are available dedicated to the management of metro networks with supervision of stations and barriers.
The control of the subway stations requires specialized applications, able to remotely control every single access gate. In the picture a Metro C station, Rome, controlled like the others by AEP software.
The Société Nationale des Transports Ferroviaires, SNTF, is the Algerian public enterprise created in 1976 for the management of the traffic and national railway lines of Algeria. In the picture a train of SNTF.
AEP Software

RAILWAY SYSTEMS

NOT ONLY ROAD

The AEP software was designed to be able to manage complex railway networks, thanks to dedicated functions essential in this area, such as the reservation of seats and the definition of particularly complex fare, much more varied than those used in public transport by road.

TESTED

The solutions offered by AEP have been extensively tested and have been used for years by the Egyptian Railways, which transport over 500 million passengers every year, and by the railways of Algeria.
A station of the Mini Metro in the city of Perugia. A cable-driven “People Mover” that has already been replicated in Tuscany for the Pisa centre - Pisa airport shuttle. The Mini Metro is composed of 7 stations and has all the characteristics of a light subway.
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STATIONS AND WAREHOUSES

STATIONS
Station Concentrators are usually the main structure of the ticketing system along the railway or subway lines and operate in connection with the Corporate Control Centres. All the equipment of the station are connected to the concentrator: ticket offices, validators, gates, self-service machines, etc.
Station Concentrators makes it possible to perform validation, sales, monitoring and remote management of the equipment, even in the event of temporary interruptions in connectivity.
The staff is equipped with appropriate tools that also allow local control of the station.

WAREHOUSES
Warehouses can be equipped with concentrators similar to those of stations which, as for stations, also provide the means of reducing the data exchanged volumes with the Corporate Control Centre.
The AEP software allows realizing complex architectures of concentrators with mutual tree-type connections.
In the case of smaller systems, it is possible to use a virtual concentrator located at the Corporate Control Centre that manages communications with the periphery via the Mobile Data Network or Wi-Fi.
SECURITY
When we talk about security we intend to refer to many different themes: security as general reliability of the systems, as robustness against possible attacks from the outside but also protection of personal data.

The AEP software always takes into great consideration all these issues, relying above all on consolidated techniques, such as SAM modules with Remote SAM Management, PCI certifications, HSM systems and latest generation cryptographic techniques..

MILLIONS OF DATA
In an Electronic Ticketing System data exchanges between the periphery and the centre occur continuously and it can be said that there is no component that does not require an adequate communication system, which must therefore be completely reliable and secure. The AEP software dedicated to communication is constantly updated, aimed at increasing its security and reliability, in parallel with technical developments.

PERSONAL DATA
The AEP software complies with the provisions of the General Data Protection Regulation (GDPR) and of the Commission nationale de l’informatique et des libertés (CNIL) concerning the protection of personal data.

SISTEMI ANTIFRODE
AEP it also offers dedicated solutions for the ex post analysis of data, through Business Intelligence techniques, capable of keeping the system under adequate control and to understand if all the means put in place to guarantee security are adequately effective.
In the figure on the left, the portable terminal AEP CDB-4 PLUS, can be used to equip the retails, as on-board computers for vehicles and also for on-board control operations, for mobile sales, for transport upon request and Taxi.

**AEP Software**

**CONTROL AND PENALTIES**

**DURA LEX SED LEX**

AEP provides solutions that allow any form of purchase of travel tickets, from home, at the ticket office, to automatic machines, from smartphones, with bank cards, from retails, on board etc. Who does not pay the ticket really *no longer has any excuse* and, when discovered, is bound to pay the penalties provided for by the Law.

**THE CONTROL**

AEP proposes several solutions for on-board control, carried out using portable devices that are very easy to use. When the controller gets on board it presents its card to a validator and in this way blocks further validations until the end of the checks. The AEP software allows controlling Travel Titles very quickly, on contactless or optical reading supports.

In the event of a break-in, it permits the issuing of a fine, specifying the reason when it can not be detected automatically. In countries where this is allowed, it is possible to consult the central archive of fraudsters to proceed with the issue of increased fines for repeat offenders.

**PAY FINES**

The fines can be paid immediately, paying the amount due to the controller, or in deferred time, in the manner provided, both through the Internet portal, both at the ticket offices and at the self-service ticket machines. Instalment payment is also possible.

**THE ADMINISTRATIVE ITER**

If the fine is not paid in due time, the administrative process starts, which can be very complex and can be managed entirely by the AEP software.
EMV BANK CARDS

No registration is necessary, no queues are made, there are no rules or deadlines to learn and remember: it is really difficult to imagine a more practical and simpler solution for customers of the direct use of contactless EMV bank cards, also good for who could not find the ticket on the ground.

Also from the point of view of the Company, the advantages are considerable, since we eliminate cash management and the distribution of tickets with all the related costs (physical support, storage, distribution, reordering ...). Even the times for passengers to join the buses are drastically reduced, resulting in more fluid circulation, greater compliance with schedules, less consumption of buses, less pollution. Just think that a sale made by the driver requires at least 10 seconds, while the tap of the card takes less than a second. Every 100,000 tickets sold on board save 250 hours!

SECURITY AND COMPLEXITY

AEP was one of the pioneers of this solution and is therefore today able to propose complete and tested solutions according to the Transport for London model, with the application of the most advantageous fare.

ET-PAY is the AEP digital platform ready, certified and immediately usable.

To do this, we have made all the necessary investments, solving very complex problems, introducing new lines of equipment, developing all the required software and obtaining the necessary certifications and authorizations.

We are ready!
SIMPLIFIED APPROACH
If your needs coincide with those of most transport companies, it is not necessary to approach the issue of Electronic Ticketing in the classic way in which a highly personalized project is developed each time.

In fact, AEP offers the possibility to become immediately operational with the same technical solutions used by large companies through the formula et-365 that follows the SaaS (Software as a Service) model, now widely accepted in all typical IT sectors.

With it you do not buy traditional software licenses but simply pay a fixed annual fee, reducing the financial impact. The total costs of management and maintenance of the solution are clear and well defined, with also tax benefits, as classifiable as operating costs (OPEX).

CLOUD COMPUTING
With et-365 you will find at your disposal a state-of-the-art Business Control Centre located in the cloud at leading server farms, in a controlled and protected environment.

No sizing problem: AEP constantly guarantees the most modern and up-to-date ITC solutions appropriate to your needs.

No management problem: AEP constantly guarantees you high levels of service and connectivity.

BASIC CONFIGURATION
The basic configuration includes the Corporate Control Unit, the ticket offices, the retail, the on-board bus software, the one for controllers and the web portal.

TOTAL SUPPORT
All services are included in et-365: the Card Data Model, the SAM modules definition, the initial configuration and the first start-up, the updates, the tariff changes, the periodic back-up and the telephone hot-line.
AEP Software

LET’S THE IMAGINATION WORK

FANTASY AND INNOVATION
AEP is always at the forefront when it comes to investing in innovative solutions that reduce costs and improve efficiency.

IN THE SERVICE OF DRIVERS
More and more companies have realized the advantages of on-board sales by the driver, with AEP software and multi-functional units such as AEP CDB-6 PLUS and CDB-4 PLUS. An interesting example of optimization of the related business processes is the introduction of self-service dedicated to drivers, usually located in the depots. With these machines the collection of cash is drastically simplified: the driver only has to introduce the banknotes and overthrow the coins in the appropriate basket. The amount is counted automatically and can end up directly in the company’s accounting cycle, with direct accreditation in the pay-check of the driver’s skills. The same machine can also supply the petty cash for the remains and distribute pre-coded Travel Tickets to be delivered to the machine personnel for short sale thereof by hand.

THE FRIEND CONTROLLER
The periods of the end of the month are often those in which there are more inflows in the ticket offices, for the renewal of subscriptions, especially those of school. So why not bring the ticket office directly to school? AEP has created a special set of transport containers that make this operation very easy, very welcome, of course, to parents, who receive a service of considerable social importance. This is how other advantages are achieved: a relationship is established between guys and the staff and the culture of paying everyone, paying less is spread, reinforcing the figure of the controller as a subject that protects the interests of the correct travellers.