Quick Reference

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1. ABOUT THIS DOCUMENT

1.1 Objectives

This document provides a quick reference guide for the open platform OMNIA.

1.2 Document Properties

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001	01-03-2008	First Version
002	28-03-2008	Expanded User Interface section

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1.4 References

Ref.	Title / Publisher	Version

1.5 Definitions

IRTE	Integrated Road Traffic Environment
UTC	Urban Traffic Control
PTM	Public Transport Management
PT / PTV	Public Transport / Public Transport Vehicle
AVM / AVL	Automatic Vehicle Monitoring / Automatic Vehicle Location
RDS	Radio Data System
VMS	Variable Message Sign
DRG	Dynamic Route Guidance
SOA	Service Oriented Architecture
SLA	Service Level Agreement
VRU	Vulnerable Road User
RN	Reference Network
RS1	Roadside Unit
UI / GUI	User Interface / Graphical User Interface
CCTV	Closed Circuit Television
CSO	Central System Operator

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2. INTRODUCTION

The state-of-the-art response to the ever-increasing traffic volumes and daily congestion on today's roads is an integrated architecture in which ITS applications for Traffic Control, Transport Management, Environment Monitoring and Multimedia Mobility Information can cooperate fully to implement traffic management strategies.

Growing experience around the World shows that ITS integration performance and efficiency can be achieved only when the design is based on an open, flexible and scalable architecture, and when a common data dictionary and standard interfaces are defined between the different ITS applications.

OMNIA is the open platform conceived by MIZAR, a company of the Swarco Group, to support the integration of a wide range of ITS applications, and to offer a homogeneous "look and feel" to all the functionalities and objects involved.

The OMNIA concept exploits MIZAR's three decades of experience gained in the fields of traffic control, transport management, mobility information service and integrated ITS architectures. All of the ITS applications offered by MIZAR in fact have inherent features making them ideal for integration in the OMNIA platform. Anyway OMNIA is suited to interface also third parties ITS applications.

OMNIA has been developed by MIZAR to provide an innovative response to the fundamental requirements of wide-area traffic management systems for future decades, offering significant improvements in environmental protection and greater attention to safety especially of vulnerable road users.

Thanks to OMNIA, any city will be able to build its own specific "tailored" ITS environment.

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3. OMNIA

3.1 Overview

OMNIA is an open platform designed to functionally integrate and to offer easy access to a wide range of ITS applications through a common interface.

Based on leading-edge solutions, OMNIA is structured like an IRTE (Integrated Road Transport Environment) in which:

- OMNIA is located at a higher level and provides an homogeneous access to one or more cooperating ITS applications
- each specific ITS application connected to OMNIA carries out its own control and management functionalities, but is featured to cooperate with other ITS applications.

The OMNIA user friendly Common GUI offers distributed measurement and supervisory facilities, which provide:

- more effective and simpler monitoring of the road network and sub-system components
- a simplified way of interacting with the components belonging to the various sub-systems, in order to display details about their status and to send commands.

The OMNIA Common GUI is based on state-of-the-art Web Technology and provides high accessibility to the system without requiring any specific workstation configuration. Optimised for the most widely used web browsers (Internet Explorer 7, Firefox 2), the Common GUI provides multi-language support.

Thanks to its modularity and scale-ability, OMNIA can be successfully applied to any traffic environment, and is especially suited to large-scale systems.

OMNIA offers embedded functionalities for advanced traffic monitoring which involves both system component diagnostics and traffic data.

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4. SYSTEM ARCHITECTURE

OMNIA offers the integrated environment and an homogeneous access to a wide range of ITS applications able to operate autonomously as well as natively provided with features suitable for integration and cooperation.

The OMNIA open platform architecture is structured like an IRTE (Integrated Road Transport Environment) in which:

- OMNIA is located at a higher level and provides an homogeneous access to one or more cooperating ITS applications
- each specific ITS application connected to OMNIA carries out its own control and management functionalities, but is featured to cooperate with other ITS applications.

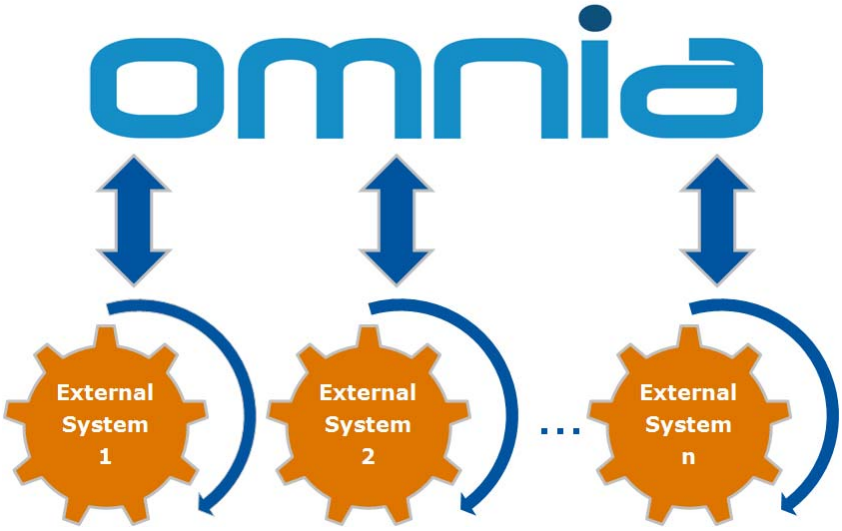

Figure 1: OMNIA Open Architecture

The OMNIA open platform guarantees:

- **Scalability**: the possibility to extend the system functionalities in terms of ITS applications, platform functionalities, controlled peripherals, etc…
- **Flexibility**: possibility to actuate different traffic and transport management strategies by means of the different ITS applications and to add to the platform new software functionalities.

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4.1 OMNIA platform

The OMNIA platform, from this point on called OMNIA, is based on an open client server standard architecture and on a modular and flexible suite of functions.

OMNIA modules carry out the following basic functions:

- Graphical and interactive user interface

  provides the system operators with all the functionalities needed to monitor and to interact with the controlled objects.
- Communication Management

  manages all the data exchange inside the OMNIA platform and with external systems

OMNIA offers embedded functionalities for advanced traffic monitoring which involves both system component diagnostics and traffic data.

- traffic data collection and estimation

  all the traffic measures (traffic volumes, speed, …) and traffic related data (actuated signal plan, clearance capacity, turning proportions, …) are gathered and stored in the central system archive together with their estimated statistical profiles
- system diagnostic status monitoring

  the diagnostic status is kept updated for all the system components. All the diagnostic data are stored and made available through dedicated screens and detailed reports. Availability indicators are elaborated to support maintenance and automatic alarms are generated for abnormal situations.

OMNIA offers also facilities that can be used to supply/receive data and command to/from other mobility management systems/platforms.

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4.2 Functional Architecture

The following scheme shows the OMNIA functional architecture.

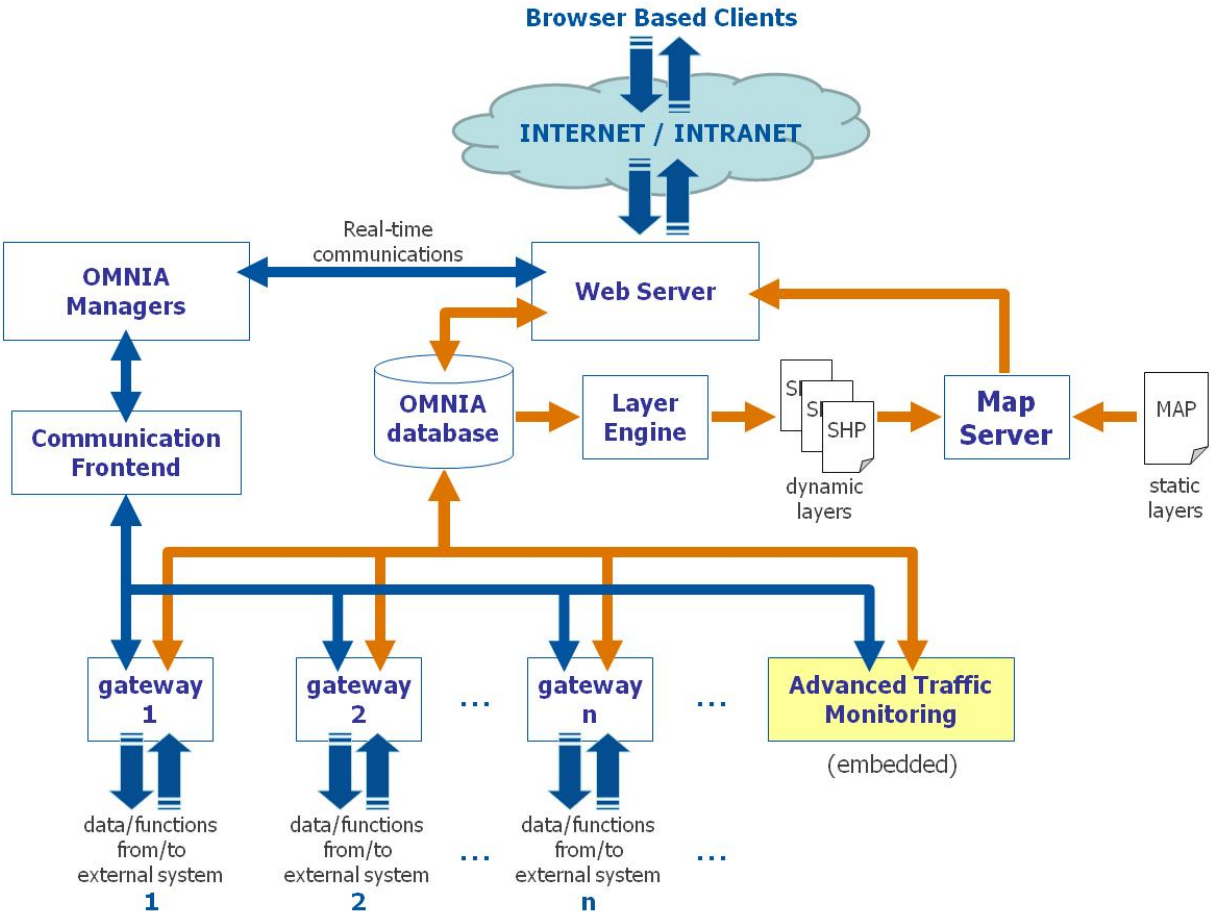

Figure 2: OMNIA Architecture

- Web Server

  Based on Microsoft Internet Information Services (IIS), is responsible for accepting HTTP requests from clients. The Web Server serves authorised login providing them the access to the OMNIA Common GUI and the Web Desktop environment. The user identity (username and password) is used to determine which application / data can be run.

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- Layer Engine

  Reads data from the OMNIA database and prepares dynamic layers. Dynamic layers are automatically updated every 30s.

- Map Server

  Based on Autodesk MapGuide, integrates dynamic layers prepared by the Layer Engine and static layers (maps).

  The Map Server offers:

  - interactive map viewing (Ajax technologies)
  - Quality cartographic output with scale-dependant details
  - Support for different standards like ESRI SHP and SDF vector files, ArcSDE, MySQL and ODBC database formats
  - Fast scalable and secure server platform

- Communication Frontend

  is responsible of the following main functions:

  - receives TCP messages from OMNIA managers and forward them to each and every backend system;
  - receives TCP messages from subsystems and forward them to the correct OMNIA manager.

- OMNIA Managers

  Web Connection Manager (WCM), User Interface Command Manager (UCM), and other generic purpose managers,... provide the support for the real time functionalities of the user interface controlling the messages dispatched between OMNIA, its clients and the subsystems.

- Gateway

  A specialised software module that provides the interface between OMNIA and each subsystem.

According to the scheme in the following page, the embedded Advanced Traffic Monitoring function shares the same engines for Database [1], Web Server [2] and Map Server [3] with the OMNIA platform.

Advanced ITS functions are directly provided to OMNIA by the connected subsystems. For these systems, unless differently specified, OMNIA does not provide Database, Web Server and Map Server functionalities.

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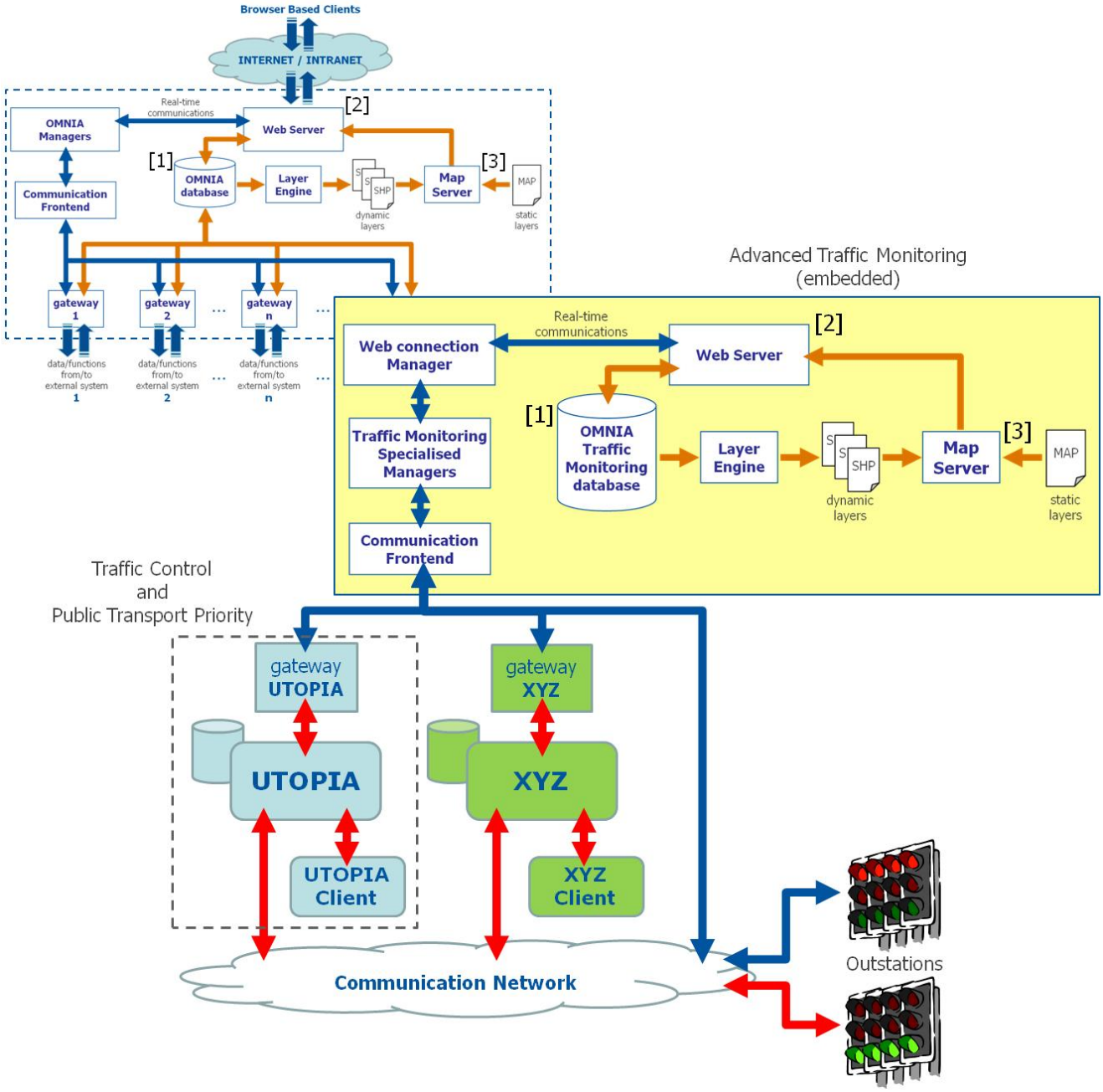

Figure 3: OMNIA Architecture – Advanced Traffic Monitoring Detail

Figure 3 shows the OMNIA architecture where Urban Traffic Control functionalities are powered by UTOPIA.

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The main functions supported by UTOPIA are:

- Public Transport Priority (PT Priority)

  Priority to PT vehicles is provided according to several schemes, ranging from functional integration with AVM systems, to local detectors, to dedicated detectors managed through the PT Locator functionality.

- Traffic Network Control (Control)

  Fully dynamic and adaptive control, traffic responsive traditional strategies, plan selection, fixed plan can be implemented by OMNIA according to the specific local needs.

  Control actions are provided using a robust Feedback Loop approach at both the Local (intersection) Level and Central (area) Level. The control actions base on the real-time estimation of the controlled traffic network status and forecasts the status over the complete optimisation horizon performed by the Status Observer.

Details about Public Transport Priority and Traffic Network Control functionalities are available in the UTOPIA documentation.

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4.3 Physical Architecture

4.3.1 Server(s)

Fully compatible with 32-bit and 64-bit architecture, the Server(s) provides high performance with minimal delays

- Operating system: Microsoft Windows Server 2003
- Database engine: Microsoft SQL server 2000/2005
- Web Server: Microsoft Internet Information Services (IIS)
- Map Server: Autodesk MapGuide
- Application framework: Microsoft .NET Framework 2.0

4.3.2 Workstation

OMNIA Common GUI use Browser Based Clients to provide high accessibility to the system without requiring any specific workstation configuration.

Although being in principle independent by the Operating System, OMNIA Common GUI is optimised for the most widely used web browsers (Internet Explorer 7, Firefox 2) and offers full multi-tasking capabilities and protected tasks.

Each operator has its own configuration of allowed functions. Authorisation is given at login. Both username and password must be supplied. Unauthorised access can be stopped.

For Windows based workstation, MS Windows XP operating system is suggested.

4.3.3 Communication Network

The communication network provides the communication links inside OMNIA and between OMNIA and external systems where communications are based on TCP/IP communication protocol.

Based on a flexible WAN architecture can support several different kinds of communication media (fibre optic, dedicated telecommunication lines, VPN based on DSL connections, private copper cables, etc…).

In order to have sustainable performance of the OMNIA Common GUI, medium to large bandwidth is suggested for connection with the Web Server. Small bandwidth connections (i.e. dial-up connections) are possible but with low performance

The architecture of OMNIA requires a robust and reliable communication network between external systems the control centre.

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4.4 System Database

OMNIA uses relational databases based on Microsoft SQL Technology to store all the data related to the system configuration.

The database is also used to store the measures coming from the field and the diagnostics status supplied by the embedded Advanced Traffic Monitoring function.

The central databases contains the following data:

- Configuration archive:
  - Cartographic data
  - Intersections topological description
  - Signal Plan description
  - Detectors description and traffic classification
- System access archive:
  - Registration of all the accesses to the system
  - Registration of all configuration, management and control operations done on the system
- Traffic data and estimations archive:
  - Historical data for traffic measures
  - Statistical data for traffic measures
  - Historical data for traffic estimations
  - Statistical data for traffic estimations
- Control data archive:
  - Historical data for actuated traffic lights control, subdivided for SPOT unit and hour of the day
  - Actuated traffic lights control data
- Diagnostic data archive:
  - All central modules and events diagnostic data
  - Peripheral devices diagnostic
  - Communication network diagnostic
  - Alarms
- System performance and availability:
  - Availability of the peripheral devices and the central modules
  - Congestion indicators and flow/delay curve

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In particular, all the statistical data are subdivided with the indication of the day typology basing on:

- Weekday
- Period of the year
- weather conditions
- Special conditions (public transport strikes, particular events, etc…)

The storage of diagnostic data and of the system abnormal workings (congestion, alarms, …) is done basing on “at event” modality.

The storage of traffic data is done in two phases: real time storage of the original data and historical/statistical data storage.

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5. COMMON GUI

The OMNIA user friendly Common GUI offers distributed measurement and supervisory facilities, which provide:

- more effective and simpler monitoring of the road network and sub-system components
- a simplified way of interacting with the components belonging to the various sub-systems, in order to display details about their status and to send commands.

The OMNIA Common GUI is based on state-of-the-art Web Technology and provides high accessibility to the system without requiring any specific workstation configuration. Optimised for the most widely used web browsers (Internet Explorer 7, Firefox 2), the Common GUI provides multi-language support.

5.1 Access to the OMNIA system

OMNIA provides a protected Login where the access to the system is subordinated to the verification of the operator access rights.

The authentication to the OMNIA system is based on three parameters:

- User name
- Password
- Access level (role)

Figure 4: OMNIA login

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Figure 5: OMNIA welcome page

In particular, the access level specifies the authorizations needed to make some actions inside the system. The predefined levels are described in the following table.

ID	Role Code	Role Description
1	ADM	Administrator (full access)
2	SE	System Engineer
3	SO	System Operator
4	SS	System Supervisor
5	MG	Maintenance Group
6	TE	Traffic Engineer
7	SD	System Diagnostic

Table 1: OMNIA User Roles

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Different Roles correspond to different rights as shown in the following figure

	ADM	SE	SO	SS	MG	TE
Map View	R/W	R	R/W	R	R	R
Junction View	R/W	R	R/W	R	R	R
Signal Group Diagram	R	R	R	R		R
Time Space Diagram	R	R	R	R		R
Status Reports	R	R	R	R	R	R
Traffic Data	R	R	R	R	R	R
User Settings	R/W		R			

Table 2: OMNIA User Role Rights

The users and the passwords (protected) are stored in the OMNIA system database.

The management of the protected accesses permits to the OMNIA system the construction of the accesses archive, containing the information related to:

- System accesses (user, password, date, hour, classification, workstation)
- Configuration, management and control operations done on the system

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5.2 User Interface Modules

The following sections show the OMNIA User Interface Modules

The User Interface permits to the Central System Operators to:

- Access real-time and off-line (archive) diagnostic data
- Access real-time and off-line (archive) traffic data
- Interact with the system

Diagnostic data and traffic data are presented using tables or directly on the Graphical Interface (using a colour scale).

5.2.1 Web GUI

The following scheme shows the OMNIA Web GUI modules.

The scheme includes the Advanced Traffic Monitoring specialised Manager Functions.

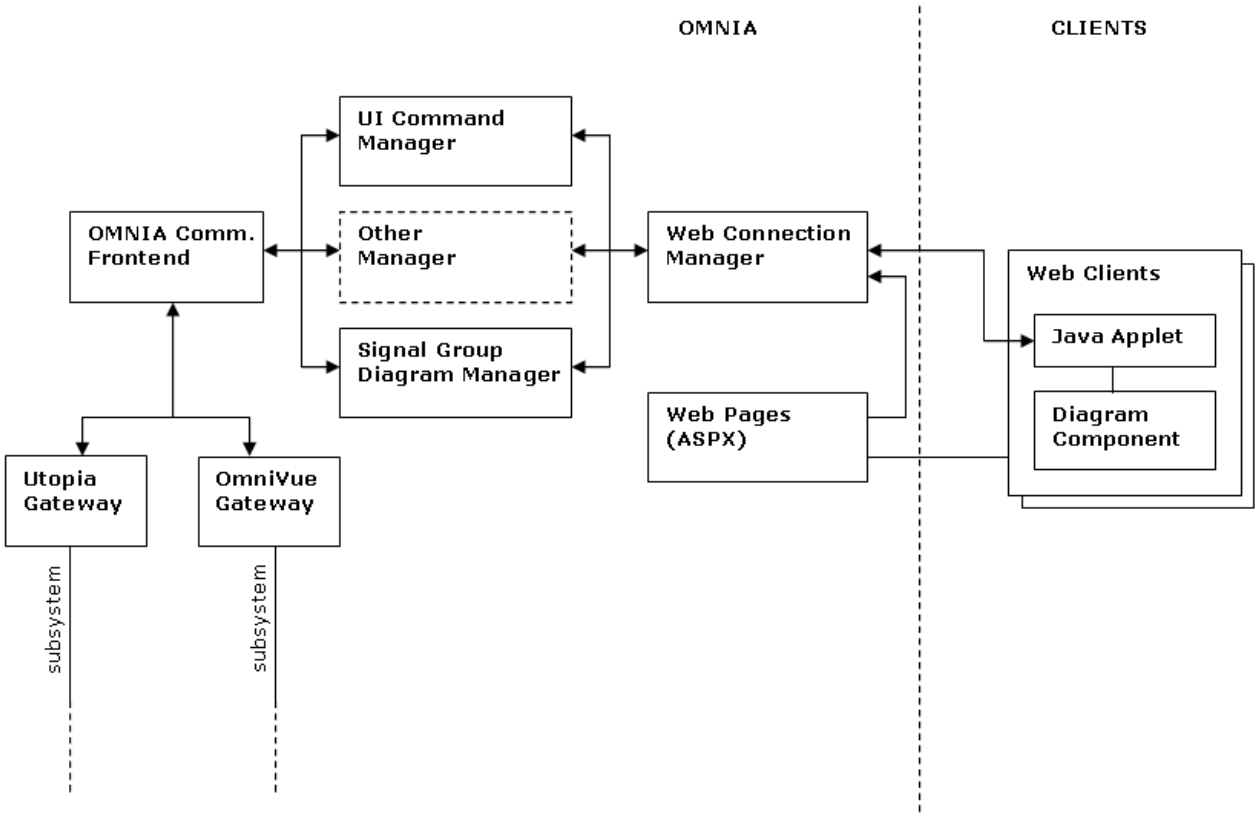

Figure 6: Web GUI scheme

According to the above scheme, different components of the Web GUI are:

- Web Client
  web page shown to the final user, normally generated from a server ASPX page;
- Diagram Component
  web client component that draws the signal groups diagram and shows it to the final user;
- Java Applet
  Communication module, exchange data with the OMNIA central system and sends signal group and detector status to the diagram component;
- Web Connection Manager (WCM)
  Is the server of the communications with all the web clients and is located in the same machine of the web server. It dispatches messages between OMNIA functions and clients;
- Signal Group Diagram Manager (SGM)
  It manages requests of clients and messages incoming from subsystems.
- Server Web Pages (ASPX)
  These are the core of the OMNIA web UI;
- UI Command Manager (UCM)
  It manages commands from the UI;
- OMNIA Communication Frontend (OCF)
  Communication interface between OMNIA Web GUI and backend systems.

The **Web Connection Manager** handles all the TCP communications between the “web world” and standard applications. It appends a specific code to all the messages incoming from web clients; it can be used to trace the execution of required functions.

The **OMNIA Communication Frontend** has two main functions:

gets a TCP message from managers and generates the same message for each and every backend system;

gets a TCP message from subsystems and forward it to the correct manager.

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5.2.2 Selection Trees

To ease the search/selection of the objects (on the map or in any other view), OMNIA permits to group the objects into geographical areas. For large systems, areas can be further split into several districts and each district can be then divided into several local areas.

Areas, district and local areas are displayed in the Areas section of the Selection Panel (West panel). When an area is selected in the Areas tree, the object tree (in the Objects section) displays only the objects (controllers, roadside units,...) belonging to the selected area.

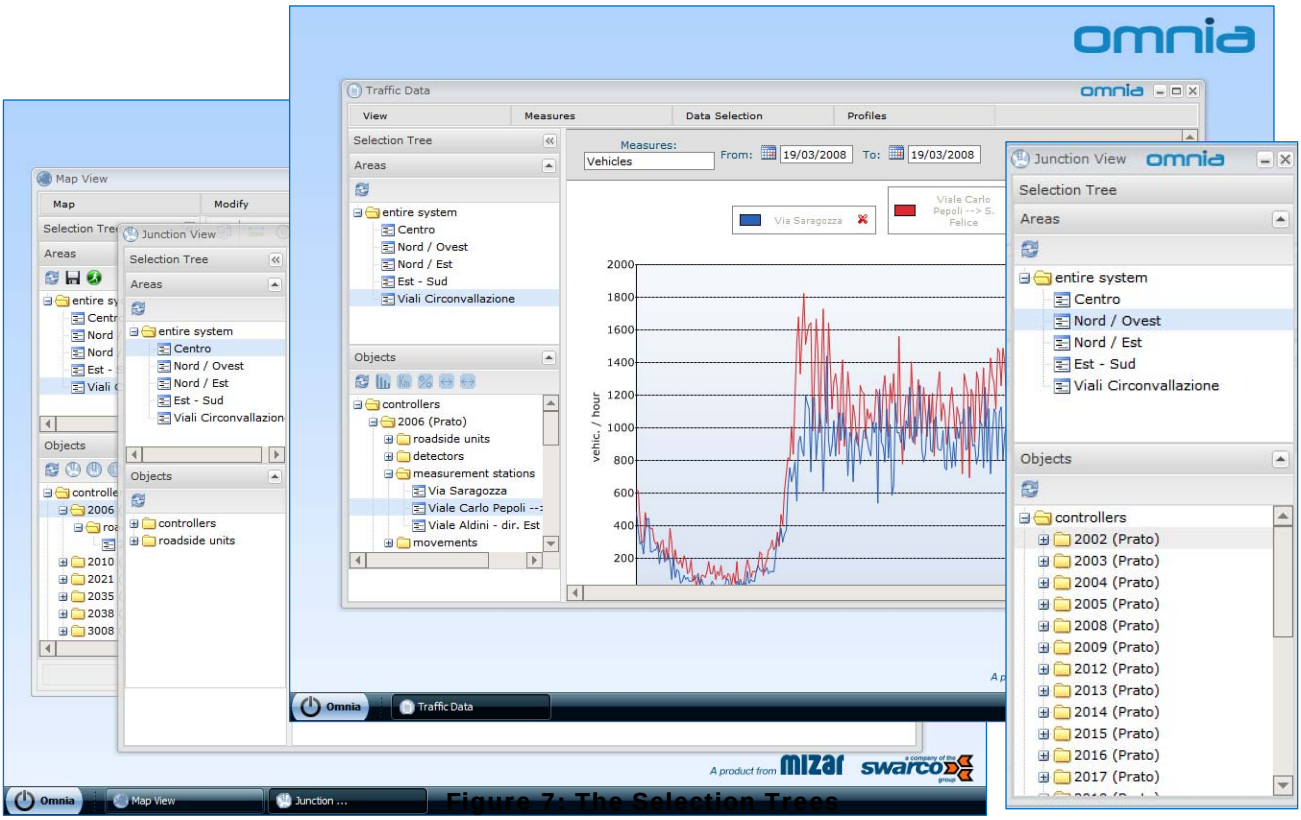

Figure 7: The Selection Trees

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5.2.3 MAP View

The MAP View presents the controlled network on a cartographic view and is designed to aid the Central System Operator in the following fundamental activities:

- controlled network monitoring
- interaction with the Local (intersection) Level
- direct/easy access to traffic and diagnostic archives

CONTROLLED NETWORK MONITORING

The monitoring function is the most important function made available by the MAP View. The module presents on the graphical interface the operative status of the controlled network:

- diagnostic (availability) status of the most important components (Roadside Units, Traffic Light Controller, measurement detectors, …)
- level of service (performance) of the most important traffic data (intersection degree of saturation, signal plan, traffic volumes, …)

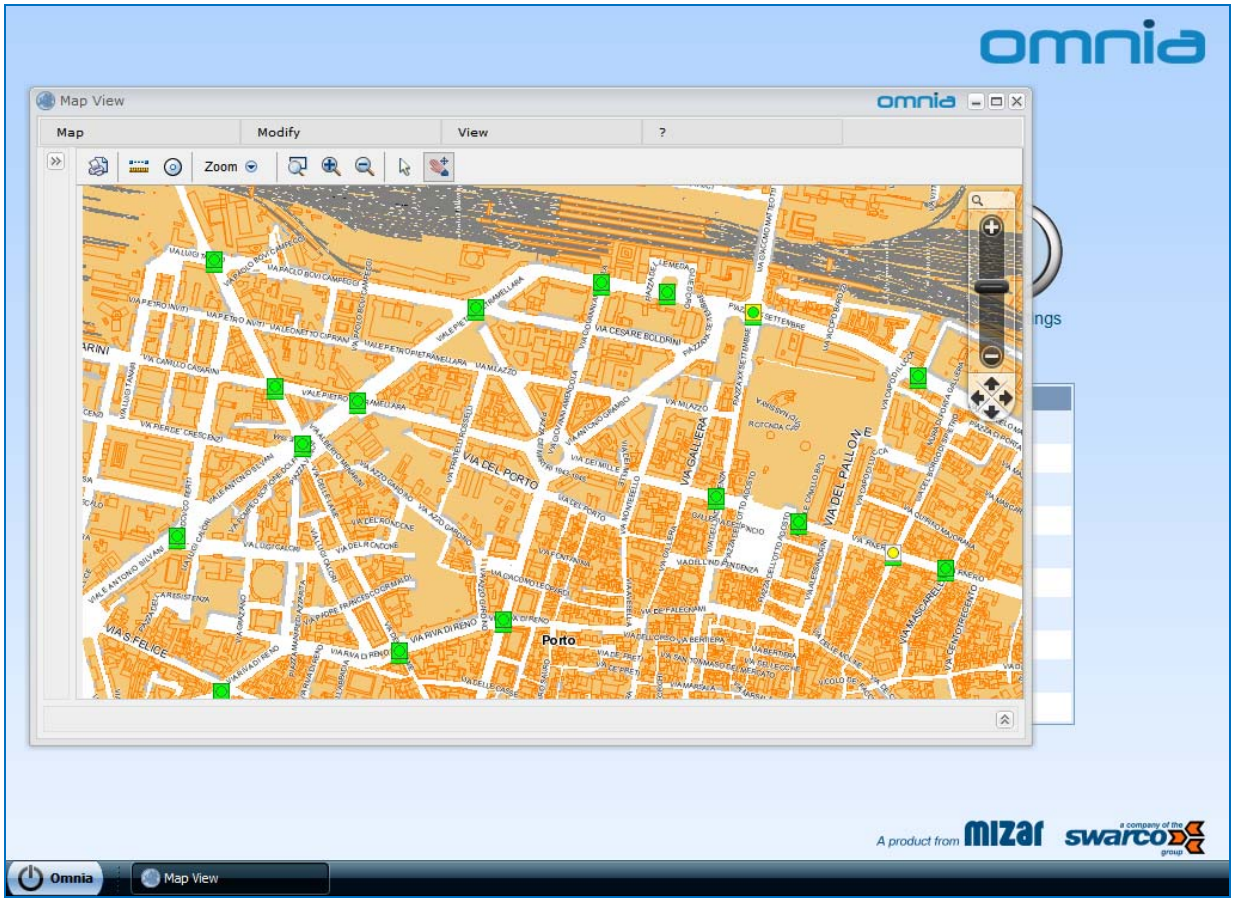

Figure 8: Map View

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Diagnostic data are presented using configurable symbols. The default configuration is shown in the following tables.

Traffic Light Controller – Status	
	Power Up (transient Status) or No Info
	Up (Working Properly)
	Partial Flashing
	Flashing
	All Red
	Dark
	Failure Mode (dark)
	Failure Mode (flash)

Traffic Light Controllers - Op. Mode	
	Coordinated Mode or Controlled – Centralised Mode
	Isolated Mode
	Linked Mode
	Manual Control
	Forced Mode (Controlled - Centralised Mode Inhibited)
	No Info or Controlled – Local Mode

Table 1: Traffic Light Controller Status – Op. Mode

Roadside Units - Status	
	Up
	Initializing (Waiting for configuration)
	Down
	No Info

Table 2: Roadside Units Status

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The interface is provided with filters that permits to enable/disable the display on the Map View of the following icons: controllers, controller status, controllers op. mode and Roadside Units

Traffic data are presented directly on the roads using a colour scale (different colours are used to display different values of the represented traffic measure).

INTERACTION WITH THE MAP

The Map View provides several methods for zooming in and out, and for zooming in on a selected region on the map.

It is also possible to move the Map across the screen (pan) simply clicking on any part of the map and then, holding down the left mouse button, drag the area to the desired location. When the mouse button is released, the map is redisplayed in the new location

Selecting an area, district, local area from the Areas section of the Selection Panel (East Panel), the map can be zoomed on the view that displays the selected area on the map. Map views can be stored/loaded and then displayed directly using the buttons available in the Area section of the selection panel or the link in the Map menu.

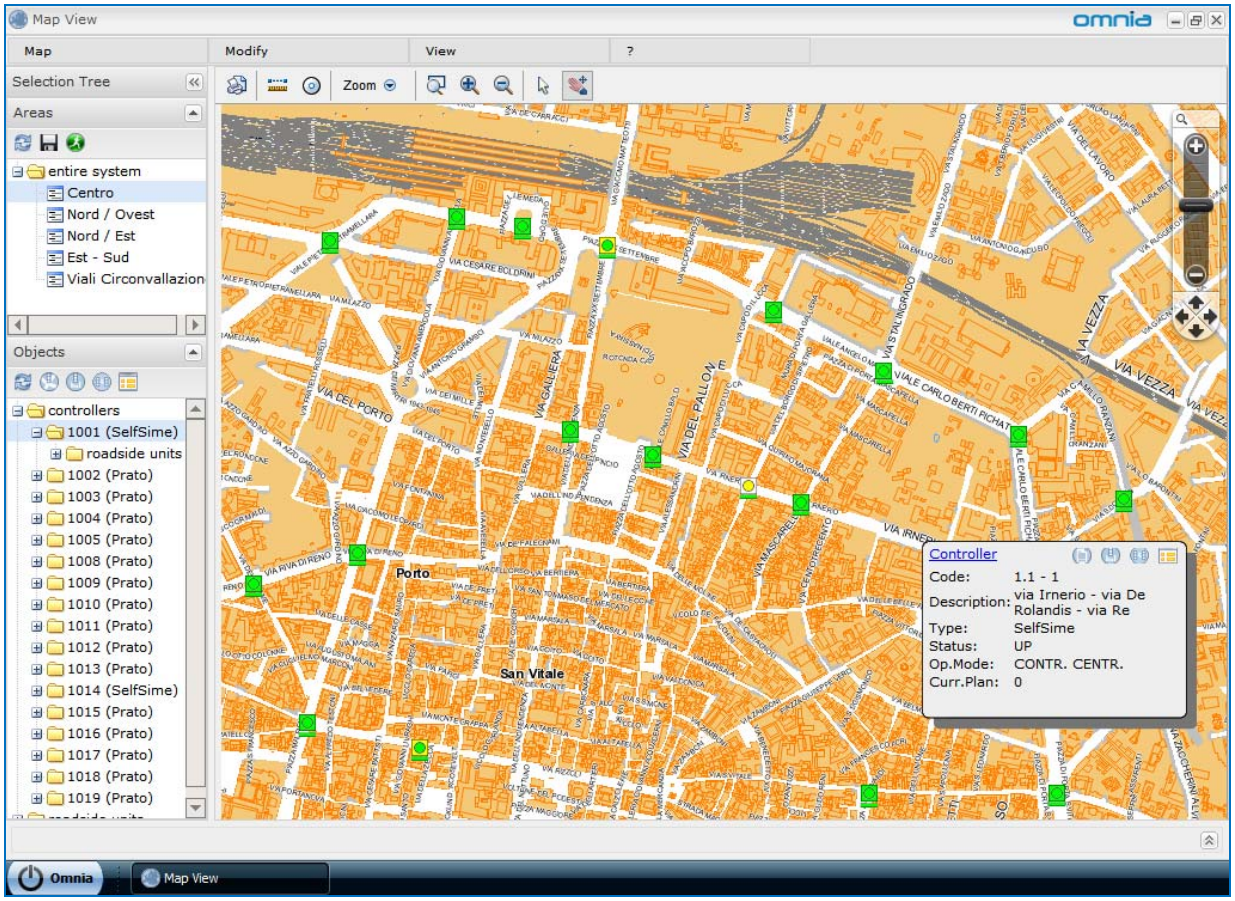

Figure 9: Map View – Objects Selection

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Selecting a Controller / Roadside Unit from the Object section of the Selection Panel (East Panel) the user can:

- zoom on the selected object
- start a different view / function on the selected object (i.e. Intersection View, Signal Group Diagram, Status Reports)
- start the User Commands Panel on the selected object.

Pointing a controlled object icon on the map, a description panel appears, listing the object identifier(s) and the current status.

INTERACTION WITH THE LOCAL (INTERSECTION) LEVEL

The MAP View permits the interaction (User Commands) of the Central System Operator with the Roadside Units and the Traffic Light Controllers operating at the Local (intersection) Level.

The interaction function is enabled only for those users that have assigned the proper rights and permits the following operations:

- send commands and configurations to Roadside (SPOT) Unit
- send signal plans and signal plans activation commands

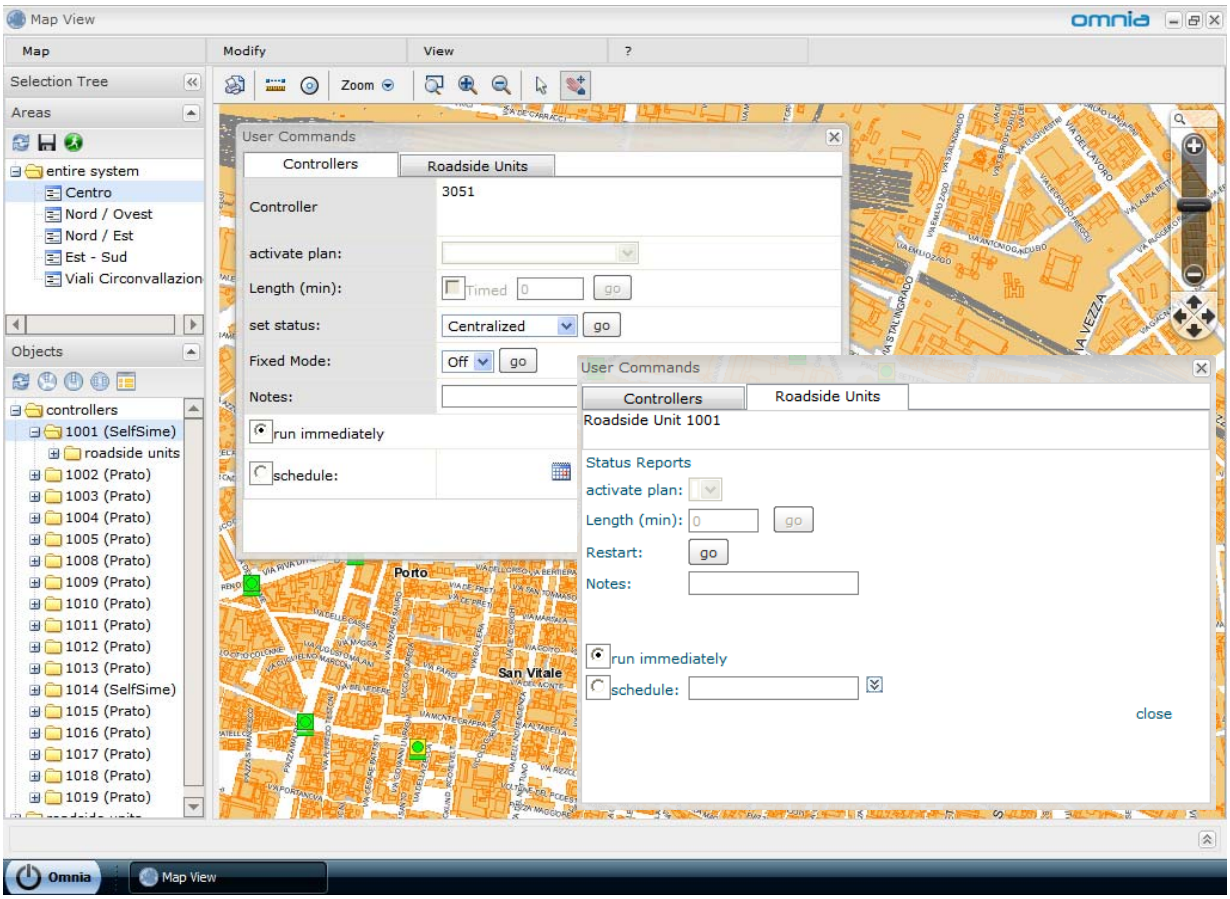

Figure 10: Map View – User Commands

DIRECT/EASY ACCESS TO TRAFFIC AND DIAGNOSTIC ARCHIVES

The access to historical archive is made by the direct selection of the related object on the map or on the selection tree. Data can be presented using charts or tables. For more details see 5.2.7 (Status Reports) and 5.2.8 (TRAFFIC DATA Presentation)

MAP VIEW CONFIGURATION TOOLS

The interface provides also the tools for its configuration. These tools (enabled only for the users provided with the proper rights) permits the views configuration (storage, initial view settings, views configurations,…).

EVENT TABLE

The following figure shows the event table.

The event table is accessible directly in the Event Table Panel (South Panel) of the MAP View and displays the real-time diagnostic / control events of the OMNIA system.

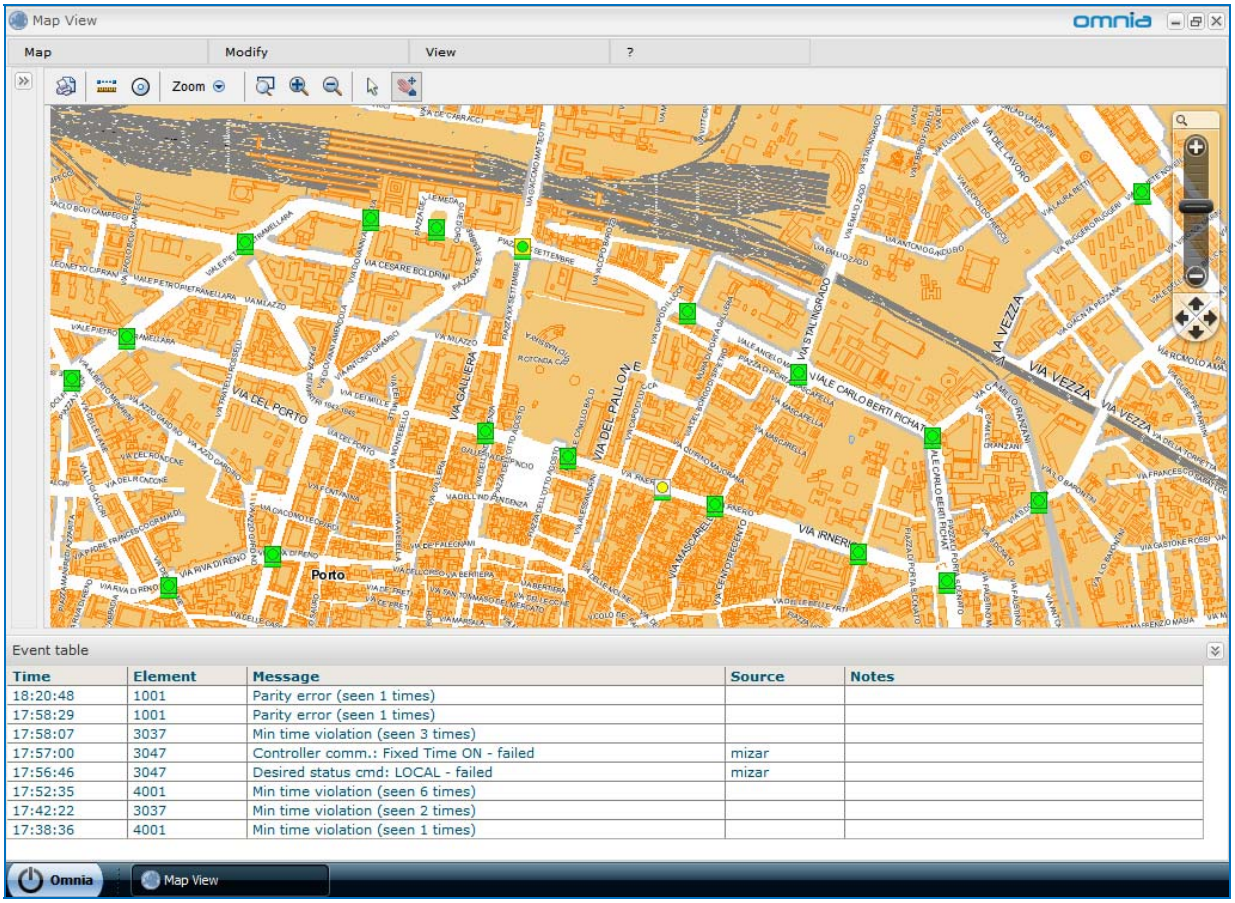

Figure 11: Map View – Event Table

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5.2.4 INTERSECTION VIEW

By selecting an Intersection already configured from the list of the intersections, the Intersection View starts a graphical view that presents diagnostic and traffic data on the intersection map.

The view is organised in three different areas:

- Intersection Map
- Object Panel (object tree and group status diagram)
- Events Table

Object Panel is displayed in the East Panel. The Events Table is accessible in the Event Table Panel (South Panel).

Several intersections can be displayed simultaneously (each intersection displayed in an independent window).

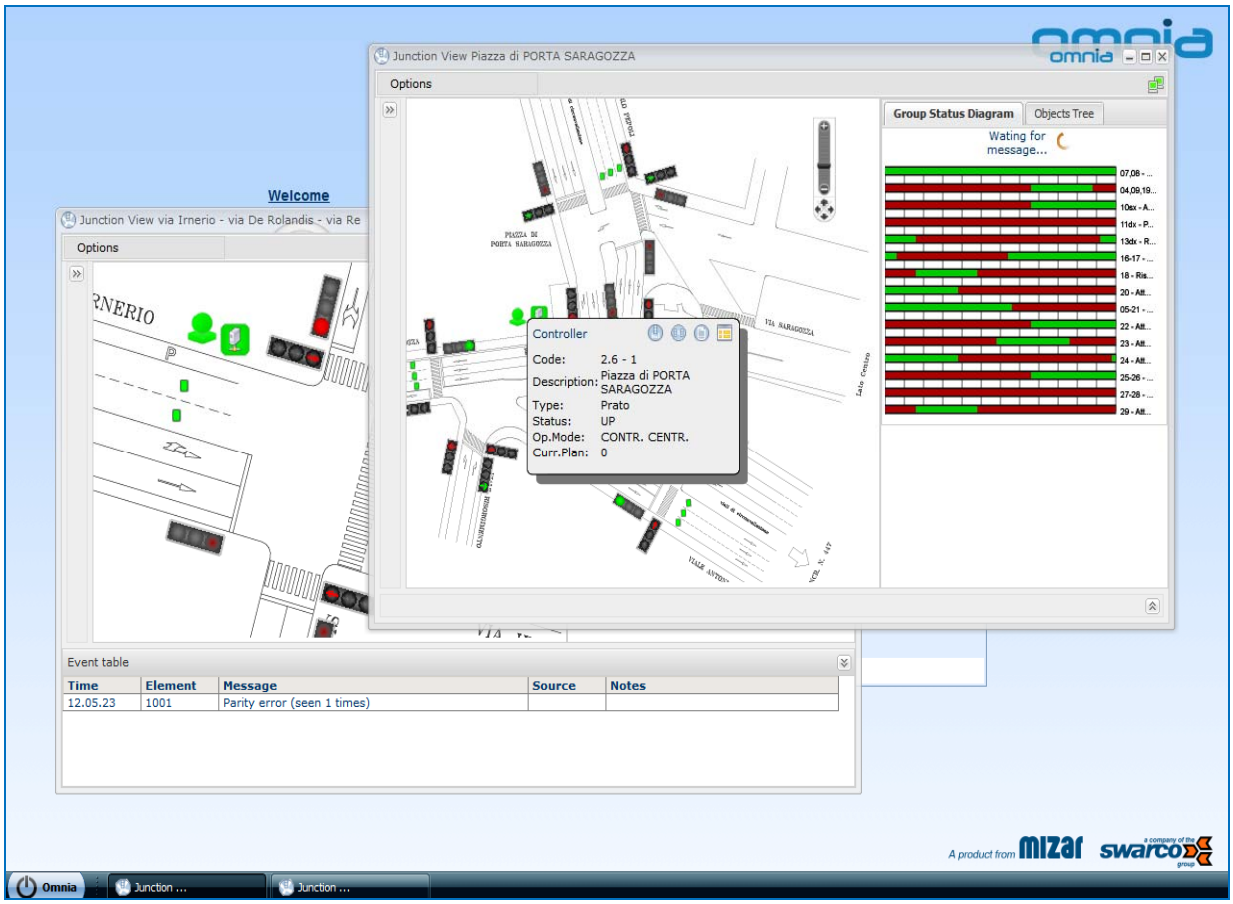

Figure 12: Intersection View

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The Junction View is designed to aid the Central System Operator in the following fundamental activities:

- controlled intersection detailed monitoring
- interaction with the Local (intersection) Level
- direct/easy access to traffic and diagnostic archives

CONTROLLED INTERSECTION MONITORING

The monitoring function presents on the graphical interface the operative status of the controlled intersection:

- Signal heads (showing either the signal group commands or their feedbacks)
- Diagnostic status of the monitored components

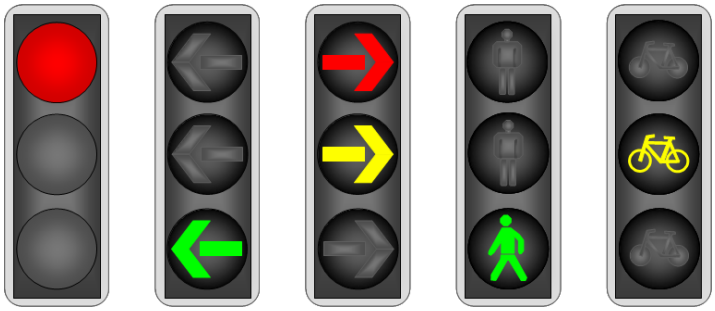
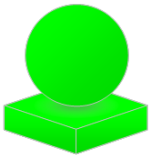


Figure 13: Intersection View – Signal head icons.

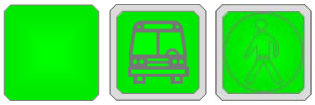
Represented monitored components are:

- Roadside (SPOT) Unit

- Traffic Light Controller (Controller status – Op. Mode)



- Detectors (private traffic, PT, pedestrian buttons)



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INTERACTION WITH THE MAP

The Intersection View provides zooming in and out functionalities directly on the zoom bar.

Pointing a controlled object icon on the map, a description panel appears, listing the object identifier(s) and the current status.

Intersection View can be started directly from the Selection Panel (East Panel) selecting the Controller / Roadside Unit to be displayed.

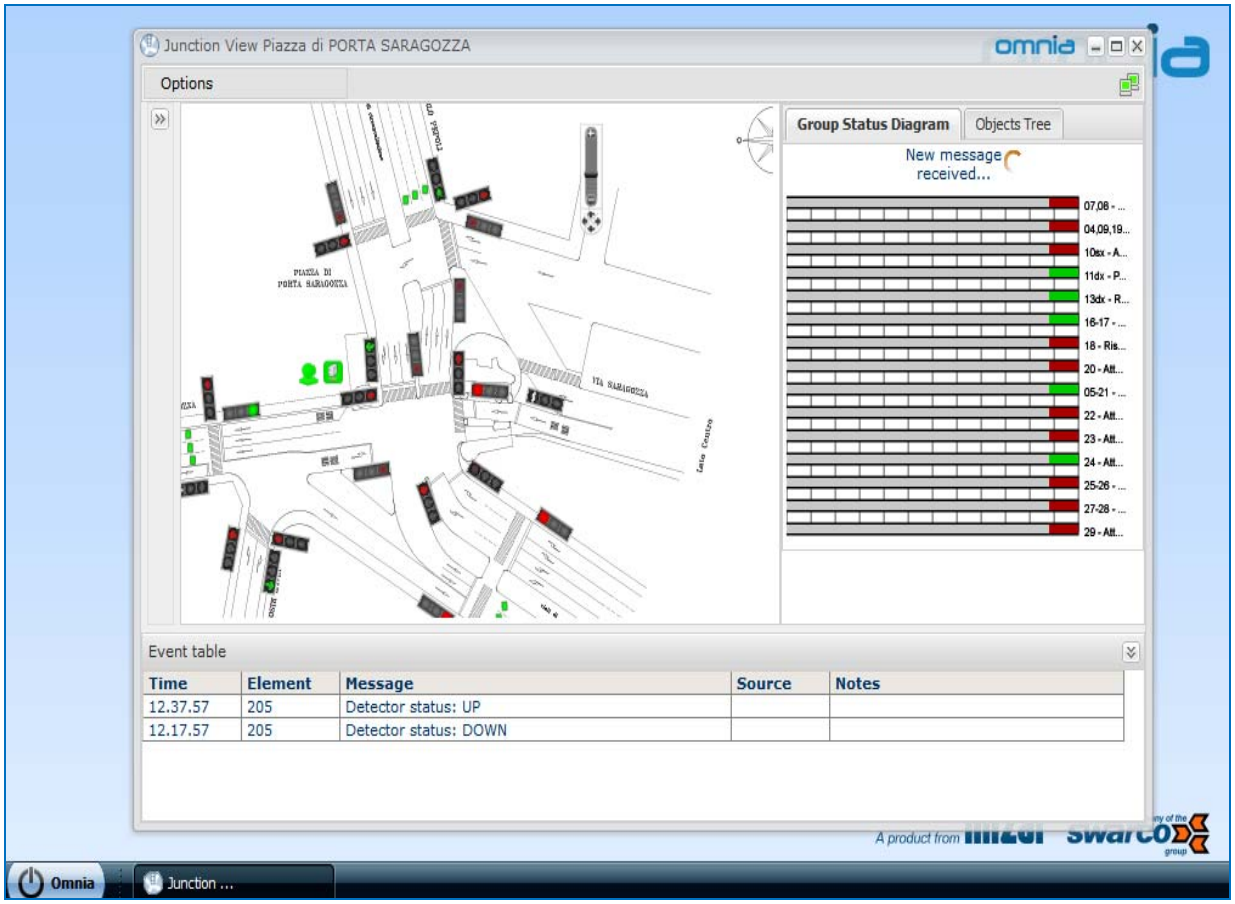

Figure 14: Intersection View – Object Panel and Group Status Diagram

GROUP STATUS DIAGRAM

The Group Status Diagram shows the real-time status of the intersection signals.

The Group Status Diagram displayed in the Object Panel shows a “quick summary” of the intersection signal groups status. The detailed version of the Signal Group Diagram is available in the specialised view.

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EVENT TABLE

Figure 14 shows the event table, accessible directly in the Event Table Panel (South Panel) of the Junction View.

The Event Table displays the real-time diagnostic / control events of the OMNIA system.

INTERACTION WITH THE LOCAL (INTERSECTION) LEVEL

The Junction View permits the interaction (User Commands) of the Central System Operator with the Roadside Units and the Traffic Light Controllers operating at the Local (intersection) Level.

The interaction function is enabled only for those users that have assigned the proper rights and permits the following operations:

- send commands and configurations to Roadside (SPOT) Unit
- send signal plans and signal plans activation commands

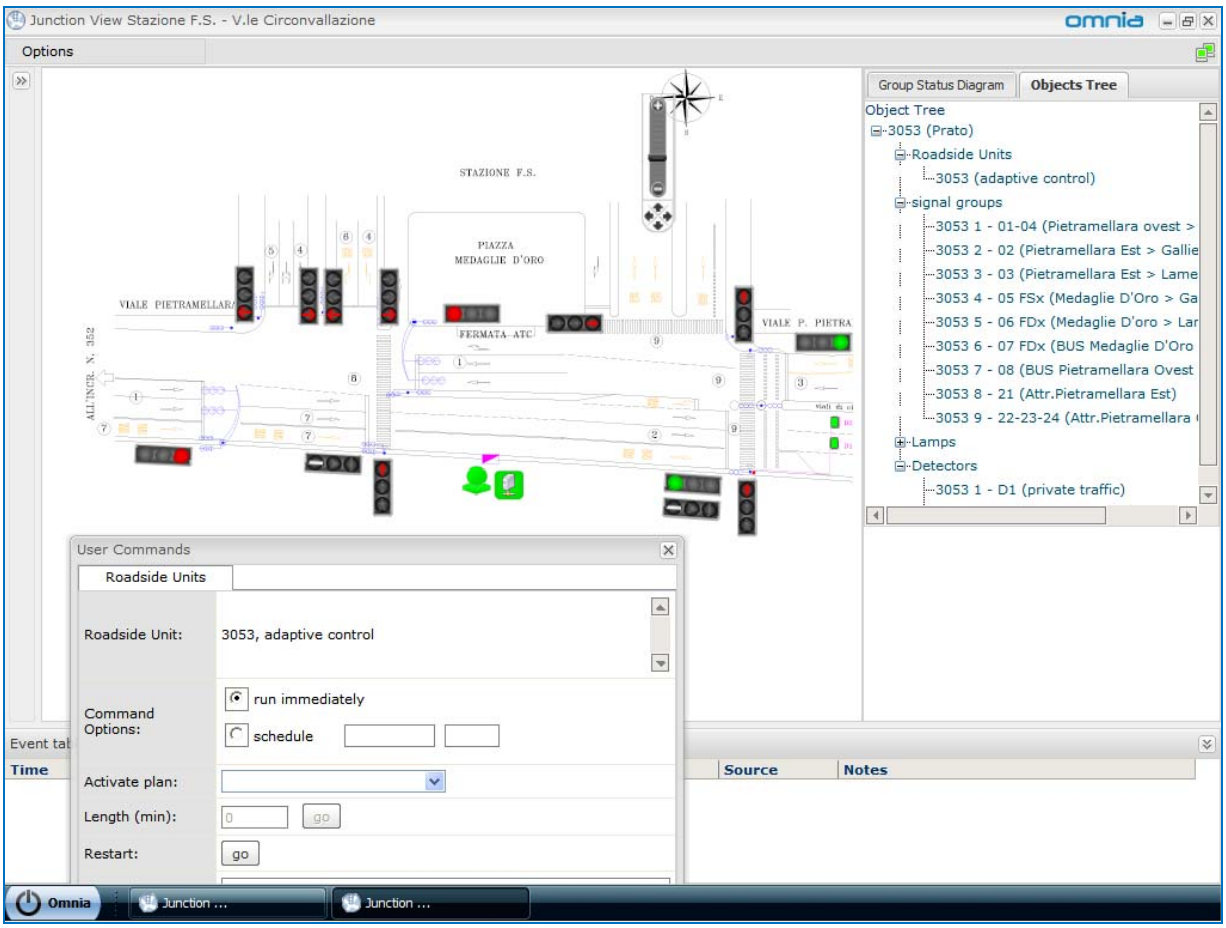

Figure 15: Junction View – Object Tree and User Commands

5.2.5 Signal Group Diagram

The Signal Group Diagram shows the status of selected signal groups and selected detectors in a time period.

It can be used both in real-time or off-line to represent current statuses for some elements (signal groups and/or detectors) or recorded information stored in the database.

A simplified (non configurable) version of the same diagram is available in the Intersection View.

The Signal Group Diagram has the following characteristics:

- can be updated in real time or on-event depending on the system configuration
- Data represented are also recorded in the system database for later view

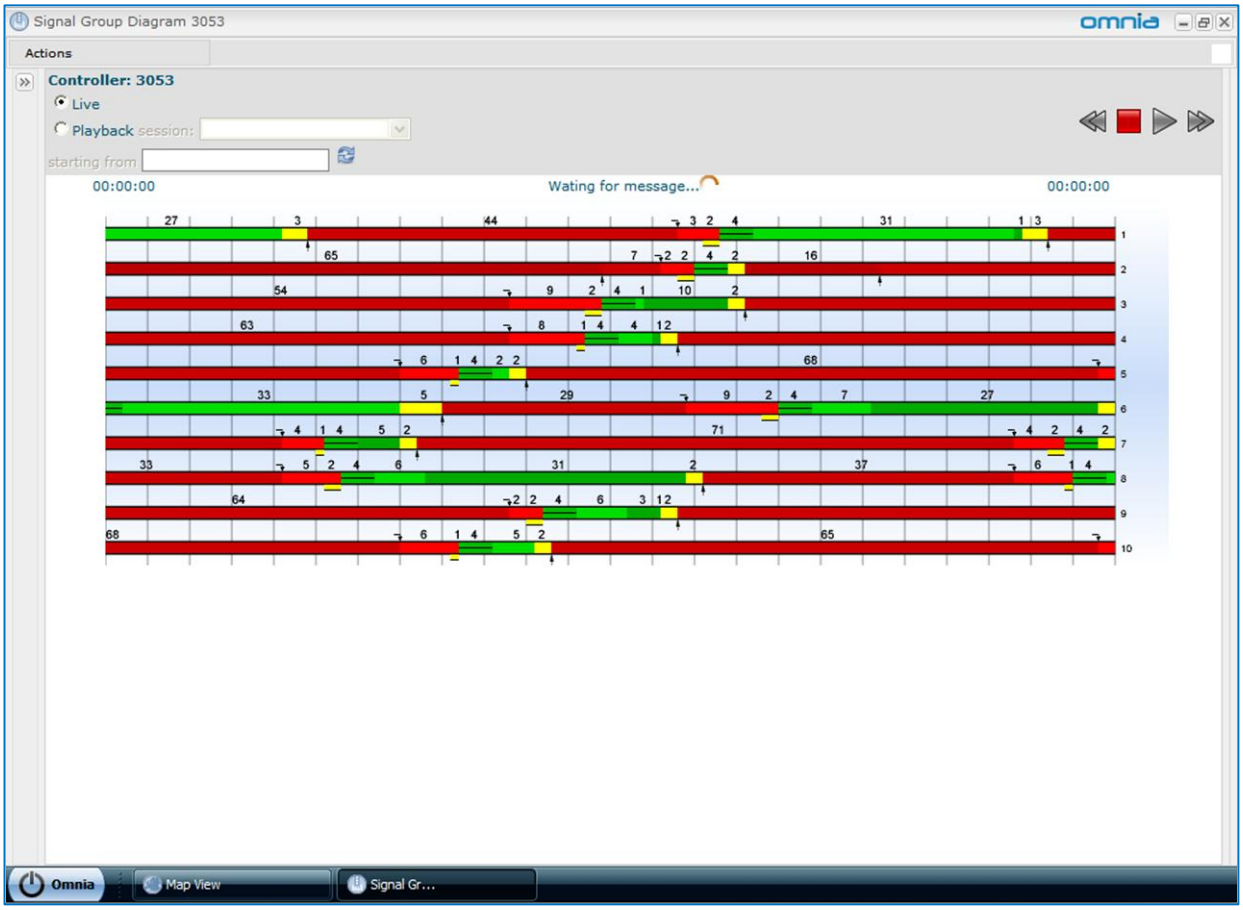

Figure 16: Signal Group Diagram – Feedbacks

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Where the Signal Group Diagram is updated in real-time, displayed timings are refreshed every 1 second.

Where the Signal Group Diagram is updated on-event, displayed timings are refreshed every time a new status is received from the roadside equipment.

In both cases, the overall delay with respect to the real signal depends on the communication network layout and is in general less than 3 seconds.

Signal Groups - Status			
	Red-yellow		Minimum red & red clearence Starts with an vertical line
	Minimum green		Rest red
	Rest green		Red with request
	Green extension		Red with prior
	Past-end-green Starts with an arrow		Red (privilege)
	Flashing green		Red (stopping conflict groups) Starts with an arrow.
	Yellow		Start/Stop interval

Table 3: Signal Groups status

Depending on the roadside level equipments characteristics, the Signal Group Diagram is normally used to display the signal groups feedbacks provided directly by the traffic light controller.

For traffic light controllers that are not able to provide signal groups feedbacks, the Signal Group Diagram can be used to display the signal groups commands issued by the roadside unit controlling the traffic light controller (if any).

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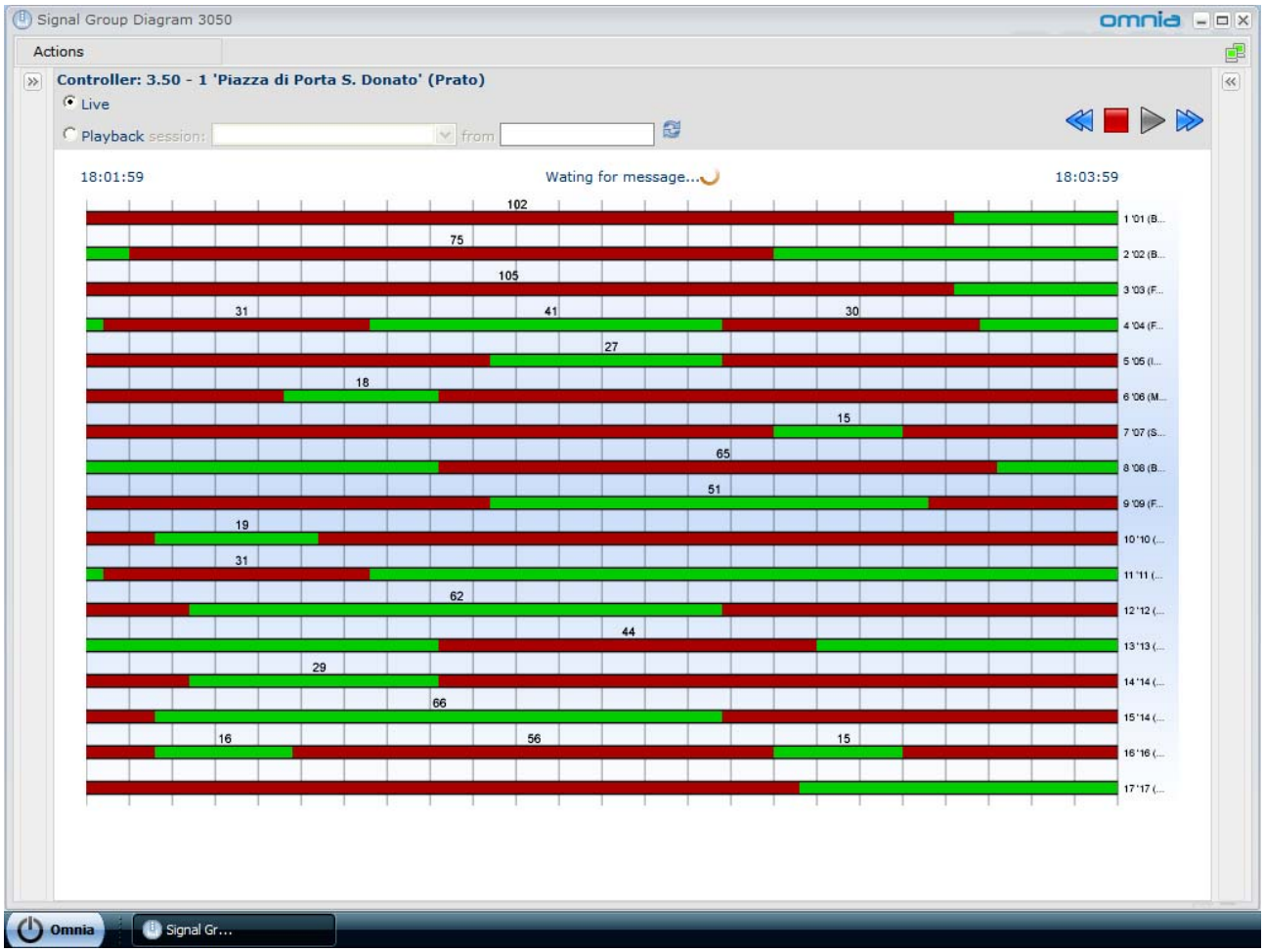

Figure 17: Signal Group Diagram – Commands

At the start-up, the diagram automatically displays the default configuration (all the signal groups displayed simultaneously).

The full diagram has the following specific functions:

- possibility to configure the group diagram for information shown (which group and detector and which order)
- possibility to save diagram configuration (selected groups, selected detector, order) for each controller
- possibility to start / stop / rewind / forward the displayed view in any moment
- recorded data presented at once (from a start time to an end time)
- data export / print functions are available

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Configuration options are available in the Configuration Panel (East Panel)

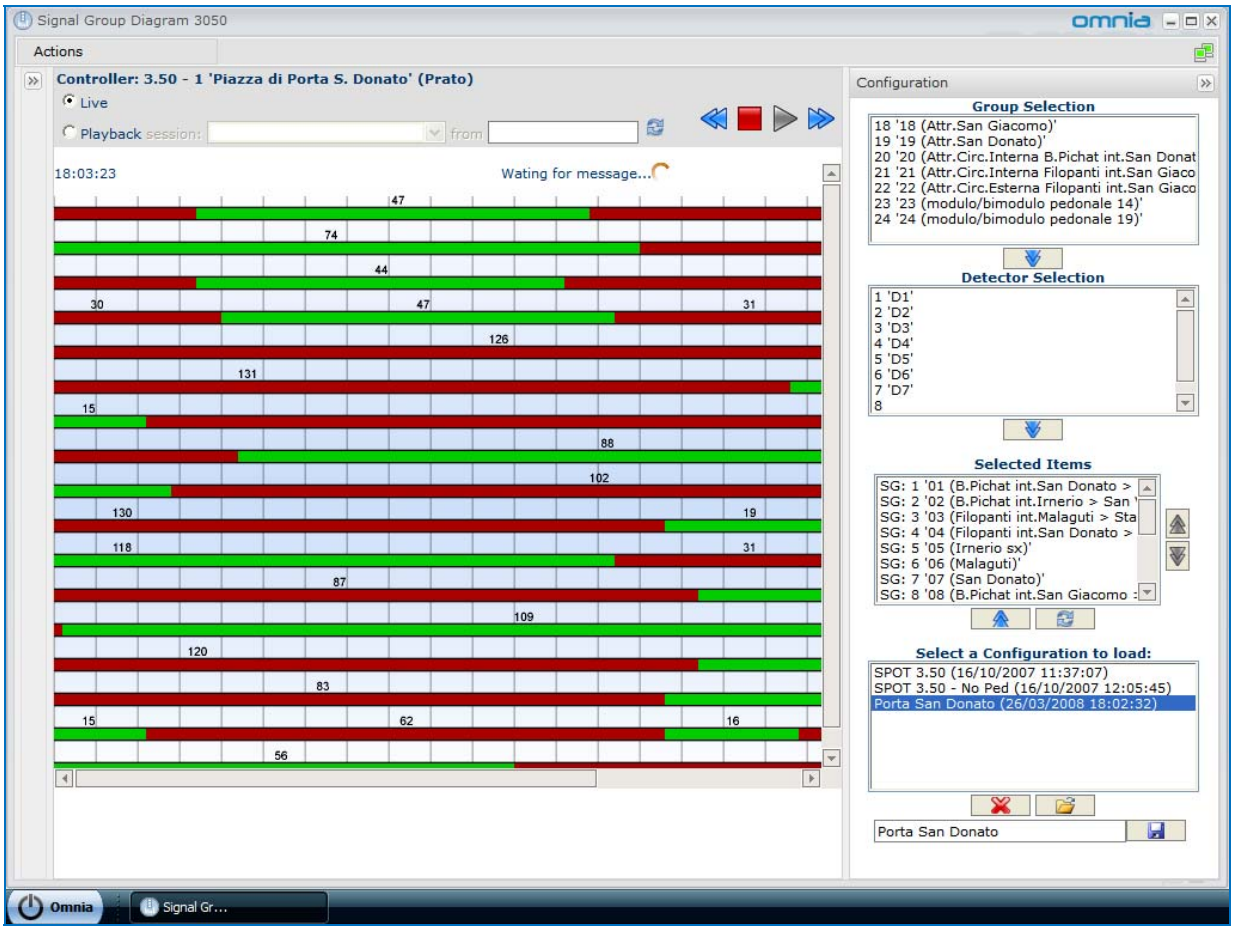

Figure 18: Signal Group Diagram – Configuration

When a monitoring session is open, all signal groups data are always saved automatically in the database for later viewing.

In addition, a scheduling function is provided where users can set a recording session on a controller giving a start and an end time.

Scheduler function is accessible from the “Actions” menu.

Scheduler configuration facilities are available in the Configuration Panel (East Panel).

The selection of the controller for which a new task must be scheduled, can be performed using the selection trees available in the Selection Panel (West Panel).

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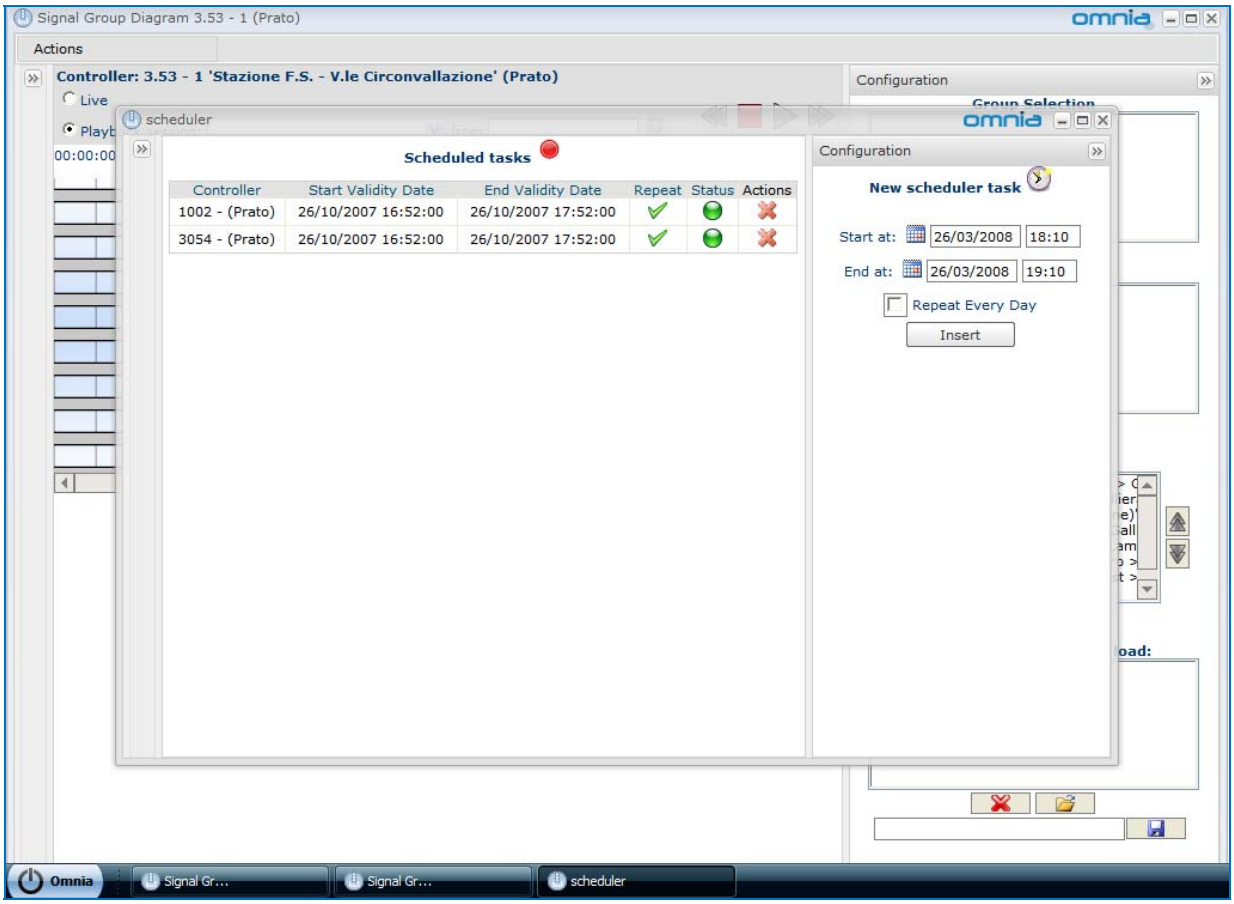

Figure 19: Signal Group Diagram – Scheduler

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5.2.6 Time-Space Diagram

The Time-Space diagram is a tool which allows users to display simultaneously signal changes in several controllers. Each controller sends status messages from one (or more) signal groups consisting of changes between red and green. (Red/amber and amber are considered as cases of red.)

Users can select how many controllers they want to include in the diagram and then which groups have to be displayed for each and every controller. Users can also configure the distance between all included controllers and the traffic speed.

After the configuration has been completed OMNIA reads needed data from the database for all involved controllers and then displays them on the diagram.

On the diagram there are also a number of lines superimposed over the signal groups that shows the speed. These lines shows the movement of the vehicles according to the configured distances and the speeds and are useful to verify the co-ordination between adjacent controllers.

Co-ordination on bi-directional carriageways can be displayed on a unique diagram using different set of speed lines in different directions.

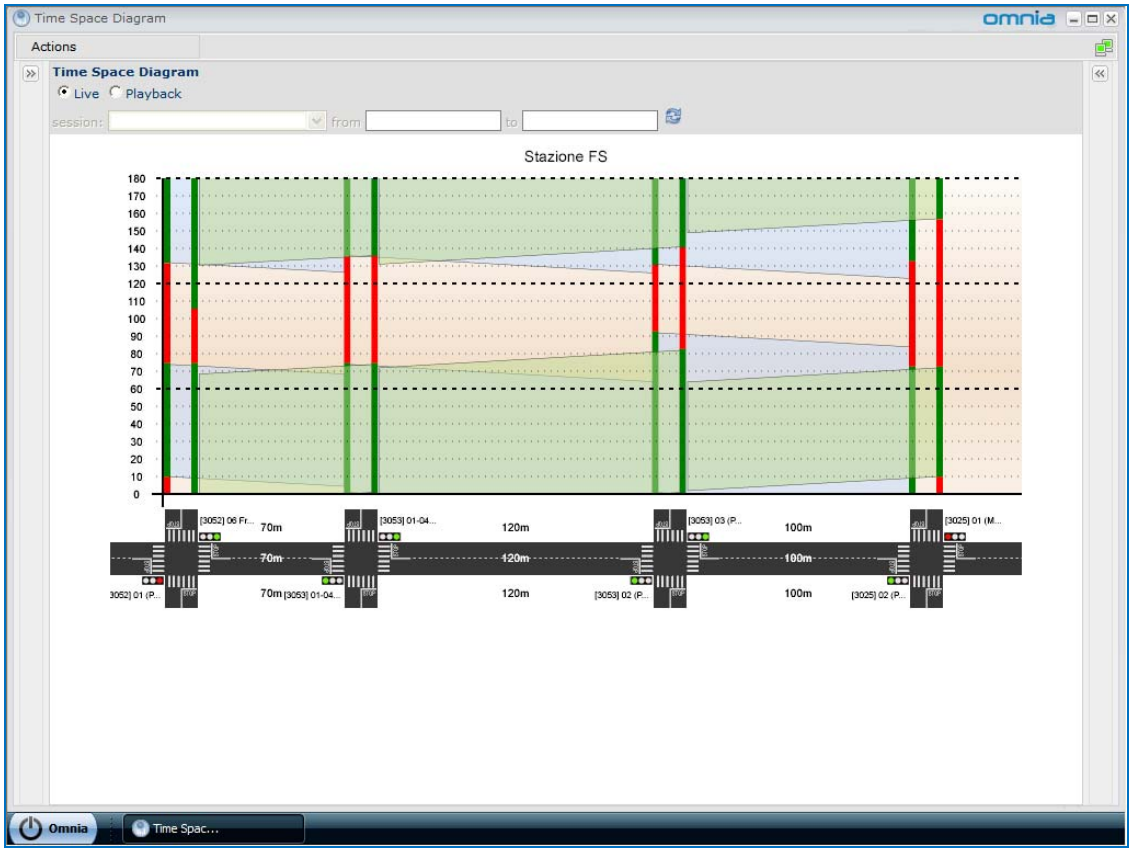

Figure 20: Time Space Diagram (on-line)

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The Signal Group status is updated in real time and data represented are also recorded in the system database for later view

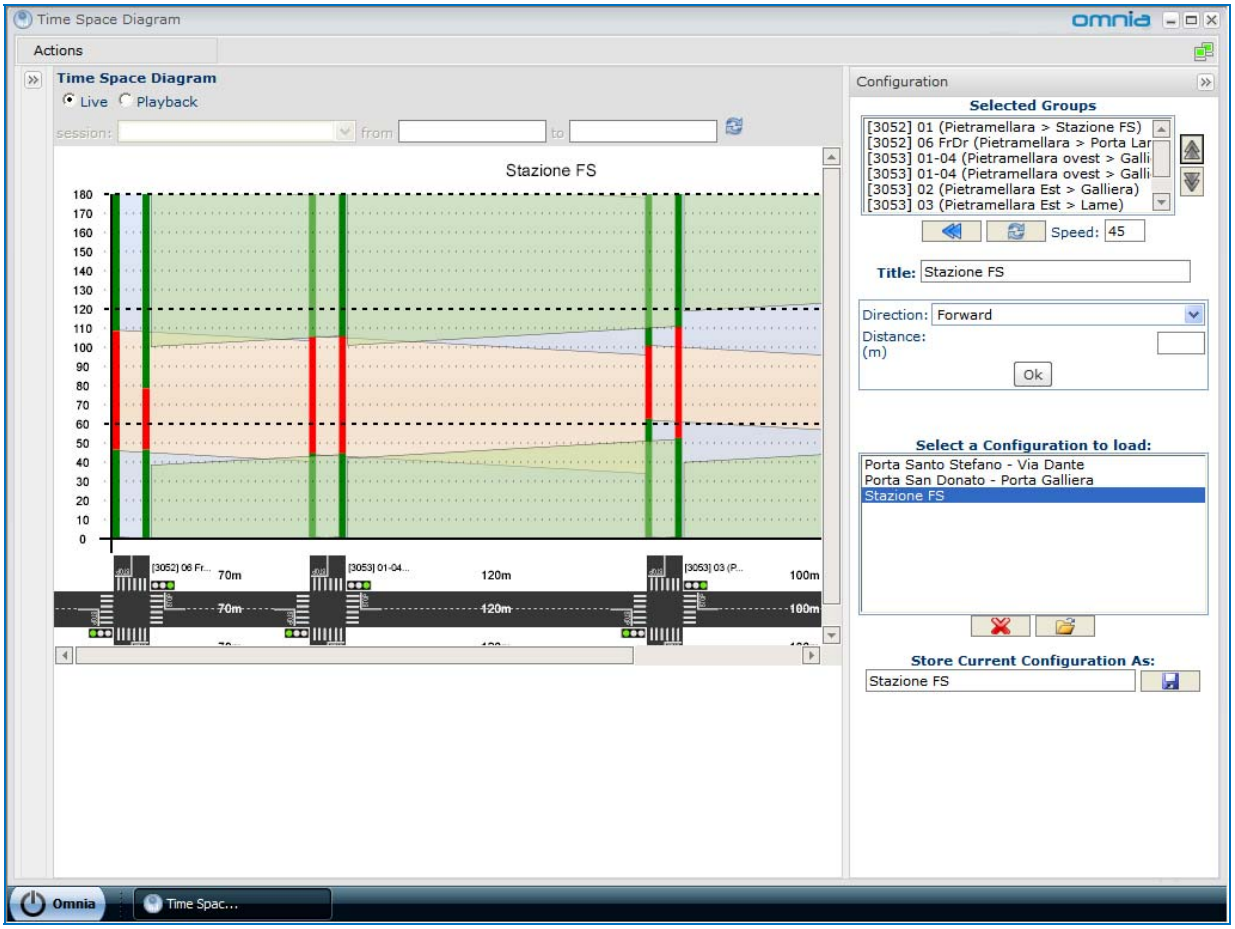

Figure 21: Time Space Diagram - configuration

At the start-up, the diagram automatically displays the Configuration Panel (East Panel), where it is possible to select a configuration to load or to prepare a new configuration.

The time space diagram has the following specific functions:

- possibility to configure the time space diagram for information shown (which group and controller and which order)
- possibility to save diagram configuration (selected groups, selected controllers, order, speed and distance) for each time space diagram
- recorded data presented at once (from a start time to an end time)
- data export / print functions are available

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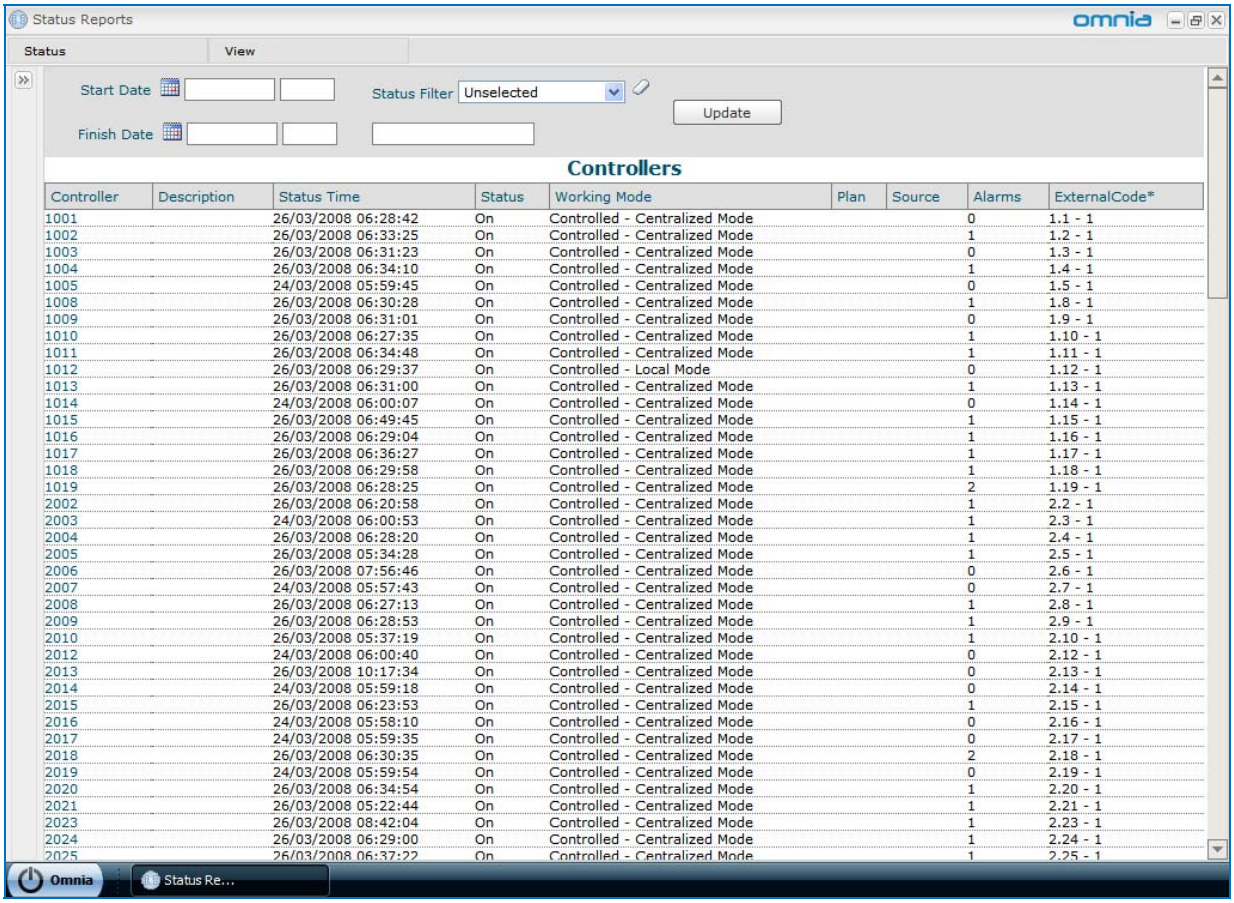
5.2.7 Status Reports

The Status Reports is the interface provided to access the diagnostic archive of OMNIA.

Current status and archive status reports are available for Roadside Units, Controllers, detectors and other devices (like VMS).

Reports can be filtered setting the time period (start and finish date) and the status value.



Controller	Description	Status Time	Status	Working Mode	Plan	Source	Alarms	ExternalCode*
1001		26/03/2008 06:28:42	On	Controlled - Centralized Mode			0	1.1 - 1
1002		26/03/2008 06:33:25	On	Controlled - Centralized Mode			1	1.2 - 1
1003		26/03/2008 06:31:23	On	Controlled - Centralized Mode			0	1.3 - 1
1004		26/03/2008 06:34:10	On	Controlled - Centralized Mode			1	1.4 - 1
1005		24/03/2008 05:59:45	On	Controlled - Centralized Mode			0	1.5 - 1
1008		26/03/2008 06:30:28	On	Controlled - Centralized Mode			1	1.8 - 1
1009		26/03/2008 06:31:01	On	Controlled - Centralized Mode			0	1.9 - 1
1010		26/03/2008 06:27:35	On	Controlled - Centralized Mode			1	1.10 - 1
1011		26/03/2008 06:34:48	On	Controlled - Centralized Mode			1	1.11 - 1
1012		26/03/2008 06:29:37	On	Controlled - Local Mode			0	1.12 - 1
1013		26/03/2008 06:31:00	On	Controlled - Centralized Mode			1	1.13 - 1
1014		24/03/2008 06:00:07	On	Controlled - Centralized Mode			0	1.14 - 1
1015		26/03/2008 06:49:45	On	Controlled - Centralized Mode			1	1.15 - 1
1016		26/03/2008 06:29:04	On	Controlled - Centralized Mode			1	1.16 - 1
1017		26/03/2008 06:36:27	On	Controlled - Centralized Mode			1	1.17 - 1
1018		26/03/2008 06:29:58	On	Controlled - Centralized Mode			1	1.18 - 1
1019		26/03/2008 06:28:25	On	Controlled - Centralized Mode			2	1.19 - 1
2002		26/03/2008 06:20:58	On	Controlled - Centralized Mode			1	2.2 - 1
2003		24/03/2008 06:00:53	On	Controlled - Centralized Mode			1	2.3 - 1
2004		26/03/2008 06:28:20	On	Controlled - Centralized Mode			1	2.4 - 1
2005		26/03/2008 05:34:28	On	Controlled - Centralized Mode			1	2.5 - 1
2006		26/03/2008 07:56:46	On	Controlled - Centralized Mode			0	2.6 - 1
2007		24/03/2008 05:57:43	On	Controlled - Centralized Mode			0	2.7 - 1
2008		26/03/2008 06:27:13	On	Controlled - Centralized Mode			1	2.8 - 1
2009		26/03/2008 06:28:53	On	Controlled - Centralized Mode			1	2.9 - 1
2010		26/03/2008 05:37:19	On	Controlled - Centralized Mode			1	2.10 - 1
2012		24/03/2008 06:00:40	On	Controlled - Centralized Mode			0	2.12 - 1
2013		26/03/2008 10:17:34	On	Controlled - Centralized Mode			0	2.13 - 1
2014		24/03/2008 05:59:18	On	Controlled - Centralized Mode			0	2.14 - 1
2015		26/03/2008 06:23:53	On	Controlled - Centralized Mode			1	2.15 - 1
2016		24/03/2008 05:58:10	On	Controlled - Centralized Mode			0	2.16 - 1
2017		24/03/2008 05:59:35	On	Controlled - Centralized Mode			0	2.17 - 1
2018		26/03/2008 06:30:35	On	Controlled - Centralized Mode			2	2.18 - 1
2019		24/03/2008 05:59:54	On	Controlled - Centralized Mode			0	2.19 - 1
2020		26/03/2008 06:34:54	On	Controlled - Centralized Mode			1	2.20 - 1
2021		26/03/2008 05:22:44	On	Controlled - Centralized Mode			1	2.21 - 1
2023		26/03/2008 08:42:04	On	Controlled - Centralized Mode			1	2.23 - 1
2024		26/03/2008 06:29:00	On	Controlled - Centralized Mode			1	2.24 - 1
2025		26/03/2008 06:37:22	On	Controlled - Centralized Mode			1	2.25 - 1

Figure 22: Status Reports (on-line)

The Advanced Traffic Monitoring function embedded in OMNIA makes available the status reports at least for the following objects:

- controllers
- roadside units
- detectors

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A specialised view permits also to display the list of alarms currently active in the system.

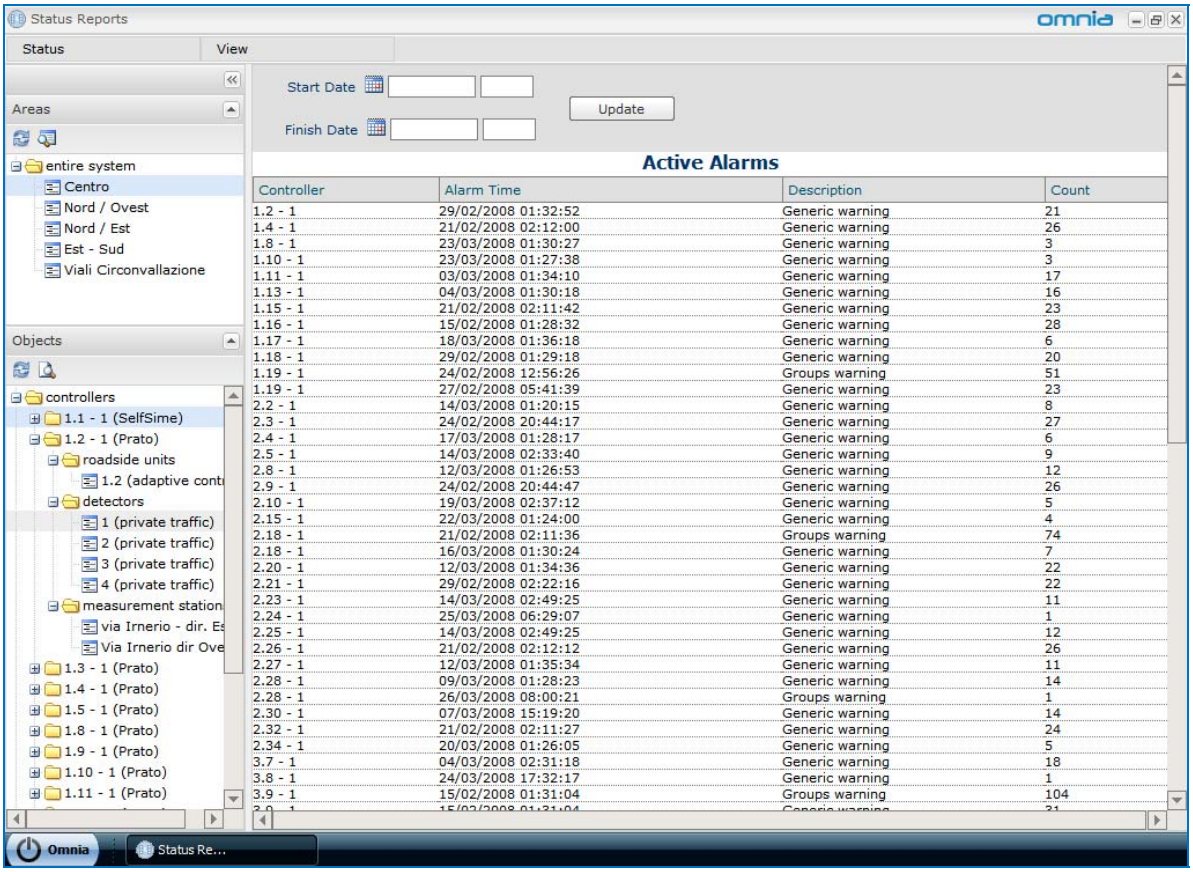

Figure 23: Active Alarms

All the status reports available for the different objects are accessible in the menu “Status” of the main window.

After a status report for a specific object has been selected, the Selection Panel (West Panel) offers quick filtering facilities that can be used to display:

- the status of the selected objects in the entire network
- the status of the selected objects in the selected area

Areas, districts and local areas can be selected in the Areas section of the Selection Panel. When an area has been selected, data can be filtered using the apply filter button. When the Area filter is applied, the view displays only the status of the selected objects belonging to the selected area and to the districts and local areas included in it (if any).

Status reports view for a specific object (Figure 25 displays the status report for a selected traffic light controller) can be also started directly from the Object section of the Selection Panel. When an object has been selected, data can be filtered using the show button. When the object filter is applied, the view displays only the status of the selected object.

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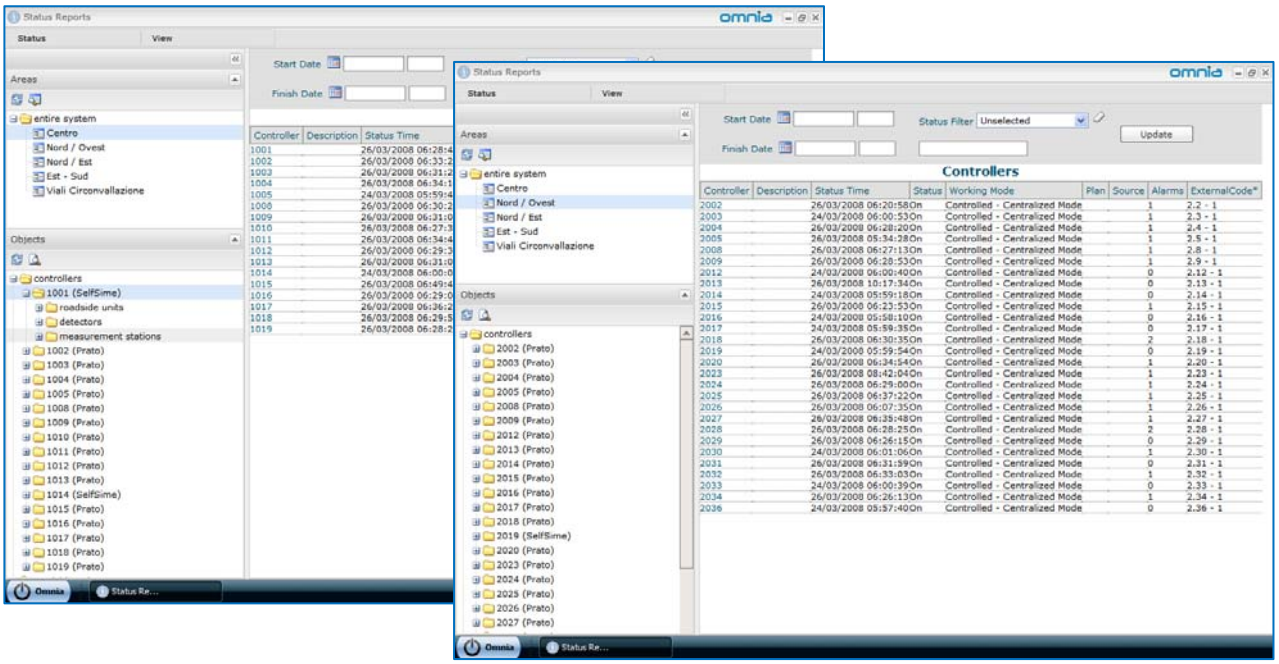

Figure 24: Status Filtered on selected Area, district, local area

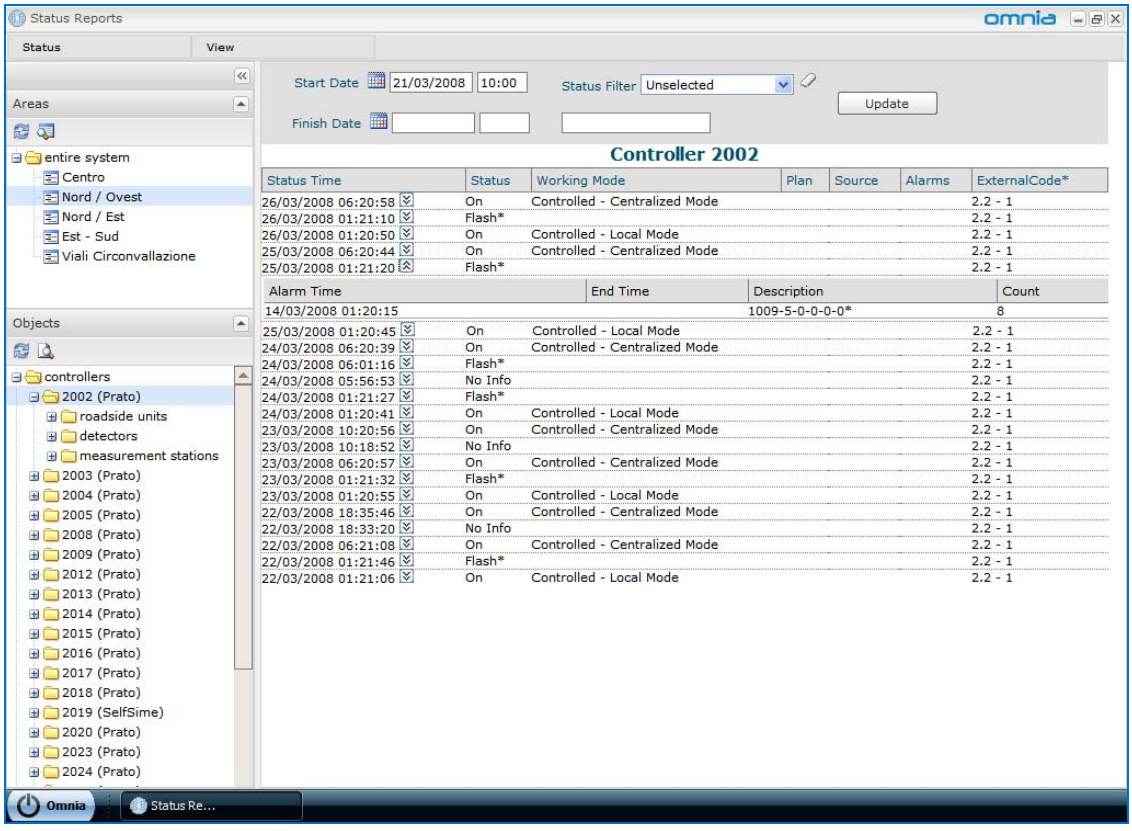

Figure 25: Status Filtered on selected Controller

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5.2.8 TRAFFIC DATA Presentation

The Traffic Data Presentation permits to display, export and print traffic measures stored in the OMNIA system archive.

Traffic Data can be presented in both table and chart view.

Displayable Traffic Data are:

- Traffic Volumes
- Speed and occupancy
- Gap, Headway and other classification data (where Automatic Vehicle Classification units are available
- Cycle time

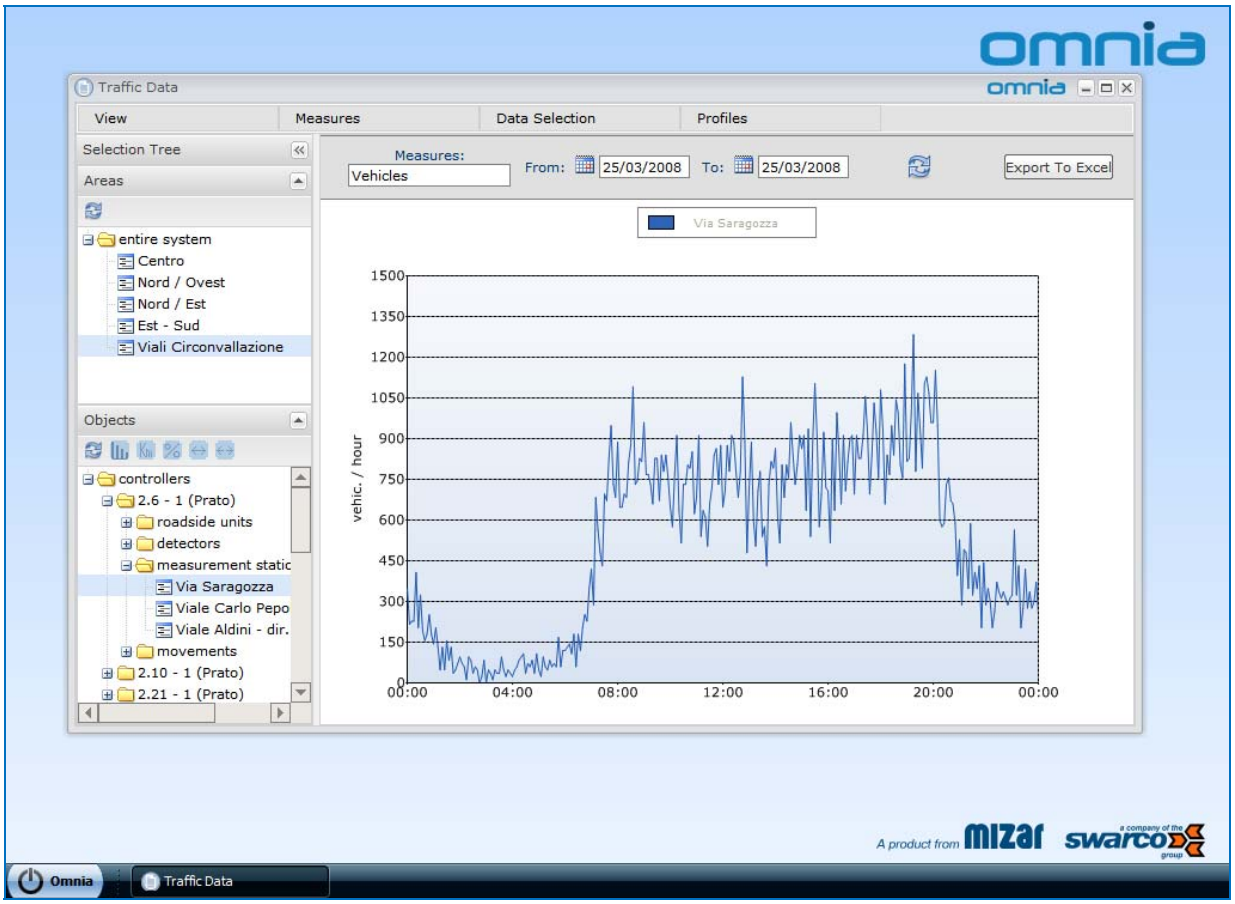

Figure 26: Traffic Data presentation – Traffic Volumes (Chart)

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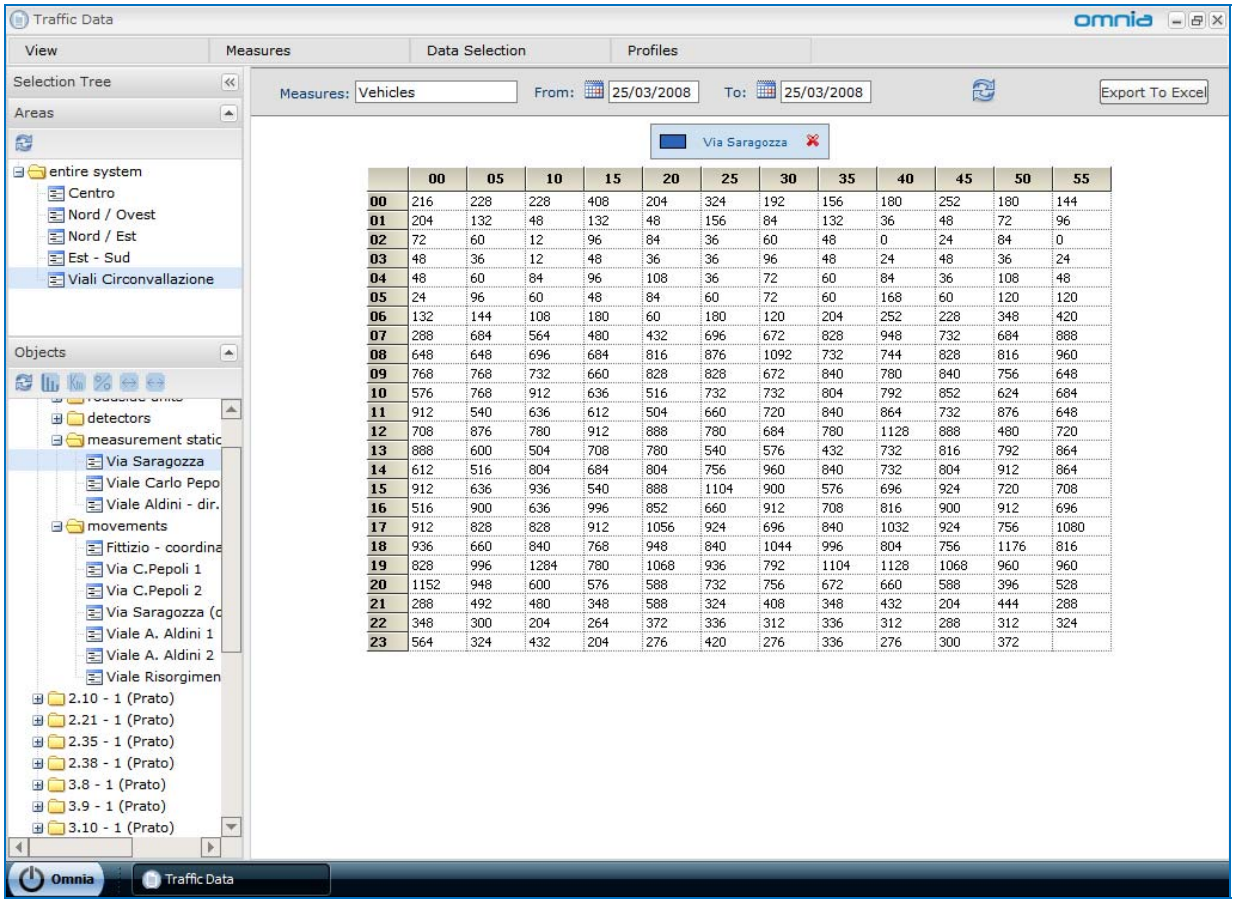

	00	05	10	15	20	25	30	35	40	45	50	55
00	216	228	228	408	204	324	192	156	180	252	180	144
01	204	132	48	132	48	156	84	132	36	48	72	96
02	72	60	12	96	84	36	60	48	0	24	84	0
03	48	36	12	48	36	36	96	48	24	48	36	24
04	48	60	84	96	108	36	72	60	84	36	108	48
05	24	96	60	48	84	60	72	60	168	60	120	120
06	132	144	108	180	60	180	120	204	252	228	348	420
07	288	684	564	480	432	696	672	828	948	732	684	888
08	648	648	696	684	816	876	1092	732	744	828	816	960
09	768	768	732	660	828	828	672	840	780	840	756	648
10	576	768	912	636	516	732	732	804	792	852	624	684
11	912	540	636	612	504	660	720	840	864	732	876	648
12	708	876	780	912	888	780	684	780	1128	888	480	720
13	888	600	504	708	780	540	576	432	732	816	792	864
14	612	516	804	684	804	756	960	840	732	804	912	864
15	912	636	936	540	888	1104	900	576	696	924	720	708
16	516	900	636	996	852	660	912	708	816	900	912	696
17	912	828	828	912	1056	924	696	840	1032	924	756	1080
18	936	660	840	768	948	840	1044	996	804	756	1176	816
19	828	996	1284	780	1068	936	792	1104	1128	1068	960	960
20	1152	948	600	576	588	732	756	672	660	588	396	528
21	288	492	480	348	588	324	408	348	432	204	444	288
22	348	300	204	264	372	336	312	336	312	288	312	324
23	564	324	432	204	276	420	276	336	276	300	372	

Figure 27: Traffic Data presentation (Table)

Where the Traffic Control function is powered by UTOPIA, The Traffic Data Presentation permits to display also estimation related to traffic model parameters like:

- Queues and Delays
- Number of stops
- Clearance Capacity
- Turning Proportions

Multiple Data display on the same chart (for comparison) is also supported. (see

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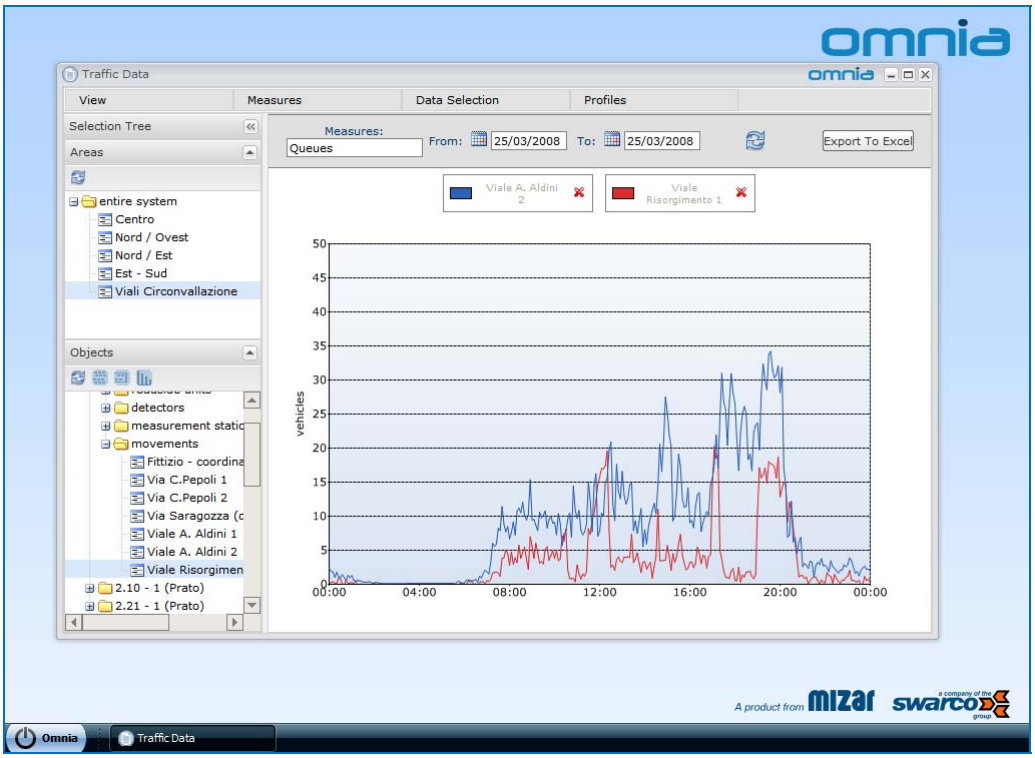

Figure 28: Traffic Data presentation – Estimated Queues (Chart)

For each traffic data that can be displayed, the interface permits to show both historical (daily) data and statistical profiles (filtered by OMNIA system according to the day type).

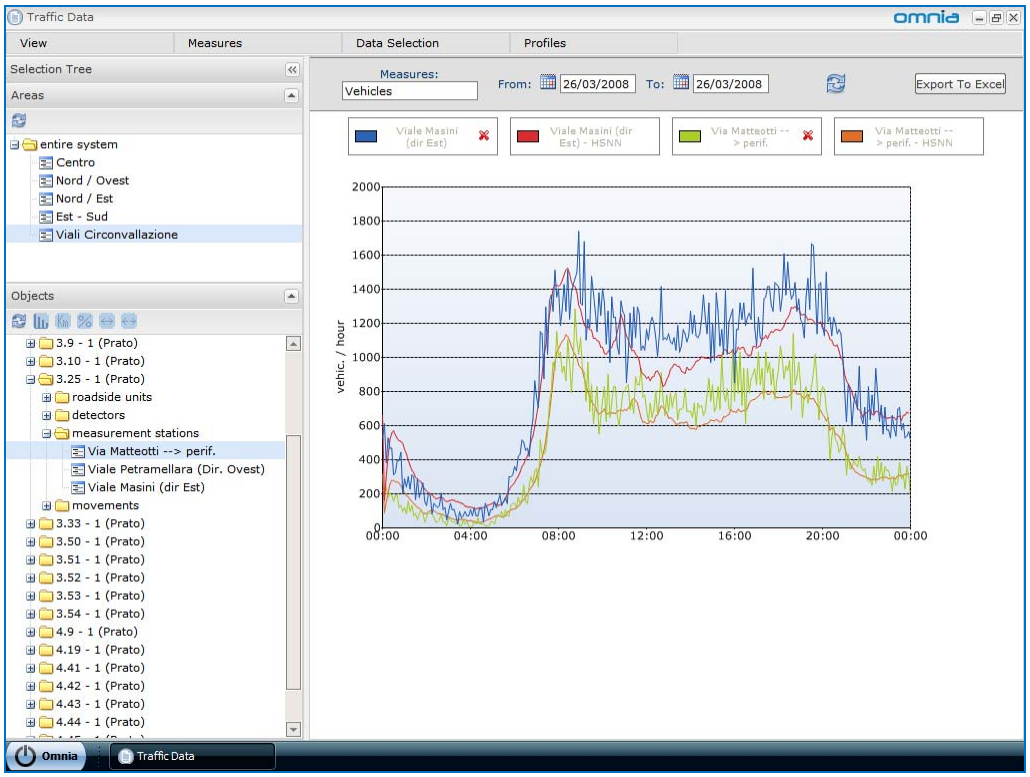

Figure 29: Traffic Data presentation – Estimated Queues (Chart)

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Provided export functions permits to export the displayed data into standard formats like Excel and PDF. Export is started pressing the “Export to Excel” button.

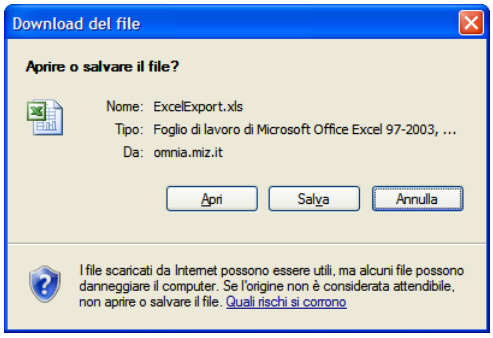

Figure 30: Traffic Data presentation – Export Functions

The export function supported exports the content of the view.

- The table export is most suited for calculations with 1 hour resolution
- The chart export is most suited for calculations with 15 minutes resolution

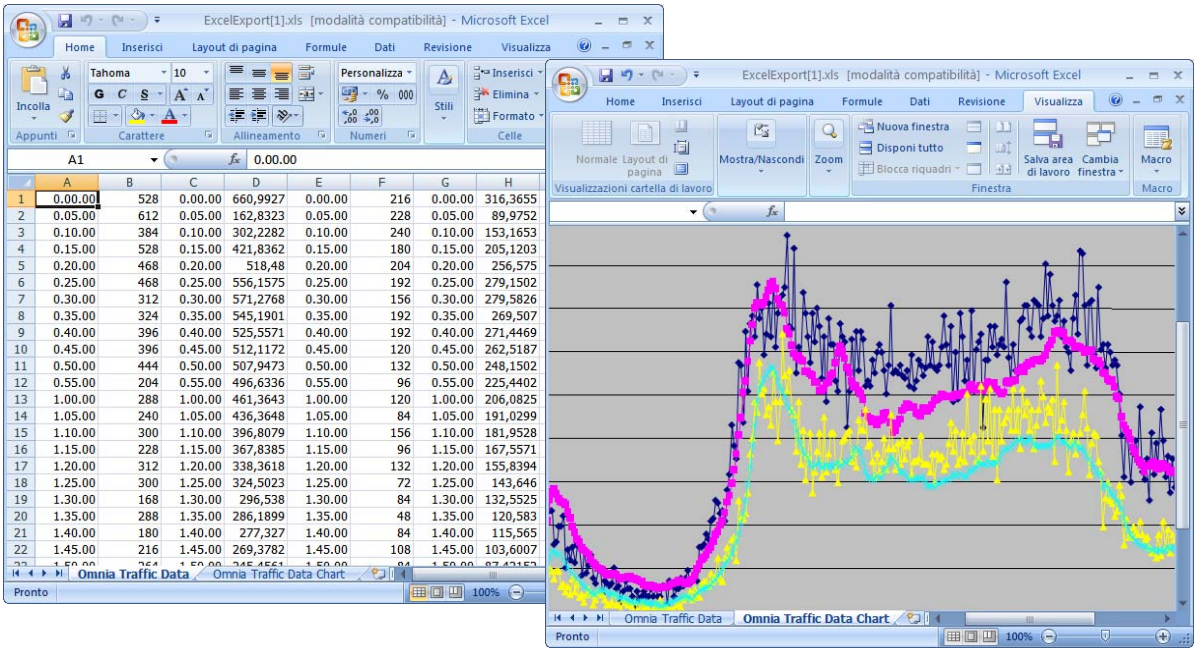

Figure 31: Traffic Data presentation – Export to Excel

The figures in the following page show how traffic data tables and charts can be displayed also for multiple days selections.

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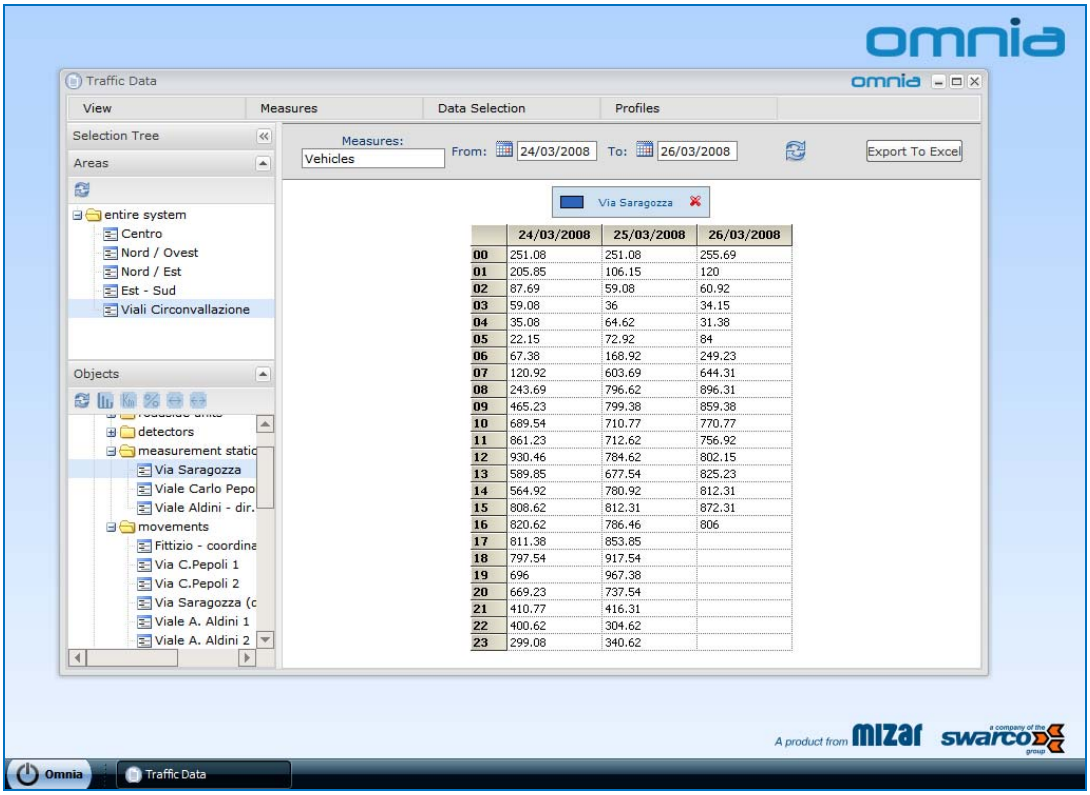

Figure 32: Traffic Data presentation – Multiple days (Table)

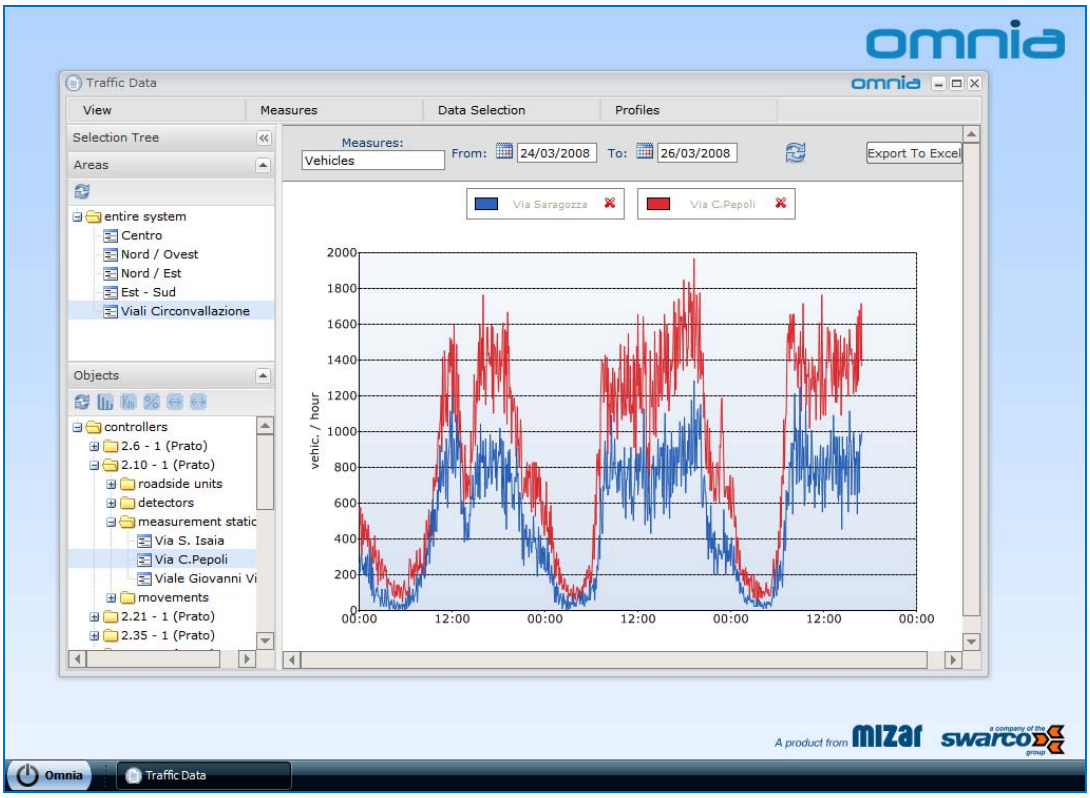

Figure 33: Traffic Data presentation – Multiple days (Chart)

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