

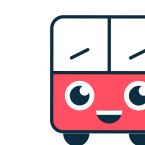


Time**4BUS** PLATFORM



Telematics and alarm system

vehicle diagnostics



Time4BUS PLATFORM



Telemetry and alarm system

vehicle diagnostics



**CONTROL & RECORDING
DEVICE TC1010**
Standard 10"

Hardware Device TC1010



COUNTING GATES



GPS



CAN BUS



COUNTING GATES



eComputer

TC1010



Wi-Fi



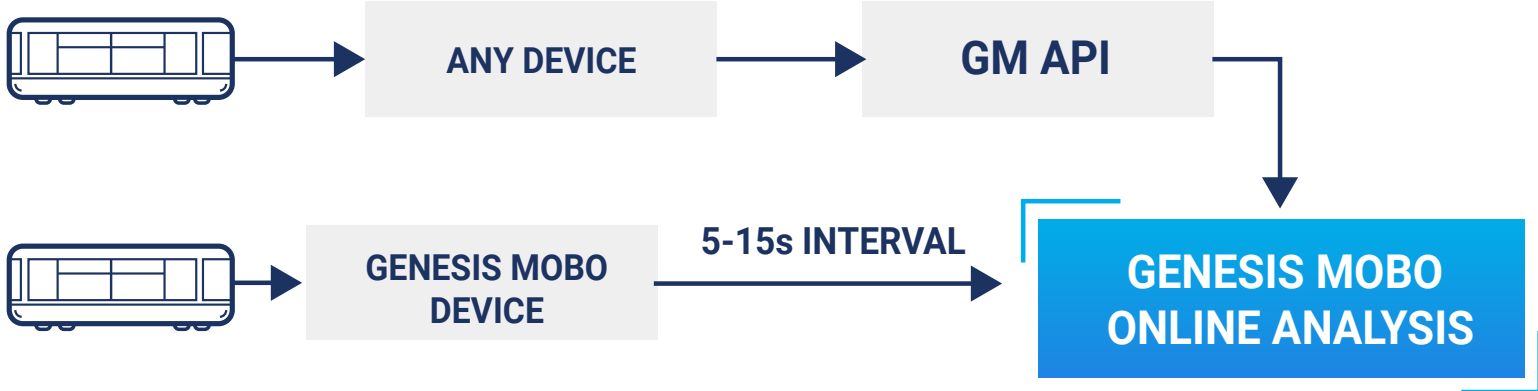
GSM

The multi-purpose device has a wide range of applications. It is equipped with a CAN analyzer, analog inputs, and a GPS module (the device can be additionally fitted with any sound system). The data obtained from vehicle signals makes it possible to, among other things:

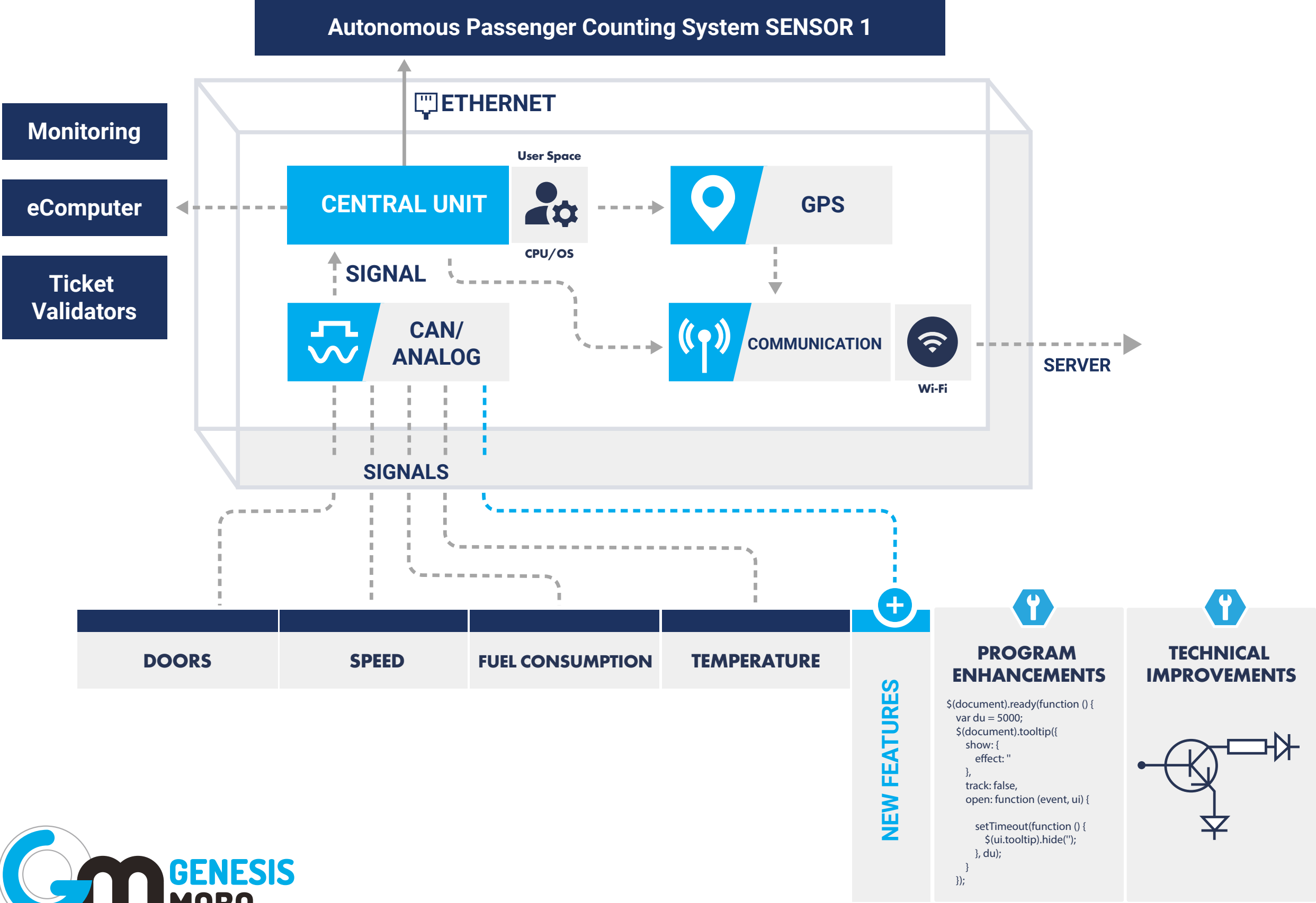
- **Counting gate management**
- **Data storage**
- **Fuel consumption logging (report generation)**
- **Automatic temperature control**
- **Technical parameter monitoring (alarm triggering)**

Based on core data (timetables, assigning shifts to drivers, GPS position), you can activate the Deviation System and the Time4BUS passenger application.

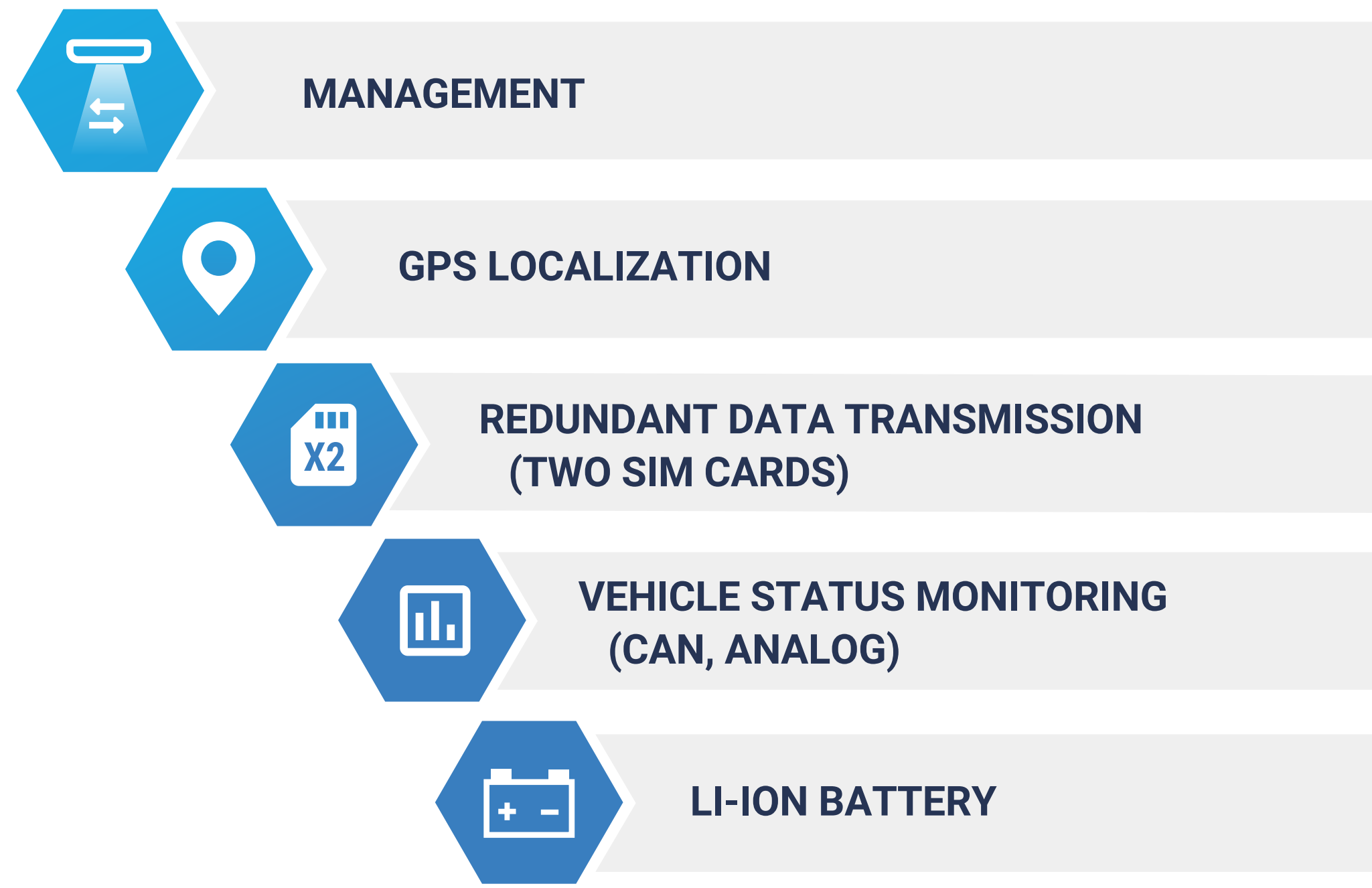
Additional features: Dispatcher module for logging and reporting public transport incidents.

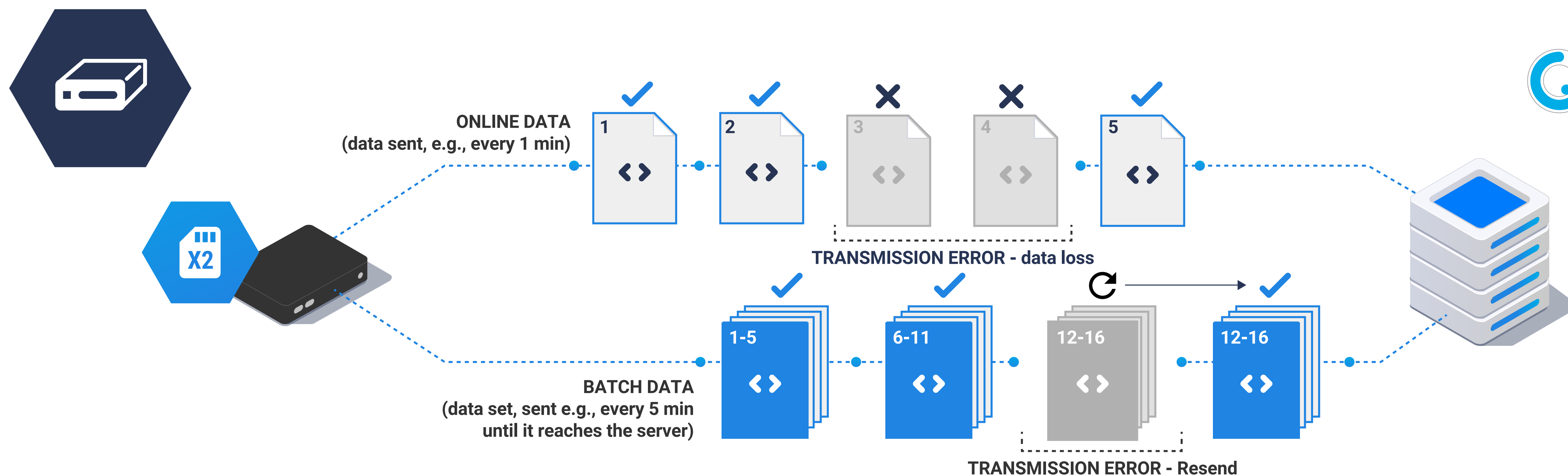


ALL-IN-ONE DEVICE



Hardware Device TC1010





Device TC1010

redundant data transmission

In the event of short-term or long-term transmission loss, data is collected on the device, and transmission is resumed once the connection is restored. For safety, our devices that control the counting gates are equipped with two separate transmission channels with two separate SIM cards, which guarantees effective data transmission.

TWO DATA TRANSMISSION CHANNELS

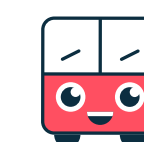
Our system distinguishes between real-time data and data intended as input for the reporting system (BATCH). Retransmission applies only to BATCH-type data, while real-time data is transmitted continuously—it reflects the current status of the vehicle rather than its historical behavior.

REAL-TIME DATA informs about the current vehicle status, which is updated every 1-5 seconds and is not confirmed. Its transmission is not resumed in case of connection loss (as it is not necessary).

BATCH DATA contains the complete vehicle journey history, i.e., a set of signals sampled at a frequency sometimes reaching milliseconds, from the entire time range beginning with the last data transfer to the server, and this data is both confirmed and retransmitted in the event of temporary transmission loss.



DEVICE TELEMTRY
Vehicle electronics signals



Time4BUS PLATFORM

Broad integration capabilities

The system enables collaboration with external monitoring systems.

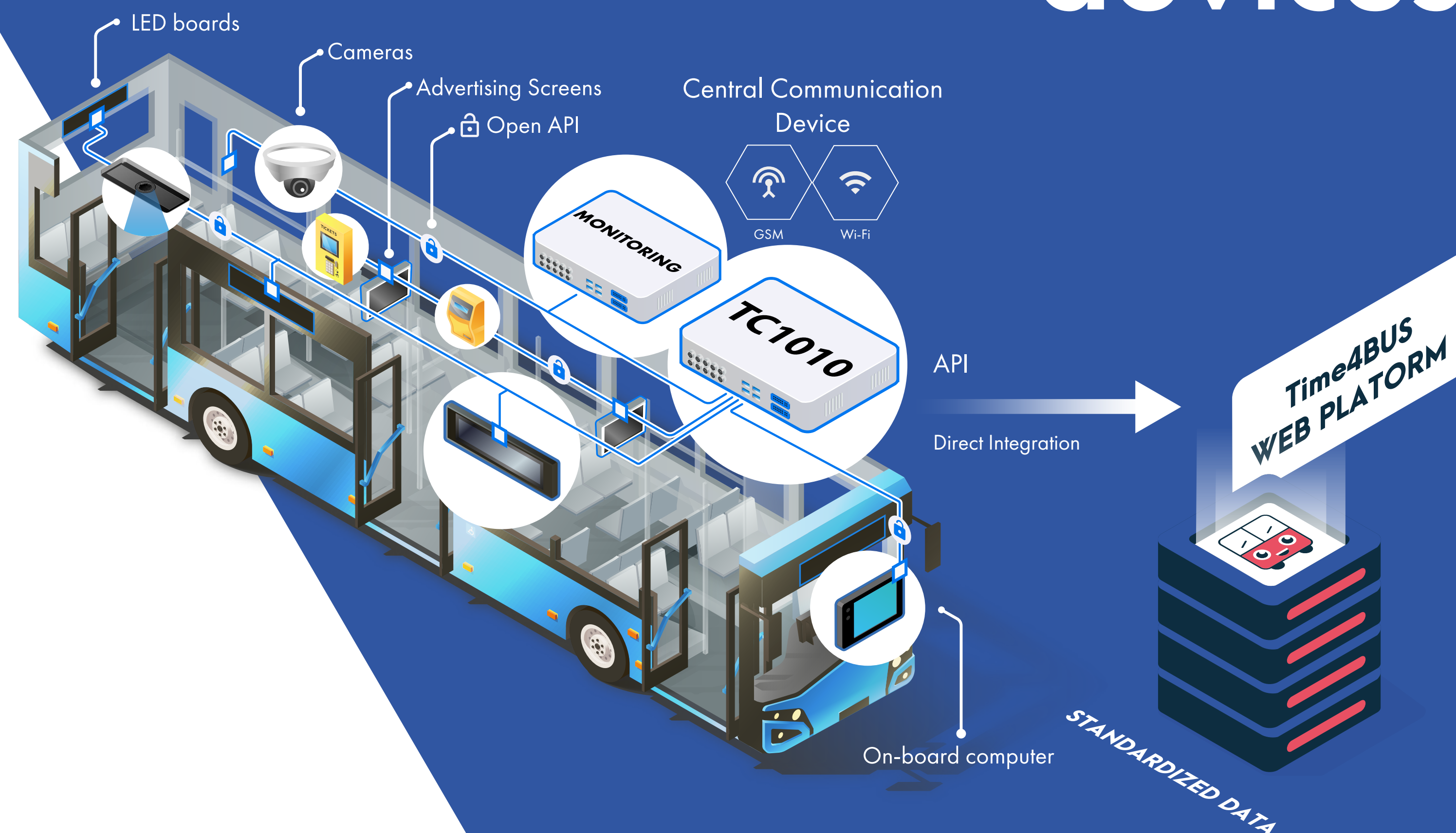
Possible models for integration with other monitoring manufacturers:

1. Direct Integration

Communication with the central Time4BUS TC1010 device

2. Indirect Integration

Using the provider's device and server





Time**4BUS** PLATFORM

Signs of Signals

PL

SIGNALS OF SIGNALS

The devices

Signals of the device

Identifier 639

Live in the living

GPS Signals

Accuracy of GPS (m) to the [acc]

4.04 4

The last update 16.09.2025 15:46:17

The last change 16.09.2025 15:45:42

Vehicle Speed (GPS) [av]

47.405

The last update 16.09.2025 15:46:17

The last change 16.09.2025 15:46:17

Direction of driving (A) [kkk]

87.37

The last update 16.09.2025 15:46:17

The last change 16.09.2025 15:46:17

Latitude of the geographical (A) [lat] [lat]

51.5917268

The last update 16.09.2025 15:46:17

The last change 16.09.2025 15:46:17

The longitude of the geographical (A) [lon]

19.0071588

The last update 16.09.2025 15:46:17

The last change 16.09.2025 15:46:17

L. GPS satellites [sat]

9

The last update 16.09.2025 15:46:17

The last change 16.09.2025 15:45:42

The Others

The time of UNIX [time]

1758030377400

The last update 16.09.2025 15:46:17

The last change 16.09.2025 15:46:17

Total course (m) to the [49] [49]

222111395

The last update 16.09.2025 15:46:17

The last change 16.09.2025 15:46:17

The door [cd] [cd]

It is not

The last update 16.09.2025 15:46:17

The last change 16.09.2025 15:38:37

Temp. Concrete. (C) [che on]

18.4

The last update 16.09.2025 15:46:17

The last change 16.09.2025 15:46:17

Telemetry from vehicle devices

Telemetry of electronic systems

Compilation of telemetry signals for all vehicles, or for a selected one by side number. Any columns can be selected from the list of signals.

 GENESIS MOBO



VEHICLE TELEMETRY
signals: engine, gearbox...



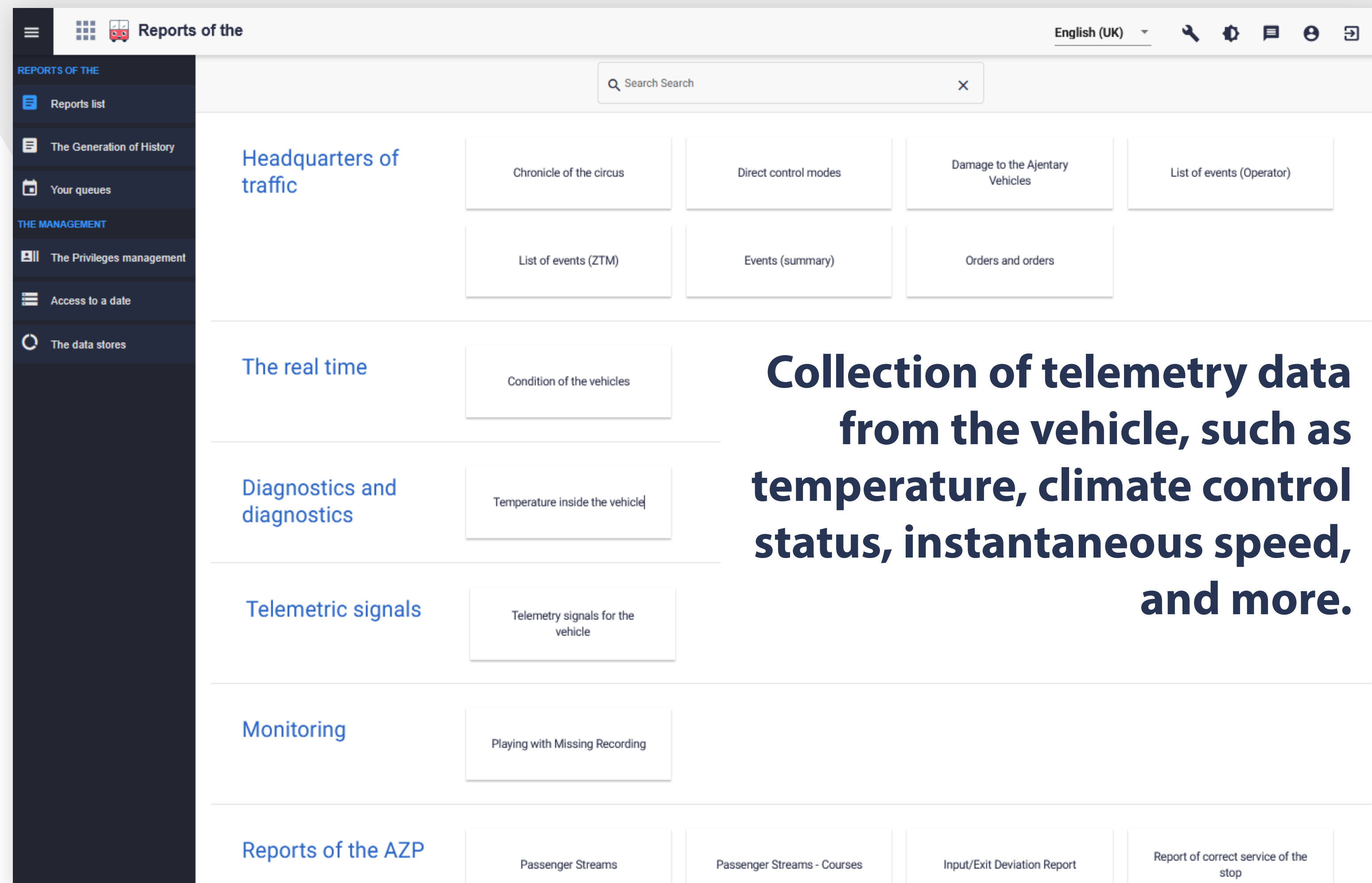
Time4BUS PLATFORM

Telemetry from vehicle

Report generator aggregated reports

Reports can be generated according to a schedule. Users can create their own report templates and prepare custom compilations of data. The generator's operation is based on the early preparation of data for daily aggregation, followed by report generation based on this pre-prepared data. Due to its design, the generator allows for the creation of aggregated reports using statistical functions over very large periods of data.

An example report could be the average, minimum, maximum, standard deviation, and median battery consumption, broken down by battery type and line in a monthly comparison.



Collection of telemetry data from the vehicle, such as temperature, climate control status, instantaneous speed, and more.



ALARMS

defining alarms
from telemetry signals

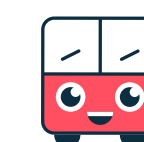
Any threats or irregularities during a journey are presented in the form of alarms. Alarms are divided into:



Informational - these are alarms that report on abnormal, but not critical, situations. An example of such an alarm could be a vehicle's low electrical balance. This is interesting information, especially in a broader perspective, but it does not require an immediate response.



Operational - these are critical alarms that require handling. An example of such an alarm for an electric vehicle could be insufficient range to reach the nearest charging point.



Telemetry alarms

The screenshot displays the Time4BUS Dispatcher center interface. On the left, there are filters for vehicle types (All vehicles, Only electrical, Buses, Trams, Trains) and operational modes (Only manual mode, Only delayed, Only accelerated, Unjustified stoppage). Below these are dropdowns for Operator and On duty status, and search bars for ID and Line. The main area is a map showing the city of Warsaw with several vehicles marked. A yellow callout points to a vehicle with a red alarm icon, labeled "Critical charger alarm in the alarm window". Another yellow callout points to a vehicle's status window, labeled "Battery charge status in vehicle window". On the right, there is a table of alarms and a notification for "No communication with charger".

Alarm ID	Vehicle ID	Alarm Type	Severity	Location	Time
2	5	Charger	High	Wilanów	2025-09-16 15:15
3	6	Charger	High	Wilanów	2025-09-16 15:15
4	11	Charger	High	Wilanów	2025-09-16 15:15
7	2	Charger	High	Wilanów	2025-09-16 15:15
9	24	Charger	High	Wilanów	2025-09-16 15:15
10	2	Charger	High	Wilanów	2025-09-16 15:15
11	7	Charger	High	Wilanów	2025-09-16 15:15

Notification: 9939 (2025-09-16 15:15) No communication with charger

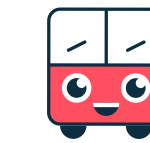


**Handling of
a non-critical alarm,
allows for the creation
of a report
(in case of a failure)
or closing the alarm.**

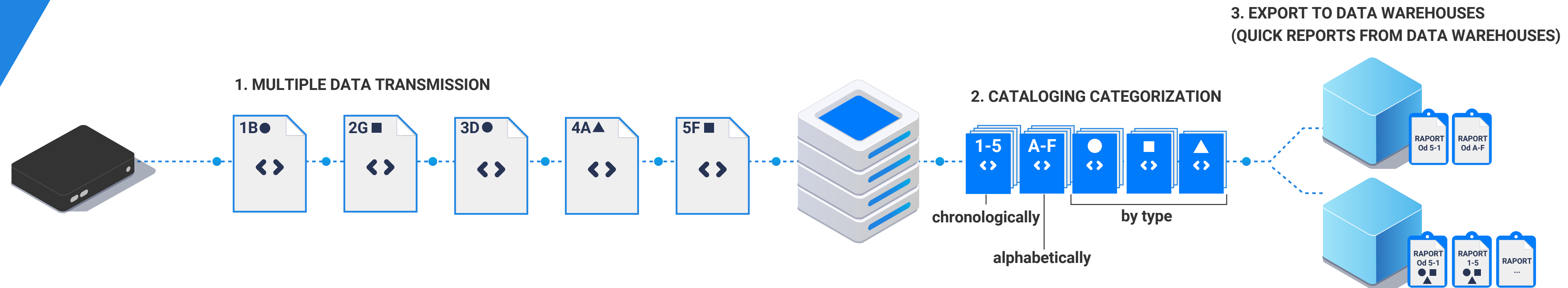


PREDEFINED REPORTS

system failures,
vehicle history



Time4BUS PLATFORM



Organizer of reports quick generation and cataloging of reports

Report generator and data preparation system for long-term reports

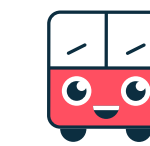
Report Generator

The system allows users to create custom reports. The first step is to select a data source, which can be either a historical data source or any data warehouse. Based on the user's selection, the program loads the necessary definitions and presents the user with a report preparation screen that consists of three areas: field definition, condition definition, and aggregation definition. It is possible to add multiple fields, conditions, or aggregation definitions. The user can save their prepared report for later generation.

Intelligent Reporting System (Data Segregation)

In addition to aggregated reports, our system features an intelligent reporting system. The user selects the aggregation method and the scope of the data they are interested in. The system then creates a data warehouse for continuous storage and processes the historical data according to the warehouse's criteria.

Daily data is processed continuously, once per day. The resulting warehouse, which is constantly populated with new data, serves as one of the sources for the report generator, making report creation fast since the data has already undergone preliminary segregation.



Time4BUS PLATFORM

Reports over 50 different reports

The reports are designed for passenger counting analysis. We currently offer over 50 different reports, categorized into four types:



1. Line and Vehicle Reports

(Reports: Basic, Line Vehicle, Vehicle, Route, Route Section, Journeys/Runs)



2. Stop Reports

(Reports: All Stop Boardings/Alightings, Boardings/Alightings by Line, Boardings/Alightings by Vehicle)



3. General Reports

(Reports: Boardings/Alightings by Line, Boardings/Alightings by Vehicle, Boardings/Alightings by Stop, Boardings/Alightings by Day)



4. Service Reports

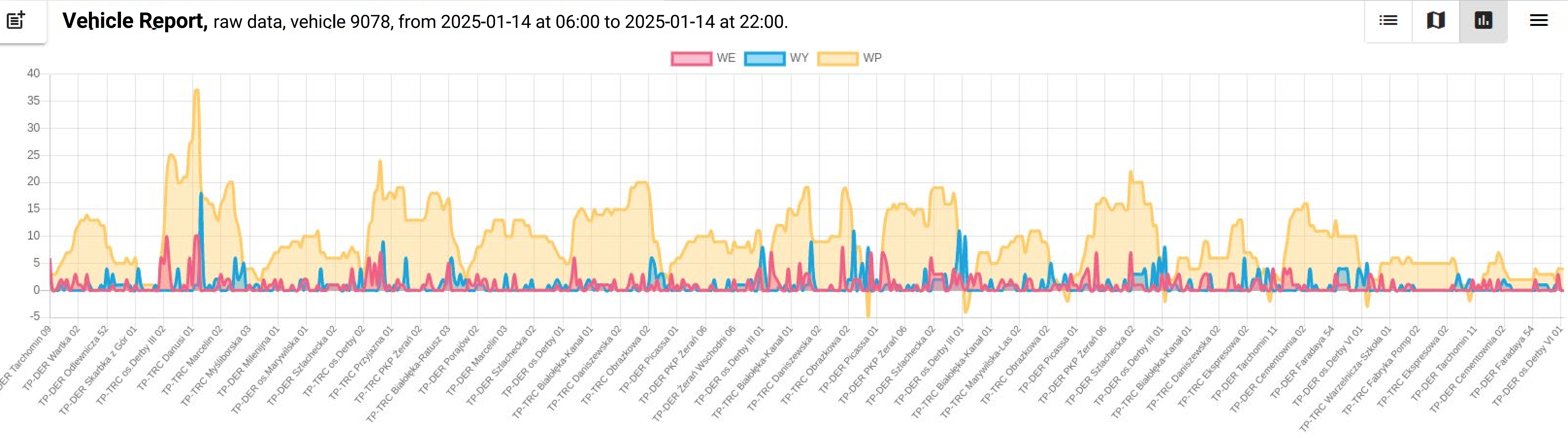
(Reports: Entry-to-Exit Ratio, Zero Boardings/Alightings at Stops)

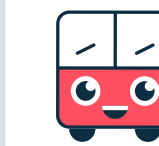


Vehicle Report: used to analyze the occupancy of a specific, selected vehicle, regardless of its assigned service tasks or routes on which it operated. The user is presented with the full journey of the vehicle from a selected time period.

Reports

over 50 different reports





Time**4BUS PLATFORM**

Reports

Telemetry reports

The reports allow for a custom combination of telemetry parameters, such as battery SOC (State of Charge), average electrical energy consumption, and more.

Report: Vehicle Telemetry Signals

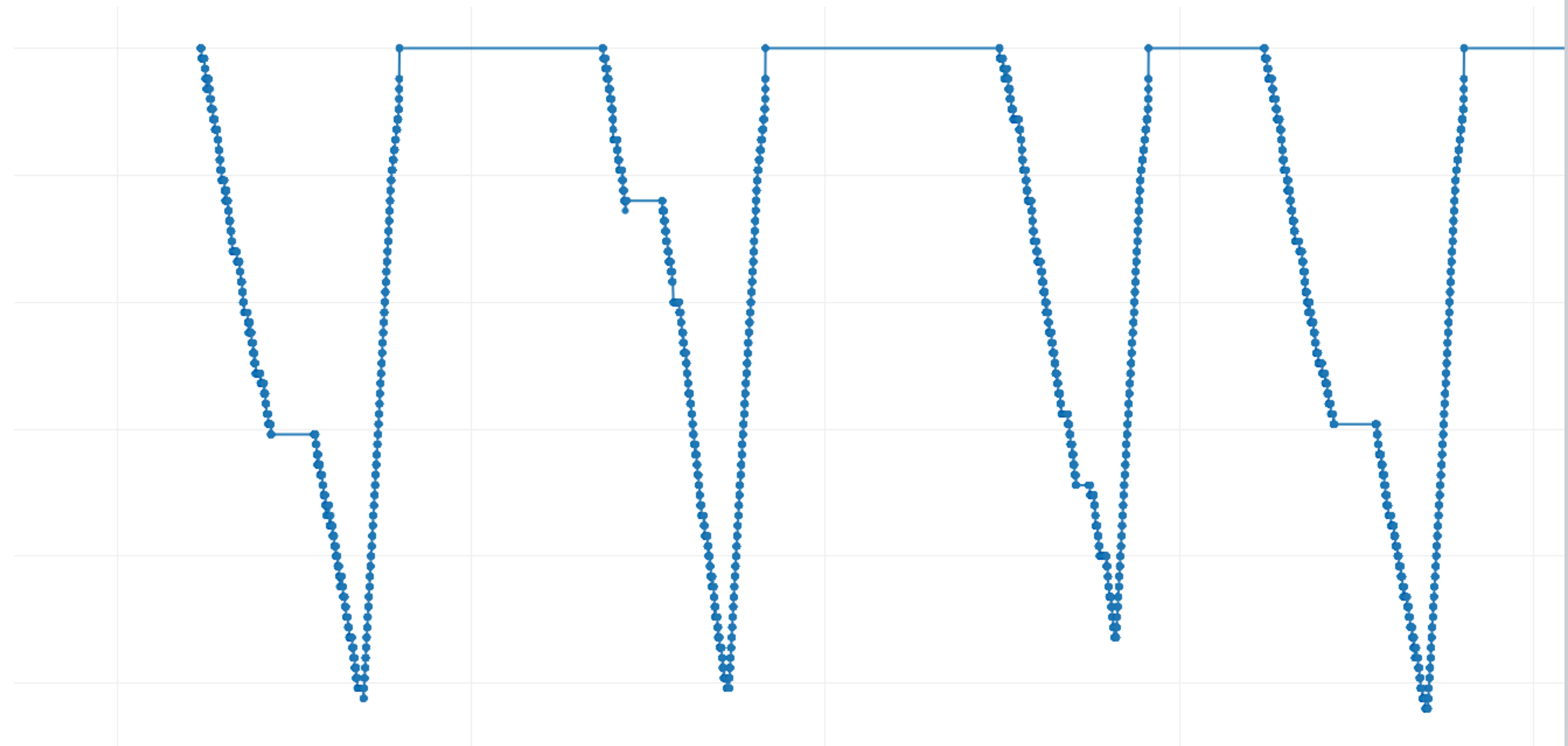
Date to: 2025-09-16 23:59

Created: 2025-09-17 14:36:05

Vehicle: 1203

Date from: 2025-09-12 00:00

Signals: Traction battery charge status





Reports

Passenger transport reports

The reports enable you to analyze telemetry parameters in relation to specific line performance, such as the average electrical energy consumption from 08:00 to 10:00.

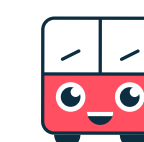


Vehicle Electricity Consumption Report											
Vehicle	Type	Line	Shift	From	To	Average Charging Energy	Average Energy Consumed	Total Energy Consumed	Total Energy Consumed	Average Recuperation Energy	Total Recuperation Energy
P120	Make U18E	A21	2	2020-11-16 04:47	2020-11-16 14:26	60.13	191.51	182.08	368.38	45.21	104.47
P123	Make U18E	A21	9	2020-11-16 00:00	2020-11-16 14:26	82.93	308.14	156.94	510.25	50.37	176.99
P123	Make U18E	A21	12	2020-11-16 06:09	2020-11-16 14:26	39.57	127.42	112.36	243.11	34.39	77.31
P127	Make U18E	A21	3	2020-11-16 06:25	2020-11-16 14:26	33.56	93.09	88.38	208.40	27.03	68.23
P120	Make U18E	A21	5	2020-11-16 06:47	2020-11-16 14:26	22.90	63.98	48.73	135.19	15.97	46.49
P121	Make U18E	A21	014	2020-11-16 00:00	2020-11-16 00:11	131.81	0.00	258.42	0.18	85.10	0.00
P124	Make U18E	A21	7	2020-11-16 04:23	2020-11-16 13:55	33.86	91.28	98.87	268.61	28.72	84.10
P125	Make U18E	A21	11	2020-11-16 04:10	2020-11-16 14:26	52.42	116.60	115.54	271.19	31.80	80.16
P128	Make U18E	A21	1	2020-11-16 04:21	2020-11-16 14:26	49.90	147.93	124.77	277.42	38.67	94.64
P180	Make U18E	A21	014	2020-11-16 13:59	2020-11-16 14:26	8.92	0.00	115.14	5.33	38.54	0.49
P280	Make U18E	A21	8	2020-11-16 06:31	2020-11-16 14:26	41.52	111.18	103.49	228.52	33.17	77.76
P233	Make U18E	A21	1	2020-11-16 00:00	2020-11-16 00:01	313.36	1.26	666.40	0.00	171.34	0.00
P236	Make U18E	A21	7	2020-11-16 13:24	2020-11-16 13:31	1.26	4.08	6.03	7.75	0.00	0.00
P238	Make U18E	A21	8	2020-11-16 03:14	2020-11-16 08:23	0.01	1.27	43.17	118.27	10.69	32.18
P250	Make U18E	A21	10	2020-11-16 06:41	2020-11-16 14:25	31.08	85.76	81.76	185.20	22.62	53.62
P252	Make U18E	A21	10	2020-11-16 00:00	2020-11-16 00:15	254.57	14.54	438.16	0.00	137.57	0.00
P253	Make U18E	A21	4	2020-11-16 04:12	2020-11-16 14:26	52.70	132.18	129.88	288.13	34.30	85.36



SERVICE

Alarm management
integrated with internal
and external services



Time**4BUS** PLATFORM

Service

Service reports

The system offers data analysis and diagnostic functionality, with data export capabilities to Excel-compatible spreadsheets.



	A	B	C	D	E	F	G	H
1	Type	Line	Shift	Vehicle	Occurrence Date	Service Date	Service Type	Status
2	Charging outside the schedule	123	5	T901	2025-08-12 11:10:00	2025-08-12 13:28:00	Postpone alarm	Status: not working
3	Faulty charger				2020-08-13 10:41:00			Status: not working
4	Faulty charger				2020-08-13 10:42:00			
5	Charging outside the schedule	123	6	T909	2020-08-13 10:43:00	2025-08-16 12:01:00	Occurrence in next shift	Status: not working
6	Faulty charger				2020-08-13 10:43:00			Status: not working
7	Faulty charger				2020-08-13 10:45:00			Status: not working
8	Faulty charger				2020-08-13 10:46:00			Status: not working
9	Faulty charger				2020-08-13 10:47:00			Status: not working
10	Faulty charger				2020-08-13 10:48:00			Status: not working
11	Charging outside the schedule	123	54	T902	2020-08-13 10:49:00	2025-08-16 12:01:00	Next occurrence	
12	Faulty charger				2020-08-13 10:49:00			Status: not working
13	Charging outside the schedule	123	5	T901	2020-08-13 11:10:00	2025-08-16 12:01:00	Next occurrence	
14	Charging outside the schedule	345	2	T917	2020-08-13 11:15:00	2025-08-16 12:04:00	Next occurrence	
15	Charging outside the schedule	110	6	T915	2020-08-13 11:30:00	2025-08-16 12:04:00	Next occurrence	
16	Vehicle battery discharge	110	1	T903	2020-08-13 11:49:00	2025-08-16 12:04:00	Next occurrence	
17	Vehicle battery discharge	245	6	T951	2020-08-13 11:53:00			Depot
18	Range of battery too low	345	5	T961	2020-08-13 12:01:00			Depot
19	Range of battery too low	110	52	T969	2020-08-13 12:09:00	2025-08-16 12:04:00	Occurrence in subsequent runs/courses	
20	Vehicle battery discharge	345	4	T955	2020-08-13 12:47:00			
21								
22								



Data Studio

A Business Intelligence (BI) tool for creating reports and analyses from selected data sets collected by the system.

Titel	Blue Bar (Count)	Purple Bar (Count)
11 Listopada	8	18
3 Maja	10	6
AMF	1	1
Abraham	2	2
Adamianna	3	1
Akcent	2	8
Aluzyna	2	1
Anabaras	2	2
Andersena	1	2
Anna Jagiello	3	3
Atuszowa	2	1
Asena Legonowo	1	1
Arcezi Siedlcy	6	4
Grochów	2	1
Armatnia	4	2
Atoniwa	4	2
Aspekt	2	1
Aetiska	1	1
Balkonowa	11	14
Banacha	8	7
Barej	9	9
Bartnicza	1	4
Chopich	12	15
Bazyliach	7	3
Bemowo-Rausz	4	3
Berensona	2	2
Kenal	9	9
Belkdan	12	6
Belolewska	12	9
Białoleka-Dwojka	4	7
Białoleka-Kanal	12	14
Białoleka-Rausz	11	48
Biały Rausz	14	11
Biezujsz	17	9
Bogusławskiego	14	16
1920 r.	2	7
Biłska	5	4
Bohmica	5	2
Bohemia	2	1
Boleseska	13	26
Bolesławowska	1	1
Borowiecka	10	12
Borowiecki	3	3
Brad Zawadnich	6	5
Brozka	4	3
Bryłowska	3	4
Brzeziny	4	3
Brzezinsk	2	2



MAP
Telemetry Alarms

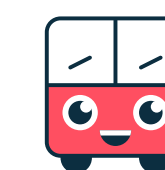
Map module

It allows for the real-time control of service delivery and supports the work of dispatchers. The map displays vehicle positions based on GPS data, their statuses, deviations from the schedule, and other detailed parameters.

The dispatcher can select and monitor an entire service run on a line or individual vehicles. Search filters enable a quick display of selected groups on the map, such as technical vehicles only, vehicles with time deviation only, or offline vehicles only.

Key Features:

- modern technology
- simple user interface
- tracking of Selected Vehicles
- intuitive filtering
- deviation alarms panel
- Telemetry alarms panel (optional)



Time4BUS Platform

Dispatcher center

All vehicles

Only electrical

Buses

Trams

Trains

Only manual mode

Only delayed

Only accelerated

Unjustified stoppage

Operator

On duty

All

Q ID

Q Line

116

Line/Brigade	ID	Variation	Passenger count
116/9	5977	-1 min	21
116/2	5985	0 min	9
116/3	5900	0 min	0
116/4	5927	0 min	0
116/7	5990	-3 min	49
116/11	5954	0 min	16
116/16	5978	-3 min	31
116/13	5987	0 min	0
116/15	5922	-9 min	14

ZTM Warszawa

English (UK)

Kobylka

Turów

Wojewódzki Instytut Techniczny Urządzenia

2 2 1 2

3 4 5

9 3 4

10 1 8

11 1 5

15 1

16 1 7

17 3 20

18 2 3

25 3 5

27 1 4

78 1 6

1

Map

Linear scheme

116/11

5954 16 14

Wilanów

5967 20 16/10

Wilanów

116/15

5977 21 116/9

Wilanów

116/8

5908 62 116/16

Wilanów

116/7

5990 49 116/6

Wilanów

116/2

5965 6 6/3

Chomiczówka

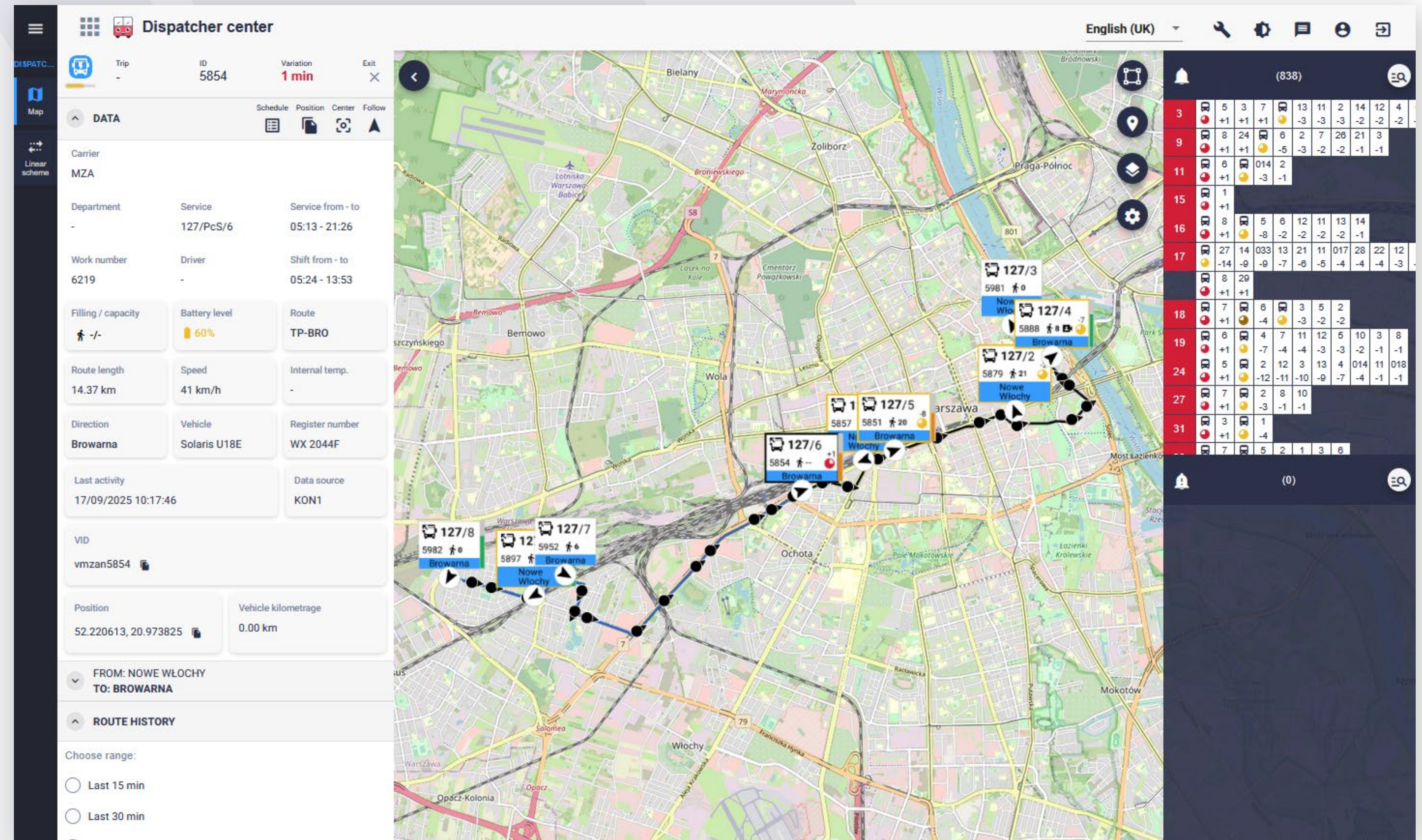


Real-time Operations via the Map Module

Map module and line chart

They allow you to monitor service delivery in real-time and aid dispatchers' decisions in challenging situations.

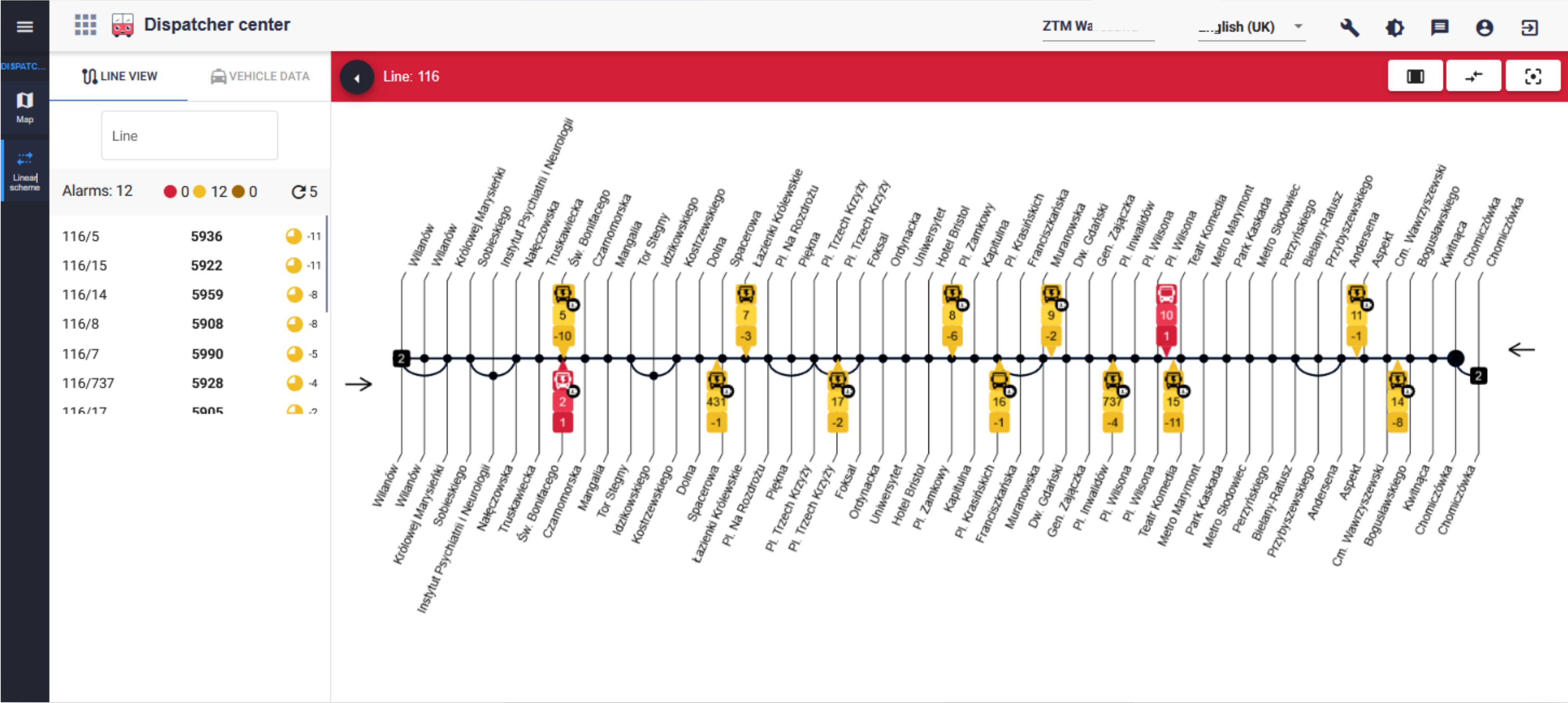
Both the map and the line chart display vehicle locations. The line chart compares vehicles to the schedule and currently running services, illustrating the overall situation on the line and enabling the coordination of on-line activities.





Real-time operations via the map module

Line chart





**Thank you
for your attention.**

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