

## Success Story

### Business Intelligence



## Brisa

### Business Intelligence Solution

Brisa Auto-estradas de Portugal was founded in 1972. In 36 years it has become one of the largest highway operators in the world and the largest transport infrastructure company in Portugal.

Today, Brisa share capitalization is around 3 500 million euro and its stocks are quoted at Euronext Lisboa belonging to the main index, the PSI-20. It also belongs to the Euronext 100, the index that joins the largest companies in France, Holand, Belgium and Portugal, and to FTSE4Good, the reference index in social responsibility.

The main business area of Brisa is the construction and profiteering of highways with tolls, either through direct investments in Portugal or through one of its national and international subsidiaries. As a complement on the main business area, Brisa also provides services related to safety or commodity in the road, highways, and urban circuits.\*

\* - source (PT): <http://www.brisa.pt>

#### THE BACKGROUND

Brisa manages a vast network of highways where many tolls coexist. The equipment installed in those tolls, such as cameras and lasers, have the ability to send data regarding their operative state. This information is stored in a central database.

Brisa's maintenance crew is responsible for monitoring all the devices in the network, analysing at each moment their state and identifying problems. Before the implementation of this solution, that analysis was made through direct queries in Brisa's databases.

#### INDUSTRY

- Transportation Infrastructures

#### KEY BENEFITS

- A more efficient analysis of events in the Brisa network, discovering correlations that until then were not detailed in depth;
- Ability to figure the relation between events and traffic, highlighting and acting faster in more critical issues;
- More pro-activity in the management of some events;
- Analysis of the efficiency regarding the recognizance of registrations and classification of traffic in tolls;
- Keeping historical data of events to allow a long term analysis.

#### XPAND IT SERVICES AND SOLUTIONS

- XPS - Xpand IT Professional Services

#### TECHNOLOGIES

- Pentaho BI Suite + MySQL

“ The final result is very positive. The end users are completely surrendered to the ability of exploration and analysis of the data provided by the platform and their feedback is the best possible. Xpand IT participation was excellent, both in the way they dealt with the purposed challenges and their business intelligence know-how. ”

José Miguel Machado  
(Technical Project Manager, Brisa)

## THE CHALLENGE

The challenge was to reduce the complexity in the event analysis, making it possible to identify anomalies in a intuitive way and in the shortest time gap. Brisa considered this challenge the perfect opportunity to develop a BI solution. The goal of the BI solution was to provide the most efficient analysis on the network data, make all information as near "real-time" as possible, enabling a faster detection of problems and consequently more rapid corrections. Another goal was the implementation of dashboards to present relevant information, in a more effective and pleasant manner, to final users. Further more, the solution needed to boost the detection of new anomalies and of new development patterns, allowing the evolution of the system in the future to make preventive analysis as well.

## THE PROBLEM

Due to the high volume of transactions in tolls and the huge number of devices, the volume of data produced was making the maintenance department's task very painful. Using SQL queries was equally heavy to the operational system, resulting in a direct impact on current operations.

The analysis was performed in Excel spreadsheets, making it difficult to normalize procedures, being the monitoring made through direct access via SSH to the toll devices, which caused a potential security issue, communications overload and consequent operational impact.

## WHY

Currently the maintenance team at Brisa does its job using direct searches on the operating system where the event data is located. The results of those searches are then analysed using spreadsheets. When potential problematic situations are detected a remote access to the tolls is made. The relationship between events and the volume of traffic is complex.

- The tolls network event analysis is extremely complex;
- It is impossible to efficiently correlate the volume of traffic with the transactions;
- The operative system is overloaded with searches;
- The absence of a systematic process that does not rely on the implicit knowledge of each operator.

## WHERE

In all highway tolls belonging to Brisa in Portugal.

## WHEN

24 hours a day and 365 days a year.

## THE SOLUTION

The project's objective was the development of a Business Intelligence solution capable of providing updated information intuitively regarding the state of the devices in the tolls network. At the same time the history on events must be preserved for future statistical analysis and/or data mining.

The solution was to develop a BI solution using Pentaho BI Suite. This solution, proposed by Xpand IT, allowed the end-to-end development in a centralized way and with much lower costs when comparing with traditional solutions. Being a near real-time BI system, this solution required the development of a data extraction process in very short intervals. As such, this process's performance was critical and a parallel extraction was chosen to deal with this requirement.

To assure performance, the current data and history are kept in separate tables. However, the logical model where the business entities are described is the same, allowing the creation of graphics with both. There were also created a group of aggregated tables to optimize even further the reporting.

To visualize the data a group of dashboards were created. This kind of representation allows the display of the information fast and intuitively, perfectly adapting to the context of the solution.

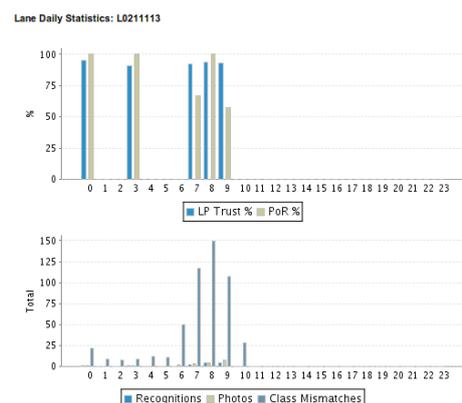
## EVENT ANALYSIS DASHBOARD

Allows the correlation between the event types. The user applies a group of filters, displaying the way the events relate to each other.



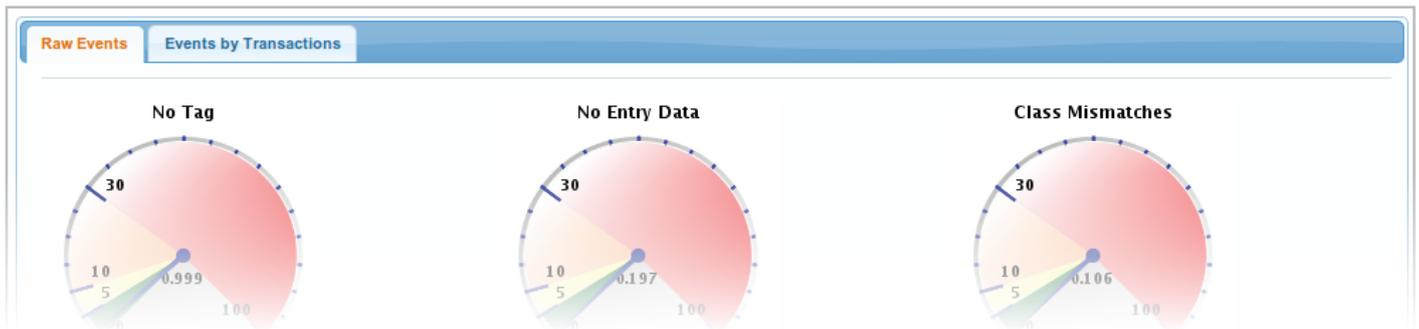
## LANE ANALYSIS DASHBOARD

In this dashboard it is possible to analyse the performance of the cameras regarding the recognizance of registrations and how this changes during the day.



## ERROR ANALYSIS DASHBOARD

Allows the display of events making it easy to detect and prevent anomalies and errors.



### BENEFITS

The implementation of this solution provided to Brisa:

- A more efficient analysis of events in the Brisa network, discovering correlations that until now were not detailed in depth;
- Ability to figure the relationship between events and traffic, highlighting and acting faster in more critical issues;
- More pro-activity in the management of some events;
- Analysis of the efficiency regarding the recognizance of registrations and classification of traffic in tolls;
- Effectively acknowledge the tolls in which the problems in the recognizance result in loss of profit;
- Keeping historical data of events to allow a long term analysis.

### TECHNOLOGIES

- Pentaho Business Intelligence Suite
  - Comunnity Dashboard Framework
  - Kettle
  - Mondrian
  - Pentaho Reporting
- Database System
  - MySQL



### WHY XPAND IT?

The success of this project was achieved because:

- Xpand IT holds a deep knowledge about the technological options for the **Business Intelligence** area
- Xpand IT employs truly **Agile** culture and methodologies that enable results aligned with the client's expectations
- Xpand IT has a **Young and Proactive** team that searches and presents solutions that are both efficient and effective
- Xpand IT worked **with** Brisa and not **for** Brisa

### ABOUT XPAND IT

**Founded in 1993**, Xpand IT started its work in the telecommunications consulting market, focusing on delivering high reliable analysis of network implementations. Between 1993 and 2002 we delivered recognized solutions to our clients, by applying our own models of cost impact over network implementations. This work was recognized world-wide, as our models were successfully applied in several telecommunication companies around the globe.

**In 2002**, using our deep backgrounds in telecommunications consulting, Xpand IT started a new offer focused in IT Services and Solutions. As that offer increased by delivering sucessful projects to our clients, IT Services and Solutions turned to be the flagship of our company in our days, employing 80 % of our staff.

**Since 2002** we expanded our target client areas from the telecommunications to almost every area that depends directly on IT, working in Consulting, Systems Integration, Packaged Solutions, Training and Application Support.

**In 2006**, open new Head Office in Parque das Nações, Lisbon. Staring also a new internationalization strategy

**In 2008**, we launched the "2011 Challenge", following the 4 'e's Strategy: e-mpowering, e-nergizing, e-ngaging, e-nabling. We also launched two new Business Units: Enterprise Mobility and Enterprise RFID.

**In 2009**, launched the Xpand IT Agile Near-shore & Off-shore Software Factory (QREN funded project)

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