

# Efficient Reuse of Public Transport Information in the City of Gijón

**Author:** *Martin Alvarez-Espinar (Fundación CTIC) – [martin.alvarez@fundacionctic.org](mailto:martin.alvarez@fundacionctic.org)*

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**Summary:** *This document reflects the benefits of the use of Public Sector Information through the successful case of the Public Transport information released by the City of Gijón. Although, at the beginning, local government was reluctant to open its data, now all the sectors take advantage of the reuse of PSI: industry produces Web applications and widgets for citizens; restaurants installed display systems to inform customers; a local artist created a multimedia artwork based on this public information. The most relevant and remarkable action has been implemented by the local government which is reusing their own Open Data, saving potentially €0.8m (4% of the total budget for transport) in the installation of display systems.*

## Introduction and background

Gijón<sup>1</sup>, a city in the north of Spain with more than 275.000 inhabitants is the largest city in the autonomous community of Asturias. Gijón City Council is energetically promoting the modernization and improvement of public services through ICT, and initiatives such as Gijón Citizen Card<sup>2</sup>, a master key that allows access to many public services. It can be used to pay for bus fares, as a personal identity card in public swimming pools and libraries or to pay for parking meters. Also, the road map of the city includes different actions to become a Smart City.

In 2010, Gijón City Council launched their Open Data initiative ([datos.gijon.es](http://datos.gijon.es)), exposing a bunch of basic, non-sensitive datasets such as touristic POIs, events agenda, and pollution levels. Most of the information has been published under permissive licenses (CC-BY) and in open standard formats. New datasets were incrementally added into the catalogue following the interests of the community –an open survey<sup>3</sup> is open from the beginning of the initiative.

One of the first proposal in the survey was the publication of the public transport information. Not only the bus timetables –published on the website in PDF format–, but also geolocation of bus stops, and the real time information of coaches moving through the city. This information already existed and was structured because most of bus stops had displays to show information about the next coach to stop: estimated remaining time, line and destination, and accessibility features of vehicles.



*Bus stop and display with information about the next coaches to stop*

In October 2010, Gijón's public transport company –EMTUSA (EMpresa de Transporte Urbano S.A)– opened the access to a web service with complete information about: timetables, lines (routes, status, origin, destination), stops (location, arrivals, departures) and coaches (status, position, journey). This information was offered in standard formats through a web service<sup>4</sup> with SOAP 1.1/1.2, and REST

<sup>1</sup> Gijón: <http://en.wikipedia.org/wiki/Gij%C3%B3n>

<sup>2</sup> Gijón Citizen Card: <https://en.gijon.es/page/8519-citizen-card>

<sup>3</sup> Survey for reusers: <http://gijon.uservoice.com/forums/64793-datos-que-se-deber%C3%ADan-publicar>

<sup>4</sup> Gijón Transport Webservice: <http://docs.gijon.es/sw/busgijon.asmx>

support. Since then, this [Real-time information on Public Transport](#) dataset was included in the Open Data catalogue (see associated [RDF/XML description](#) using a DCAT profile).

This document reflects how different sectors have taken advantage of this public transport information, from developers to artists. The most relevant and remarkable action has been implemented by the local government, reusing their own Open Data.

## Reuse by developers/citizens

The intuitive direct goal of the release of the public transport dataset is the development of applications addressed to the local citizens on the move. Obviously, this was the first official reuse of the information, a series of widgets –tiny applications– developed by individuals for their own purposes. These widgets, developed in HTML + Javascript, showed basic information about location of stops and their status.

Some other applications were developed since the webservice was made public, most of them made by students or individuals for their own use. This not produced a real economic impact, but personal comfort and engancement of the quality of life in this city.



*Web application<sup>5</sup> with the status of a bus stop (remaining time, line, and destination)*

## Reuse by private corporations

Private companies developed other striking applications, improving the quality, usefulness, and usability. Some nice examples can be found, such as ‘Bus Gijón’ for iOS<sup>6</sup> and for Android<sup>7</sup>, Gijón en Bus for Android<sup>8</sup>, or others such as this Augmented Reality app built on Layar<sup>9</sup>:



*Screenshot of Augmented Reality application with information on Cabueñes Hospital bus stop*

Apart from the mobile applications, CTIC developed an application<sup>10</sup> to visualize all the traffic of the public transport in real time (15” latency) on a city map. This tool was very useful to track and see all the information in an intuitive way, also useful for the transport company line coordinators as they commented.

<sup>5</sup> Status of the transport in the City of Gijón: <http://datos.fundacionctic.org/sandbox/gijon/bus/marquesina/>

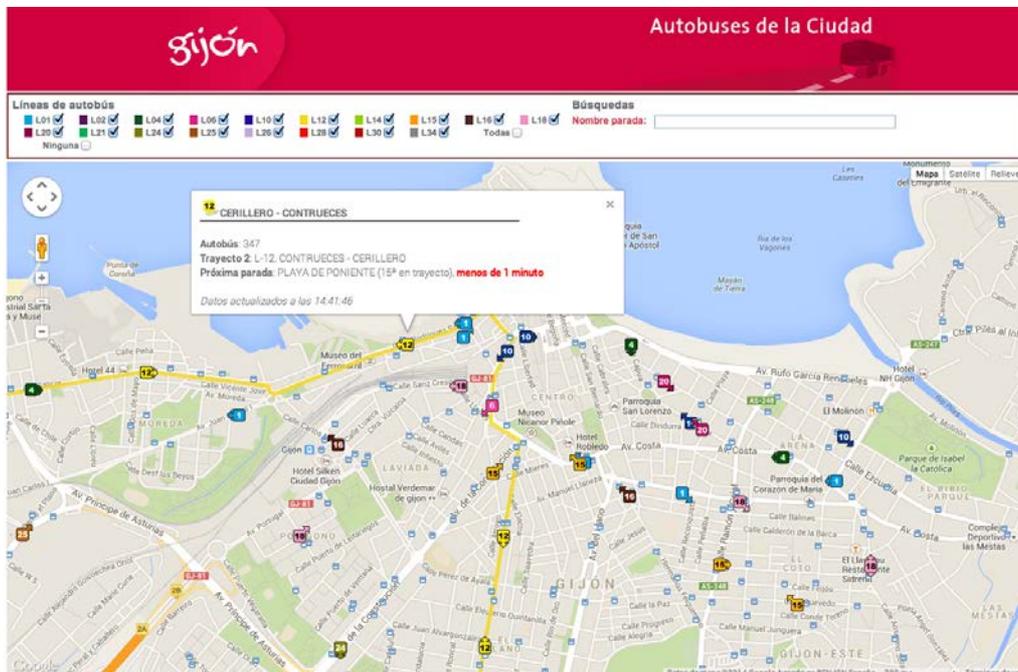
<sup>6</sup> Bus Gijón iOS App: <https://itunes.apple.com/es/app/bus-gijon/id657054796?mt=8>

<sup>7</sup> Bus Gijón Android App: [https://play.google.com/store/apps/details?id=net.enriquegonzalez.Bus\\_Gijon](https://play.google.com/store/apps/details?id=net.enriquegonzalez.Bus_Gijon)

<sup>8</sup> Gijón en Bus for Android: <https://play.google.com/store/apps/details?id=com.hoardingsinc.gijonenbus>

<sup>9</sup> Layar: <https://www.layar.com>

<sup>10</sup> Real Time Public Transport in Gijón: <http://datos.gijon.es/aplicaciones/busgijon/busgijon.jsp>



Web application with the status of all coaches in the movement through the city

## Reuse by city businesses

Other non-IT-related sector have taken advantage of the open transport information, restaurants and coffee-shops. Motivated by different publicity actions, some coffee-shops in the City, near to bus stops, installed simple systems showing the status of the nearest bus stop. Their customers are now aware of the next coach to stop, without leaving the facilities.



'Continental' bus stop, in front of Cafeteria Reconquista



Detail of the tablet showing the status of 'Continental' bus stop

This solution required a minimum investment, because all these establishments already had Internet connection. Two establishments in the city –Cafeteria Brasilia and Cafeteria Reconquista–, opted for simple tablets running the web app, showing the real-time status of the nearest bus stop, located just a few meters from the main entrance.



*Reconquista Cafe's customer looking at the tablet on the wall with the status of 'Continental' bus stop*

## Art based on data

Apart from the trivial social and economic benefits, Open Data was also used for art. Daniel Romero –known as .tape.– won<sup>11</sup> a contest organized by a local art gallery with his work *Xixon Sound. V01 – allegretto para flotilla de autobuses*, a multimedia creation based on the public transport information. The movement of the coaches visualized on the city map produces different events, transformed into music and striking visualizations.



This artwork was a multimedia setup based on geolocation, data visualization, electronic music, interaction, and animation (.gif and stop motion in paper). The author designed a computerized programme to process the location in real time of coaches and produce music: when a coach crosses another in the street, stops or leaves a bus stop, triggers different patterns of music notes, performing a musical composition. Coaches are uniquely identified by line color and a number. Stops are identified by their names. Furthermore, public may interact with the application, activating –through QR codes– three different monsters that 'attack' coaches on the map in different ways, producing new sounds and animated GIFs.

## Reuse by public bodies

As soon as these applications began being used, the City Council realized the benefits of Open Data. With a minimum investment –the web service that was opened already exists so the cost of publication was almost imperceptible– a large amount of the population was able to access to the information the transport company wants to communicate in order to provide a better service to their clients. So the City Council began promoting among citizens the use of these applications.

At first sight, the cost of installing displays on bus stops was extremely higher than using a basic Web-enabled device running the application on the bus stop status. Of course, typical displays out in the open are more robust, but there are many public facilities where simple computers –even devices such as [Raspberry Pi](#) plus cheap monitors– may be installed securely.

The first example was piloted on the crowdest line –over 3 million passengers per year–, L1 that terminates at Cabueñes, the main hospital of the city. There, at the main hall, besides the main entrance, a screen with a microcomputer was installed. It was programmed just to run the application with the status of the main bus stop –basically, the estimated time for the next departure and the destination– nearby a map with information on the routes through the city (see illustrations below).

<sup>11</sup> News on Daniel Romero's prize (El Comercio Newspaper):

<http://www.elcomercio.es/v/20130710/cultura/artista-multimedia-daniel-romero-20130710.html>



*Cabueñes Hospital main entrance. Screen with information on the bus stop outside.*

Some other similar systems were installed in public facilities: museums, schools and main train station.

## Economic benefits

In opposition to the traditional bus stop displays, installation of these display systems based on PSI reuse over basic microcomputers have a low cost associated. This enables a potential cost saving, impacting directly over the municipal budget, having into account that existing resources should be reused.

The City Council owns 509 public buildings<sup>12</sup> both in the metropolitan area and in rural areas, apart from other public facilities such as 33 public health centres –hospitals and clinics– in the city. Some of these public facilities may potentially be used to install display real-time bus information systems aiming at promoting public transport use through a better information supply. Among the total of 532 public buildings, it have been detected 284 public buildings that usually visited by citizens and public servants –museums, hospitals, stadiums, service buildings, etc.–, suitable to host cheap computers running the real-time transport information display –ie. the same system installed in the .

A basic indoor equipment has a maximum total cost of €1,064.59 –Screen 24x7 (€634.04), Mini PC 2Gb RAM Fanless (€429.55). This basic equipment have a low cost of installation due to the existence of wireless internet connection and power supply in those facilities. On the other hand, standard marquee displays have higher costs of installation because they are on the open and installation always requires works on the street. Apart from this, there is not always power and internet coverage in all stops.

	Standard marquee display	PC-based equipment
<b>System cost (per unit)</b>	€ 3,900.00	€ 1,064.59
<b>Cost of 284 units</b>	€ 1,107,600.00	€ 302,343.56
<b>Percentage of 2014 budget<sup>13</sup></b>	<b>5.06%</b>	<b>1.38%</b>

For this study we do not consider installation costs, and we can have into account the overall budget for the public transport company –€ 21.9 Million–, so we can conclude that, following the Open Data approach, the City Council and EMTUSA would save, at least, € 0.8 million (4% of the total budget) –amount enough to buy 4 new coaches<sup>14</sup>.

So in this case we can observe how government can be use their own published data, as well as third party tools to provide services to citizens, saving money and increasing the social value of the initiative.

<sup>12</sup> Spreadsheet with the list of public buildings in Gijón:

[https://docs.google.com/spreadsheet/ccc?key=0AiL5RD\\_gwIsDdFFpcEJIVDI4WjNycG12bHhCU0Q2cIE&usp=sharing](https://docs.google.com/spreadsheet/ccc?key=0AiL5RD_gwIsDdFFpcEJIVDI4WjNycG12bHhCU0Q2cIE&usp=sharing)

<sup>13</sup> EMTUSA Management Accounts:

[http://bus.gijon.es/multimedia\\_objects/download?object\\_id=138852&object\\_type=document](http://bus.gijon.es/multimedia_objects/download?object_id=138852&object_type=document)

<sup>14</sup> Piece of news about the recent purchase of 7 coaches by EMTUSA:

<http://www.elcomercio.es/v/20131109/gijon/emtusa-destinara-millones-compra-20131109.html>