

IVU.suite FOR PUBLIC TRANSPORT

METRO CALI CALI, COLOMBIA

Fewer traffic jams, shorter travel times and attractive prices: MIO Cali revolutionised public transport in the Colombian metropolis. The fleet management solution for the BRT system was developed by IVU.

2



IVU.suite KEEPING COMPLEXITY MANAGEABLE

Every day is filled with complex tasks for transport operators: creating timetables, organising duties, setting fares, managing fleets, administering data – and much more besides. To do all this, they require specialists with the right training – and the right tools. IVU.suite maps a transport operator's operational processes in their entirety, offering a suitable solution for every task.

IVU.suite gives transport operators more, allowing them to establish an end-to-end digital workflow and integrate all operational areas – from planners through to drivers. Whether they use an end-to-end solution or stand-alone products, all data remains in a single system, generating efficiency – on the road and in the control centre.

We understand that transport operators' tasks are as specific as the routes they operate. Which is why IVU.suite inherently contains everything that is required for successful operations. One standard system for everything – making it quick and easy to implement. On a daily basis, IVU.suite products help over 500 transport operators worldwide to deploy tens of thousands of buses and trams, put employees in the right place at the right time, provide information to millions of passengers, and settle traffic data. The IVU.suite makes complexity manageable.

IVU. SYSTEMS FOR VIBRANT CITIES.

IVU.suite END-TO-END SOLUTION FOR PUBLIC TRANSPORT

An integrated, one-stop solution – IVU.suite offers the right support for all of a transport company's fields of activity: from planning, dispatch, fleet management, ticketing, and passenger information through to the settlement of transport contracts. IVU.suite products plan routes, inform passengers, ensure connections, control traffic signals, dispatch drivers, monitor fleets, sell tickets, merge data, and increase efficiency. Whether complete solutions or individual components are deployed, IVU.suite is based on open standards and can be integrated in the most varied of system environments.



IVU.timetable

administers all basic and infrastructure data, and supports the planning process from structuring the route network and creating timetables through to publishing information. Page 6-7

IVU.pool

consolidates timetable data from the entire range of different planning systems across companies and standardises the data to create the basis for integrated passenger information. Page 8–9

IVU.run

supports the entire schedule planning process, from daily deployment through to multi-day vehicle scheduling including maintenance and service times. Effective optimisation ensures efficiency. Page 12–13

IVU.duty

creates efficient duty schedules for staff through smart optimisation. A flexible rule system and numerous automated functions make workloads easier. Page 14–15

IVU.vehicle

plans and controls the entire vehicle deployment process. The integrated depot management monitors mileages and service intervals, as well as supports parking space planning. Page 16–17

IVU.crew

supports the entire personnel dispatch process and ensures that all employees are where they need to be. Effective optimisation ensures efficient duty schedules.

Page 20-21

IVU.pad

is the digital workplace for employees in the field. The web app contains all important information such as duty schedules and handbooks, and improves communication with employees. Page 20–21

IVU.fleet

helps operators to respond quickly and appropriately in every operations situation. The traffic control system continuously monitors all aspects of a trip and suggests suitable actions. Page 24–25

DISPATCHING	FLEET MANAGEMENT	TICKETING	PASSENGER INFORMATION	CONTROLLING
IVU.vehicle Vehicle dispatch and depot management	IVU.fleet Control centre	IVU.fare Tariff management and fare collection	IVU.realtime Dynamic passenger information	IVU.control Accounting and reporting
IVU.crew Personnel dispatch	IVU.cockpit On-board software	IVU.ticket On-board ticketing	IVU.journey Integrated journey planner	
IVU.pad Digital workplace	IVU.box On-board unit	IVU.validator E-ticketing terminal		

IVU.cockpit

runs on the IVU.box on-board computer. The software provides driving instructions, communicates with the control centre, and supplies passenger information. Page 24–25

IVU.fare

manages sales processes from setting fares through to settling ticket sales (paper or e-tickets) within networks and individual companies. Page 26–27

IVU.ticket

is the software used for sales and inspection terminals. It handles the ticketing process, from printing tickets through to selling and validating e-tickets. Page 26–27

IVU.box

is the user-friendly on-board computer. It communicates with the control centre and manages on-board systems. As IVU.ticket.box it also takes on ticketing tasks. Page 28–29

IVU.validator

is the e-ticketing customer terminal. Whether it is used for boarding checks or as a stand-alone sales terminal, the intuitive user interface makes it easy to operate. Page 28–29

IVU.realtime

provides real-time information to passengers on all channels. Directly linked to the control centre, the system generates a consistent flow of data from vehicles to passengers. Page 30–31

IVU.journey

computes the best route for passengers at all times. The travel planning system forms the basis for digital travel information, including car- and bike-sharing initiatives. Page 30–31

IVU.control

records planned and actual data, merges this data and prepares it for further processing, e.g. for transport contract settlement or for evaluations and analyses. Page 32–33



IVU.timetable RELIABLE TIMETABLES

Get your optimal timetable with just two mouse clicks per trip – IVU.timetable always ensures the best connections. All basic and infrastructure data is contained within one system, allowing for perfect coordination of routes, headway, and trips.

IVU.timetable supports the entire timetabling process – from structuring the route network and creating timetables through to publishing services and supplying information to operation control and passenger information systems. Numerous automated features such as pre-defined travel paths and travel times make it easier to create trips. The system continuously monitors whether preset connections are reached, and warns if conflicts arise. IVU.timetable gives you the flexibility to work around planned timetable deviations – such as road works. If the timeframe changes, the system ensures consistent planning information – from journeys and vehicle schedules through to duties. Different views, displaying information in map, table and bar or line graph format, give detailed insights.

Whether the task at hand involves simply configuring individual routes or integrating data from other operators and third-party companies, IVU.timetable has all the information at its fingertips – at all times. IVU.timetable makes everything easy – from assigning vehicle restrictions and entering parameters such as seating capacity and trip courses through to designing timetables.

SERVICE PLANNING



IETT ISTANBUL, TURKEY

Istanbul transport company IETT has over 6,000 vehicles in its network in this major city on the Bosporus. IVU.timetable generates and manages the entire timetable network in real time.



The line graph presents the timetable and any conflicts clearly in IVU.timetable

IVU.timetable at a glance

- Intelligent checking algorithms
 A single change can have major repercussions: IVU.timetable supplies consistent planning information automatically
- Automatic conflict warnings
 IVU.timetable sends an alert if designated connections are not going to be met to ensure that all connections fit into the timetable
- Clearly arranged displays
 Different views (map views, tables and bar or line graphs) give detailed insights
- Integration of third-party data
 IVU.timetable integrates timetable data
 from a wide range of sources from
 sub-contractors to public transport
 networks
- Well-thought-out design

The intuitive user interface makes it quick and easy to maintain even large transport networks

IVU.pool TIMETABLE ADMINSTRATION FOR PUBLIC TRANSPORT NETWORKS

Various threads come together in a public transport network. Timetables and network data from various transport operators converge to form a mutual body of information. No matter what planning system the data originates from – IVU.pool is compatible with it.

IVU.suite's integration solution has interfaces to all common formats, serving as a basis for the network-wide timetable information. This makes it easy to import timetable data from a wide variety of sources and integrate it into a standardised overall network. IVU.pool administers different timetable versions smoothly, allowing networks to consult the construction timetable for the summer as early as spring, for example.

IVU.pool allows you to not only create timetables directly in the system but also import them and add your own

data, such as walking distances between the neighbouring stops of different operators or connecting times between the routes of different transport companies. You can also add points of interest or barriers at stops and in buildings, with IVU.pool also retrieving data from site maps and architectural drawings. This makes it possible to model vehicle accessibility and transfer connections.

Automated features for importing and exporting data or routing lines for map displays take on standard tasks and speed up workflows. The extensive user management feature of the multi-client solution also makes it easier to work with external partners. IVU.pool optimises how public transport networks perform their tasks and roles.



Registration of footpath network in IVU.pool



SERVICE PLANNING

IVU.pool at a glance

- Standard interfaces for import and export IVU.pool integrates the timetables of various companies and generates an overall timetable
- Version management made simple
 Road works, events, holiday timetables –
 IVU.pool automatically looks ahead to anticipate future changes
- Automated processes
 If desired, IVU.pool performs standard, recurring tasks automatically, which speeds up workflows
- Importing of real graphs
 IVU.pool administers and imports real graphs to generate a clearly arranged visual representation of route layouts on maps
- Data enhancement made easy
 It is easy to add extra information such as transfer times or walking distances in buildings



DELFI FRANKFURT, GERMANY

DELFI e.V. uses features, such as those offered by IVU.pool, as much as possible to integrate all German public transport timetable data automatically. The fruit of these labours is a Germany-wide public transport data record containing 250,000 stops, which makes it easy to plan routes.

DERVIOHMUN

OPTIMISATION IS THE DRIVER OF EFFICIENCY CALCULATING HIGHLY COMPLEX SCENARIOS IN SECONDS

Planning vehicle schedules and duties is a demanding task – deploying all resources properly and optimally poses a challenge. But there is significant potential in this. Making vehicle and duty schedules just a few per cent more efficient can save transport companies a lot of money. IVU's optimisation solutions help you to keep track of complex vehicle and duty schedules and make the most out of the available resources.

IVU has been working in close partnership with the mathematicians at LBW Optimization GmbH, a spin-off of the renowned Zuse Institute in Berlin, for nearly 20 years to this end. The company develops new mathematical optimisation processes based on current scientific findings. The algorithms the company has created form the centrepiece of IVU optimisation cores, allowing you to generate duty and vehicle schedules that meet all legal and operational requirements in next to no time. This frees up resources that can be used to provide more services, for example, at the same time as making duties more balanced and staff happier. Optimisation allows dispatchers to respond directly to disruptions or roadworks and adapt duty and vehicle schedules in seconds with only minimal changes. They are then automatically transmitted to the real-time passenger information, so that the optimisation also directly improves service quality for passengers.

Maximum efficiency

IVU.suite planning products allow you to coordinate duty and vehicle schedules for maximum efficiency. Integrated duty and vehicle scheduling synchronises schedule times with break and relief opportunities entered in the system, thus avoiding potential conflicts – for instance, when a driver cannot be relieved at all stages of the route.

IVU.suite's automatic personnel dispatch function also optimises staff allocation. The system organises roster layouts and allocates them to the relevant employees. Depending on the operational requirements it could, for example, pay attention to fair allocations, or balanced work time accounts. In addition, the APD automatically takes qualifications, holidays, training courses, and requests into account – increasing driver flexibility.

Optimisation not only assists with day-to-day operations in transport companies, but also helps with business decisions such as with a call for tenders – making it possible to calculate scenarios for routes that have not yet been acquired and use them as a basis for an efficient service offering that puts operators a vehicle's length ahead of the competition.



OPTIMISATION GENERATES EFFICIENCY

This is IVU's area of expertise. From initial timetable planning to the deployment of resources – the algorithms of IVU systems solve highly complex problems.

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IVU.run EFFICIENT VEHICLE SCHEDULES

Creating efficient vehicle schedules and optimising vehicle requirements: IVU.run supports the entire schedule planning process, from daily deployment through to multi-day vehicle scheduling, including maintenance and service times. Numerous automated functions and well-developed guidelines make workflows much faster.

IVU.run adopts timetables seamlessly from IVU.timetable or from third-party systems via standard interfaces. When linking journeys to vehicle schedules, the system automatically uses operational requirements to add services such as turnaround times, cleaning and refuelling. The intelligent suggestion system makes planning even simpler: Taking both existing restrictions and vehicle-specific features – such as those for electric buses – into account, it recommends matching linkages. There are internal control mechanisms in place to ensure that the final vehicle schedule meets all operational requirements and regulations.

IVU.run's powerful optimisation core performs complex tasks. It automatically generates vehicle schedules based on individual requirements, minimising the number of vehicles required. If operationally possible and desirable, the system suggests minor adjustments to the timetable – where required – to further increase potential savings.

Last but not least, optimisation allows extensive variant planning to calculate various different scenarios and their costs, for example when transport companies are applying for new concessions.

BVG BERLIN, GERMANY

Germany's largest urban transport company keeps its customers moving around the clock. BVG transports over a billion passengers every year. IVU.run ensures optimal vehicle schedules for buses, trams, underground trains, and ferries.



RESOURCE PLANNING

IVU.run at a glance

Powerful optimisation

Tried-and-tested algorithms help to generate efficient vehicle schedules and save resources

Integrated planning processes

IVU.run incorporates relevant information into schedule planning – from timetables to duty schedules

Flexible rule editor

Planning requirements from maintenance intervals to vehicle restrictions can be entered flexibly

Extensive variant planning

If there is a new concession or changes to services, IVU.run can help with scenario and cost planning

eReady

IVU.run automatically takes e-bus requirements – such as loading cycles or schedule length restrictions – into account and makes intelligent suggestions for increased efficiency



IVU.run links journeys to vehicle schedules





IVU.duty PERFECT DUTY SCHEDULES

The optimal duty schedule at the touch of a button – IVU.duty generates efficient duty schedules for the entire workforce, from drivers and service staff through to workshop employees. The intelligent suggestion system and powerful optimisation make light work of such complex tasks.

Having a close connection to IVU.run means that IVU.duty takes all the relevant data directly from vehicle working scheduling. The system immediately takes into account any changes to individual vehicle schedules and suggests amendments to duty schedules where required. Thanks to its flexible rule editor, IVU.duty automatically takes into consideration all operational, collective agreements and legal requirements. Optimisation algorithms automate the entire planning process on request. Within a few minutes, they merge thousands of duty elements, crewing guidelines and qualifications to produce an optimal duty schedule that can be used right away – without any manual reworking whatsoever. IVU.duty adapts to the relevant company objectives such as minimising costs or making duties as balanced as possible. Variants and adjustments are possible to enable a rapid response to short-notice changes and ensure that duty schedules are as unaffected as possible.

The integrated duty and vehicle schedule planning feature benefits regional transport operators in particular. It synchronises schedule times with drivers' work and ensures the best possible deployment of all vehicles and employees.



RESOURCE PLANNING

IVU.duty at a glance

- Intelligent optimisation
 IVU.duty merges thousands of duty elements to produce an optimal duty schedule and ensure efficiency
- Integrated duty and vehicle scheduling Vehicle schedule times can be synchronised with working and break times and optimised in a single step for an optimal resource deployment
- Adaptation optimisation
 IVU.duty leaves existing duties largely untouched – even in the face of shortnotice changes to the duty schedule
- Flexible rule editor
 Duty guidelines, labour laws,
 company agreements: Rules can be
 flexibly stored and adjusted
- Extensive variant planning
 If there is a new concession or changes to services, IVU.duty calculates the impact on staff



TRANSDEV GERMANY

A network of over 30 bus and railway companies makes Transdev one of the largest transport providers in Germany. IVU.duty harmonises planning processes and allows flexible staff deployment.



IVU.duty can display scheduled vehicle and personnel movements in a clearly arranged manner in a map

TORGHATTEN NORWAY

Whether by bus, ferry or plane, the Norwegian transport company Torghatten makes sure that its customers arrive at their destinations. IVU.vehicle ensures efficient vehicle deployment in this vast country.

IVU.vehicle OPTIMAL VEHICLE DEPLOYMENT

IVU.vehicle puts vehicles on the road and ensures optimal depot management – in a way that is efficient, conserves resources, and cuts costs. The system offers assistance with planning staff assignments, workshop visits, and standing times, and optimises bus and tram deployment.

Links to the schedule planning feature of IVU.run or another system give IVU.vehicle an extensive suggestion system, which speeds up the allocation of vehicles to schedules. The clearly arranged display of available and suitable vehicles is a helpful advantage, particularly when a replacement service needs to be organised at short notice. In addition, an automatic conflict check prevents errors and ensures that all rules are observed. At the same time, the system monitors all trips in real time and signals an alert if there are disruptions so that dispatch managers can act quickly. IVU.vehicle has direct links with workshop planning. Workshop orders can be created so that you always have a clear idea of which vehicles are available. Blocks shown in the bar graph and in the relevant table views make it immediately apparent if a vehicle is not ready for use. In addition, it allows IVU.vehicle to precisely plan both parking in depots and charging processes for electric buses.

The intuitive user interface displays all key information, including planned and current vehicle schedules and routes, as well as deployed vehicles and employees. Service intervals and conflicts – such as location breaks – are also shown here. With IVU.vehicle, transport companies are perfectly positioned to deal with every operating situation.

DISPATCHING





IVU.vehicle at a glance

Automatic dispatch

IVU.vehicle's automatic dispatch function speeds up vehicle deployment and makes things efficient

Intelligent suggestion system

IVU.vehicle knows which vehicles are available and makes a suitable suggestion for every vehicle schedule

Effective conflict check

Comply with all rules and speed up workflows: The automatic conflict check protects against errors

Integration of real-time data

IVU.vehicle displays actual data for current trips and issues an alert if there are disruptions so that dispatch managers can act quickly

Optimal charging management

The charging management is seamlessly integrated into the user interface and supports e-buses to optimally plan charging processes, taking range restrictions into account IVU.vehicle displays all dispatch information at a glance







IVU.crew + IVU.pad FAIR DUTY SCHEDULES

The right member of staff in the right place at the right time: IVU.crew supports the entire personnel dispatch process and ensures that all employees are where they need to be – whether that is driving a bus or operating a lifting platform in the workshop.

IVU.crew has the right tool for every work step, ranging from long-term roster layout and holiday planning to medium-term dispatch and short-term fleet management, right through to correct settlement and evaluation. The continuous flow of data ensures consistency. IVU.crew automatically transfers every change to the integrated payroll accounting function, whose flexible rule systems simplify performance evaluations.

All planning phases benefit from powerful optimisation algorithms. During the process of devising weekly schedules and roster layouts, IVU.crew calculates the optimal outcome based on operational requirements, be it a resilient duty schedule, satisfied employees, or efficient operations. Dispatch optimisation also takes into account employees' preferences and qualifications, pays attention to restrictions, and ensures fair, balanced duties.

IVU.crew and IVU.pad are closely linked, with the mobile app keeping employees in the loop at all times. Key information such as duty schedules, manuals, and forms are at their fingertips. Whether it is holiday planning, duty requests, or changing shifts – digital dispatch speeds up workflows and ensures satisfied staff.

IVU.crew and IVU.pad at a glance

Powerful optimisation

IVU.crew's highly complex algorithms always achieve the best result for operations and personnel

Real-time updates

IVU.crew sends an alert if a staff member is not there – so that delays do not turn into operational disruptions

Integrated payroll accounting

Overtime, illness, covering shifts – the integrated payroll accounting function registers any change immediately

Direct employee communication

IVU.pad sends all the important information to employees directly – in seconds at the click of a mouse

Digital workflow

IVU.pad makes the dispatch process simple – all duty information stays within a single system

AVA SWITZERLAND

The 170 or so drivers that work for Aargau Verkehr AG (AVA) have digital workplaces. IVU.pad contains all the information they in order to know about their duties, making dispatch and operational processes quicker.



DISPATCHING



IVU.crew's configurable rule system checks employee job allocations and reports conflicts



IVU.pad keeps mobile employees in the loop and speeds up workflows







EFFICIENT FLEET MANAGEMENT FOR ALL TYPES OF VEHICLE



With every route, bus, and connection comes an increase in complexity. Smart IT systems help make it possible to maintain an overview and offer passengers service excellence. This enables transport operators to achieve more.



Data communication between the vehicle and the control centre forms operational disruptions reliable operations. When road works, accidents, and congestion threaten to disrupt traffic, when battery capacity runs low or charging stations are occupied, dispatch managers need to respond straight away, diverting individual vehicles or arranging replacement services. IVU solutions are there to help – whether your bus is diesel or electric.

On-board computer software such as IVU.cockpit sends position notifications every 20 to 30 seconds on average so that the control centre always knows the exact position of all vehicles. It simultaneously keeps track of vehicle positions continuously, compares the target and actual status of the timetable, manages in-vehicle passenger information, prioritises traffic signals, and evaluates sensors. This means that the system knows in good time, for example, whether the battery will allow the bus to complete another vehicle shedule, or if it needs to go to the workshop earlier than planned.

Control centre systems such as IVU.fleet reliably merge hundreds to thousands of these notifications, evaluate the information and notify the dispatch managers. State-of-the-art systems combine all vehicles in a single user interface. It makes no difference whether diesel buses or battery-powered vehicles are out and about – all warnings and information are displayed in the same window.

Always informed

Passenger information systems such as IVU.realtime, which are directly connected to the control centre, also inform passengers waiting at stops of the current timetable situation via displays or in the app.

This allows the control centre to track fleets of as many as 10,000 vehicles and continuously update the departure information for up to 20,000 stops. The change notifications sent from the vehicles are guaranteed to reach the output channels – the stop display, website, or smartphone – no more than two seconds later.

IVU's fleet management solutions are prepared for every eventuality. The standard systems adapt flexibly to specific requirements – be it a major city or a small town, an individual company or a transport network.

IVU.fleet + IVU.cockpit OPERATIONS UNDER CONTROL

The control centre is always in full control of the traffic situation with IVU.fleet and IVU.cockpit. Delays, bus bunching, accidents, emergency calls – various automated features help dispatch managers to respond quickly and appropriately in every operations situation.

IVU.fleet continuously monitors all aspects of a journey – from the vehicle status and the timetable situation through to current deployment of vehicles and personnel. If any irregularities are identified on a route, the system alerts the dispatch managers and suggests suitable courses of action. Changes to the route, strengthening vehicle schedules, or aborted trips can be created with just a few mouse clicks.

IVU.fleet's automatic connection management feature gives drivers helpful information, such as waiting at a stop for longer so that passengers in delayed vehicles can still make a connection. Thanks to IVU.fleet's comprehensive multi-client capability, this also works smoothly between different companies. The mobile IVU.fleet.app means that dispatch managers always have the situation under control.

The on-board computer software IVU.cockpit is also ready to help – it has multi-tenant capability, and is standard-compliant with ITxPT. Thanks to its intuitive and clearly arranged user interface, it helps drivers in real time, automatically manages the network infrastructure, establishes a connection to the control centre, and issues visual and acoustic alerts to passengers regarding the journey's progress.

Whether you are an individual company or a transport network, whether you have 10 or 10,000 vehicles – IVU.fleet and IVU.cockpit enable straightforward and reliable management of any fleet.



FLEET MANAGEMENT



Schematic and map-based display of the operations situation in IVU.fleet



Driver assistance in IVU.cockpit





BKK BUDAPEST, HUNGARY

More than 2,300 buses, trams, trolleybuses, and ferries keep people moving in the Hungarian capital. IVU.fleet and IVU.cockpit put urban transport operator BKK in constant control of the situation.

IVU.fleet and IVU.cockpit at a glance

- Integrated monitoring
 IVU.fleet continuously monitors the operations situation and sends alerts as soon as disruptions occur
- Efficient disruption management
 Optimising workflows: IVU.fleet provides assistance with suitable suggestions for dispatch actions
- Automatic connection and interval management Drivers automatically receive information if there is a delayed connection or the headway becomes irregular
- Smooth communication

Whether you use analogue and digital private mobile radio or public mobile radio, drivers and the control centre remain in touch

 Comprehensive passenger information
 IVU.cockpit automatically issues visual and acoustic information and makes announcements in the passenger compartment

CONNEXXION NETHERLANDS

Passengers travelling with the leading Dutch transport operator have a choice between debit card, credit card, or OV-Chipkaart smart card. IVU.fare and IVU.ticket.box with pay terminal accept all payment types.

IVU.fare + IVU.ticket END-TO-END TICKETING SOLUTION

Developing pricing models, analysing income, acquiring customers – IVU.fare manages the entire spectrum of sales processes from setting fares through to settling ticket sales. IVU.ticket brings tickets to the customer: Printing paper tickets, selling and validating e-tickets – the software for sales and inspection terminals handles all transactions reliably, whether in the vehicle or at the counter.

The IVU.fare central background system contains all data required to process ticket sales, including fares, devices in use, sellers, and seller authorisations. The integrated customer management function makes the multi-client-capable system an end-to-end e-ticketing solution. From ticket issuing and contract management, through to automatic SEPA direct debits – everything remains within one system. IVU.ticket calculates the appropriate price through its connection to IVU.fare. The software takes position data from the on-board computer via standard protocol for easier location finding. IVU.ticket assists with both cash sales and cashless card payments using the pay terminal – contactless or with PIN entry. It also supports widely used e-ticket standards such as VDV-KA and Calypso as well as barcode tickets – for example, from the IVU.ticket.app.

The mobile ticketing app takes care of the whole process on your smartphone. When used with IVU.fare, extensive evaluation functions are available to transport operators.



TICKETING



Point of sale view for sellers in IVU.fare



IVU.fare and IVU.ticket at a glance

- Integrated fare management
 IVU.fare contains all data required for ticket sales, from the fare management through to settlement
- Secure sales processes

All transactions are fraud-proof, cashierproof and tamper-proof, and payment flows are fully traceable

Comprehensive evaluation

Statistics and analysis functions help to evaluate sales and improve service offerings

Simple e-ticketing

Central customer accounts for payment and settlement make setting fares and e-ticketing more straightforward

Completely customisable

Whether tickets, customer cards or the app, the layout can be adapted to the company's design



In-vehicle sales dialogue in IVU.ticket

SYSTEM SOLUTIONS SOFTWARE AND HARDWARE FROM A SINGLE SOURCE

The on-board computer is the digital control centre on the bus. It records and processes all transactions in real time, communicates with the control centre, manages the on-board electronics, collects data, and informs passengers.

To do all this, on-board computers require not only high-performance hardware that is state-of-the-art, but also appropriate software. IVU is a one-stop shop for everything, from the IVU.fleet control centre system and the IVU.cockpit on-board computer software, to the device itself. This ensures uninterrupted data flows and smooth processes.

The on-board computers IVU.box and IVU.ticket.box are equipped with all the interfaces required to connect the full range of peripheral devices in the vehicle. They support common mobile communications standards as well as analogue and digital radio, record position data using GPS, and transmit data via Wi-Fi. They also evaluate sensor data, control the doors, and manage external e-ticket readers such as IVU.validator.

Cutting-edge data protocols turn the on-board computers into a high-performance passenger information platform. They use international standard protocols such as IBIS-IP and ITxPT to not only provide passengers with visual and acoustic information about the next stop, but to also tell them about the currently available connections there.

The interactions between all these components, from the control centre to the on-board technology, produce a future-proof service offering that benefits passengers and transport operators alike.



FLEET MANAGEMENT & TICKETING

DATA MANAGEMENT

REAL-TIME

INFORMATION

IVU.ticket.box

The on-board computer prints tickets, scans barcodes, validates e-tickets and manages peripheral devices. The pay terminal accepts credit and debit cards, with PIN entry and contactless options. The touch display means that drivers can operate the user interface quickly and intuitively – even during their hectic everyday schedules.

DISRUPTION

MANAGEMENT





IVU.validator

TRAFFIC LIGHT

CONTROL

Whether you use it purely as a reading device for boarding checks or in combination with the optional screen as a useroperated sales terminal – the IVU.validator enhances the IVU.ticket.box with a number of attractive features. The device is attached to the second door and not only takes some of the pressure off the driver, but also makes boarding faster.

TFL LONDON, GREAT BRITAIN

Red double-decker buses are a characteristic feature of the British capital. IVU.realtime gives customers real-time departure time information for over 8,500 vehicles at more than 2,500 stop displays.

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IVU.realtime + **IVU**.journey REAL-TIME INFORMATION ACROSS ALL CHANNELS

Up-to-date and correct passenger information at stop displays and on your smartphone – IVU.realtime keeps customers informed in real time across all channels. The dynamic passenger information system, which is directly linked to the control centre, generates a consistent flow of data from the vehicle to the passenger.

Standardised interfaces connect IVU.realtime to a number of different data sources, including external data hubs. The system uses the incoming real-time data to calculate passenger-appropriate departure forecasts and transmits this information automatically to the various output media. Where required, information can be added manually and automatically and relayed either visually or acoustically over external systems. The IVU.realtime.app is the perfect app for passengers – complete with a departure monitor, real-time connection search tool, trip companion and door-todoor navigation. Just like all other output media, it can be fully adapted to your transport company's individual design requirements.

If you also want to give passengers the option to look for information on the website, the IVU.journey travel planning system is a good place to start. Whether you are travelling directly to your destination or your trip involves changes, stops, and journey interruptions – the system always calculates the best connection. IVU.journey also factors car- and bike-sharing initiatives into the route calculations where these services are available.

PASSENGER INFORMATION





IVU.realtime and IVU.journey at a glance

Efficient real-time information
 Whether you have 10 or 10,000 buses,

IVU.realtime processes and distributes real-time data in a fraction of a second

Consistent data flow

The same information is displayed across all channels, from display screens and the app, right through to data hubs

Mobile app

The IVU.realtime.app delivers passenger information to smartphones, complete with a trip companion

Barrier-free access

Integration of additional information on stops and vehicles for people with disabilities

Customisable design

The visual representation and sound of all passenger information can be adapted to your individual requirements

The mobile IVU.realtime.app informs passengers about current departures and accompanies them from door to door







IVU.control ANALYSING AND SETTLING DATA

After the trip comes the evaluation and settlement phase – IVU.control records relevant target and actual data, merges it, and then prepares it for further processing. This supplies transport companies and public transport authorities with all the data they need to settle services, analyse deployment of resources, and find ways of improving their service offerings.

Numerous automatic interfaces connect IVU.control directly to relevant IVU.suite products and to other systems. This process results in every trip, every route, every vehicle movement, all deployed employees, and other pertinent information seamlessly making its way to the central database – making it easy to control important details such as punctuality, vehicle and personnel deployment, and capacity utilisation. Efficient and flexible evaluation tools deliver accurate responses to even the most complex of issues.

IVU.control compares target and actual data and analyses cancellations automatically based on causes, type of replacement service, and other criteria defined in the relevant transport contract so that services can be settled. On request, the system automatically generates statistics or reports for internal and external reporting in Excel or PDF format – complete with all graphs and formatted in accordance with individual requirements.

IVU.control also helps to calculate station and train path fees for trains and to conduct extensive quality surveys using the associated tablet app. Punctuality probability of train arrivals, displayed in IVU.control



NASA SAXONY-ANHALT, GERMANY

NASA GmbH plans, orders, and finances regional rail passenger transport in Saxony-Anhalt on behalf of the state. The company uses IVU.control for financial controlling of the transport contracts.

CONTROLLING



IVU.control at a glance

- Dynamic data analysis
 IVU.control collects all traffic data in a central database, enabling complex evaluations to be performed
- Extensive service settlement Automatic comparisons of target and actual data, as well as evaluations make the process of settling transport contracts easier
- Straightforward evaluation
 Evaluation tools allow you to combine data flexibly using the drag-and-drop function to establish interrelationships
- Automatic reports

Individual report templates allow you to produce customised statistics and analyses for internal reporting

Central data management

Uniform data storage based on the data warehouse principle enables efficient information management



GETTING THERE TOGETHER



IVU.suite

The requirements of transport operators are as diverse as the regions in which they operate. IVU.suite offers all the benefits of a standard solution, such as minimal development effort and predictable project durations. At the same time, thanks to its modular structure, it can be customised precisely to individual needs. What is needed is always exactly what is used. Tailor-made interfaces also connect to external peripheral systems, meaning that IVU.suite products fit seamlessly into any environment and are immediately ready for use.



IVU.xpress

Every transport company has its own identity and its own ways of working. The IVU.xpress special implementation process ensures that the IVU.suite can be put into operation quickly and efficiently in any environment. Clear objectives ensure a firmly defined project process and reliable schedules, from the start of the project to system design, configuration, and the final roll-out. Each system can be used productively from the outset and covers all use cases that are necessary for smooth operation. ╋

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IVU.support

Successful IT projects are based on trust. That is something that we value. We work on an equal footing with our customers; whether it involves city or regional transport, each project receives our full attention. We work together to analyse the needs in question and identify the best possible solution. That's why our work doesn't end once our systems are commisioned. We provide our customers with support throughout the entire project – and beyond. IVU.support is also available for contact afterwards, so that every vehicle reaches its destination, every time.



IVU.cloud

Why should transport operators have to deal with complex IT issues when they want to focus on operating buses? IVU.cloud allows IVU to take on full technical operations management for the IVU.suite – from hosting and maintenance through to installation of updates. High-performing, highly available, secure, and reliable: IVU.cloud enables an optimal IVU.suite deployment at every company, regardless of size. It can be seamlessly integrated into the existing IT landscape and remains fully scalable, for instance when new links or routes are added. This gives you flexibility and conserves resources. Headquarters

IVU Traffic Technologies AG

Bundesallee 88 12161 Berlin Germany

T + 49-30-859-06-0 F + 49-30-859-06-111 contact@ivu.com www.ivu.com