Port Asset Management with 3D Visualization

Dr. Hussein Harahsheh

Idom Consulting, UAE

GEO SMART ASIA 2017

22-24 AUG, 2017

Port of Algeciras

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The Port Authority of the Algeciras Bay (APBA) is engaged in a global improvement program in order to maintain its competitive position as a leading port for connecting the Mediterranean and the Atlantic. One of the main challenges was to provide the port with a **platform** capable of transforming disperse generated data into useful information to manage the port operations.

Introduction

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Proposed System Objectives

1. Real-time monitoring of port spaces and infrastructure
2. Provide a flow of information more useful to each of the members of the port community.
3. Perform alert and follow-up integral of events / incidents detection
4. Optimize the use of resources available for the attention of events and promote actions to achieve it.
5. Maintain an ongoing program of training for operators and other involved specialists in the various operations of the system.
6. Allow the generation of information consolidated and grouped by the treatment of the data received of different systems, taking maximum advantage of existing systems
7. a decrease both in waiting times and incidents, and therefore, in the cost of operations

SAMVE Platform

Idom is helping the APBA in the definition and implementation of a new integrated management system of port's facilities and infrastructure, using 3D virtual environments and geographical management systems (GIS), it is called **SAMVE** (Smart Asset Management in Virtual Environments). All the facilities of port security are managed virtually from a single interface, allowing operators to obtain the information necessary respond to the different events, with two main parts: presentation part and processing part.

- In the **presentation** part, it provides an interface with a way of action focused on events regardless of their origin.
-In **processing** part, it allows the conversion of such received data into useful information for operation and maintenance actions, always depending on authorization for different operators.

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Architecture of the System

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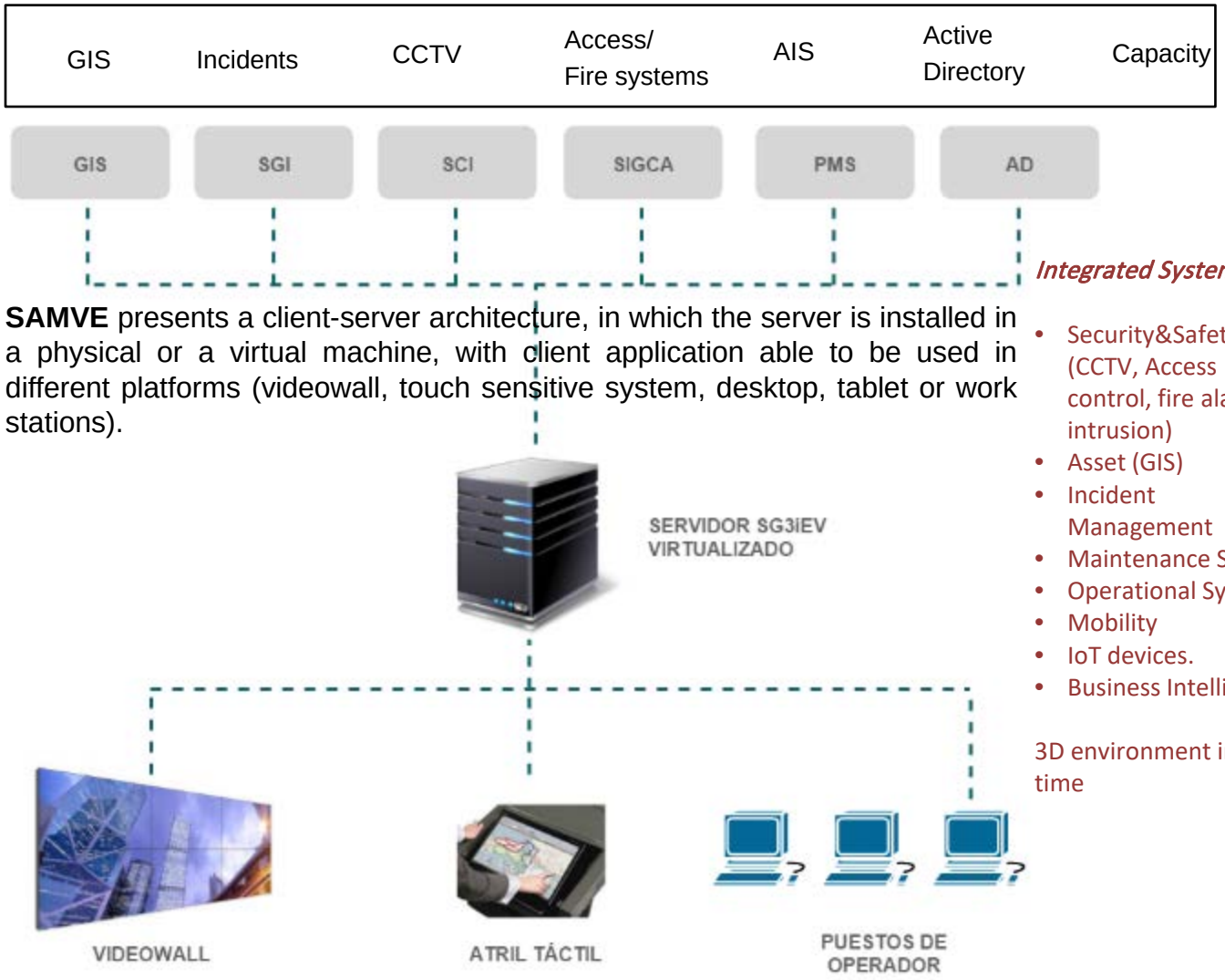
Logical Architecture of the System-Infrastructure



SAMVE presents a client-server architecture, in which the server is installed in a physical or a virtual machine, with client application able to be used in different platforms (videowall, touch sensitive system, desktop, tablet or work stations).

Integrated Systems:

- Security&Safety (CCTV, Access control, fire alarm, intrusion)
- Asset (GIS)
- Incident Management
- Maintenance System
- Operational Systems
- Mobility
- IoT devices.
- Business Intelligence

3D environment in real time

The connection with other systems may be done point to point, or through any corporate bus.

Operators can access with an integrated system of authentication (Active Directory, allowing a single sign on), either with username and password; always with the possibility of different profiles and permissions.

Functionalities & User Interface

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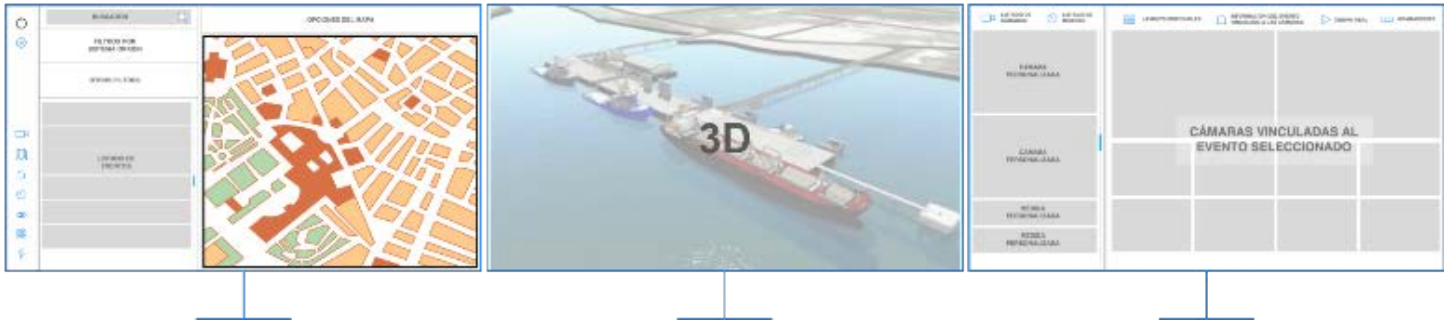
A Multiformat solution

1. Terminal Operator.
2. Big-sized video wall.
3. Touch-sensitive screen control system.

- ✓ Different resolutions.
- ✓ Different aspect ratios.
- ✓ Different number of screens.
- ✓ Different mechanisms of interactions.

SAMVE is able to self-configure to fulfit automatically the different key aspects of the user interface



2.- Functionalities. User Interface

Functionalities & User Interface

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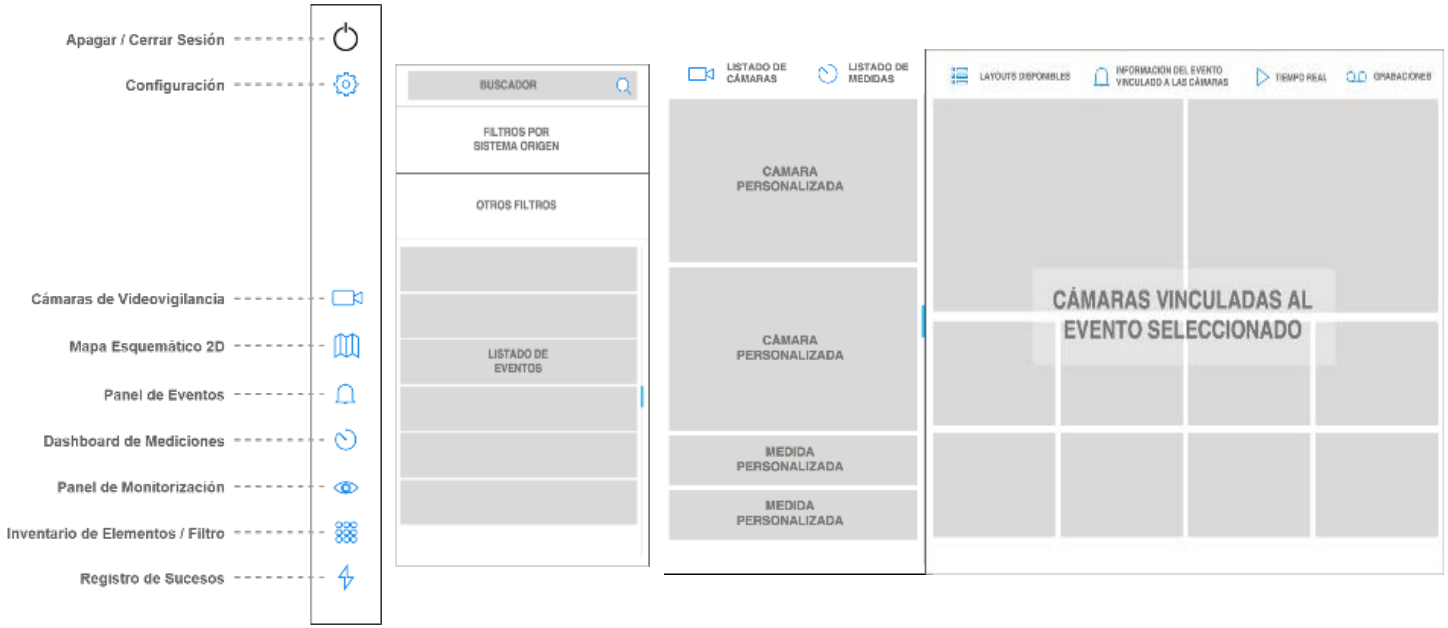
Moduls Appearance

All the modules of the system can appear on the screens, according to the needing of the operators



Functionalities & User Interface

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Final Presentation on the screen

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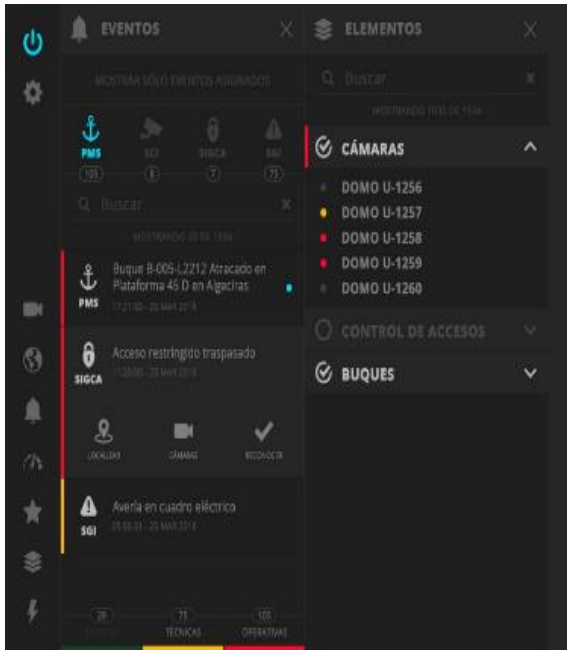
Module of Complex behaviours

- ✓ Events/alarms received from all the connected systems are managed in the same way
- ✓ Events/alarms are pooled and hierarchized, logically, geographically, and temporaly,
- ✓ When one event or group of events occur, a chain of actions can be triggered.
- ✓ Collected events/alarms can be filtered according to the logical hierarchy.
- ✓ The reaction resources presented in the area of the event/alarm are calculated and presented in real time.



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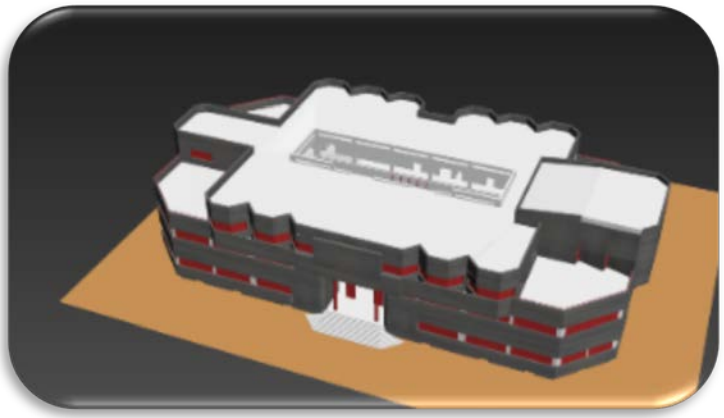
User interface in Virtual Reality

- ✓ A virtual model of the port is developped to be the basis of the user interface.
- ✓ The format of the fund can be selected between a lot of possibilities: cartography, models of elevation of land, standards of internet modeling,…
- ✓ Special building (terminals, offices, control tower) and other static elements (jetties, cranes, security elements) are developped in 3D models.



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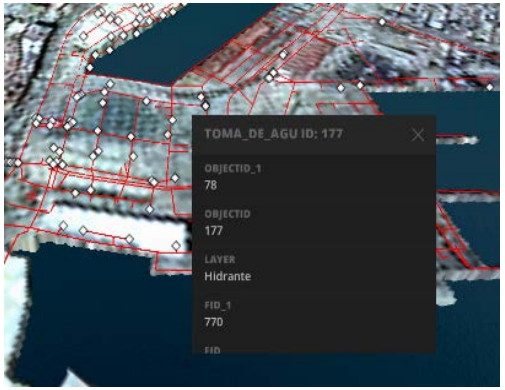
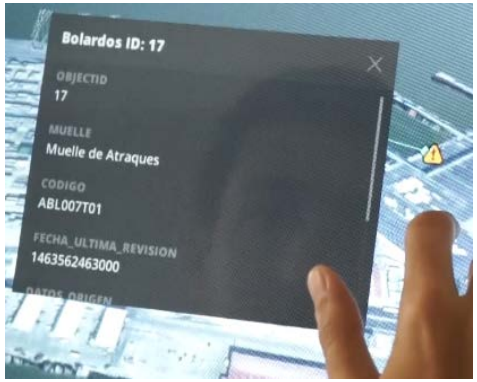
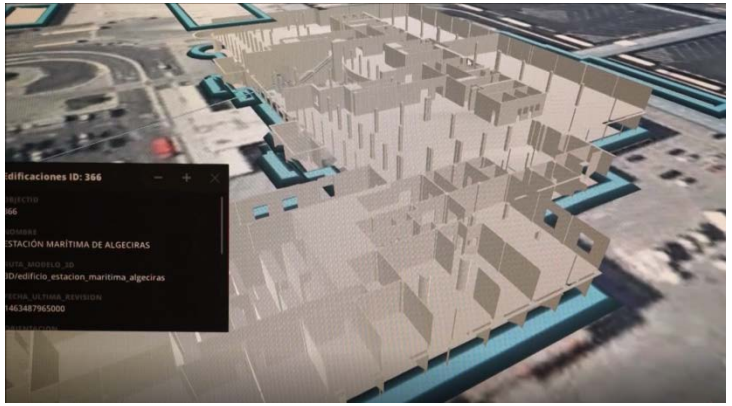
Interactive objects inside the Virtual model

- ✓ Detailed presentation of 3D element, with level of detail according to the proximity to the point or active demand by the user.
- ✓ Event management in a contextual way, using interface devices.
- ✓ Presentation of the geometric and logic information associated to each element.







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Multiple control devices

- 3D or conventional mouse, keyboard, touch-sensitive screen,.

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Module of Video Management

- ✓ Recorded files are linked to events/alarms; it´s not needed to access using the time stamp
- ✓ The cameras available to follow an event/alarm are automatically selected according to the position and real coverage

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Images of one installation

Infrastructure Management System

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General characteristics

1. Apps web portal focused on users, based on ESRI-ArcGIS
2. Inventory management tool on desktop
3. Upgrading from CAD files
4. Topology data model for network infrastructure (section - node)
5. Responsive design: multi-device support

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Geographic Information System - GIS

Gestión *Explotación* *Actualización*

Desktop Web Dispositivos Móviles

Clúster Servidores GIS

Base de Datos SQL Server

Enterprise System

SIGCA

PMS

SCI

SG3iEV

SGI

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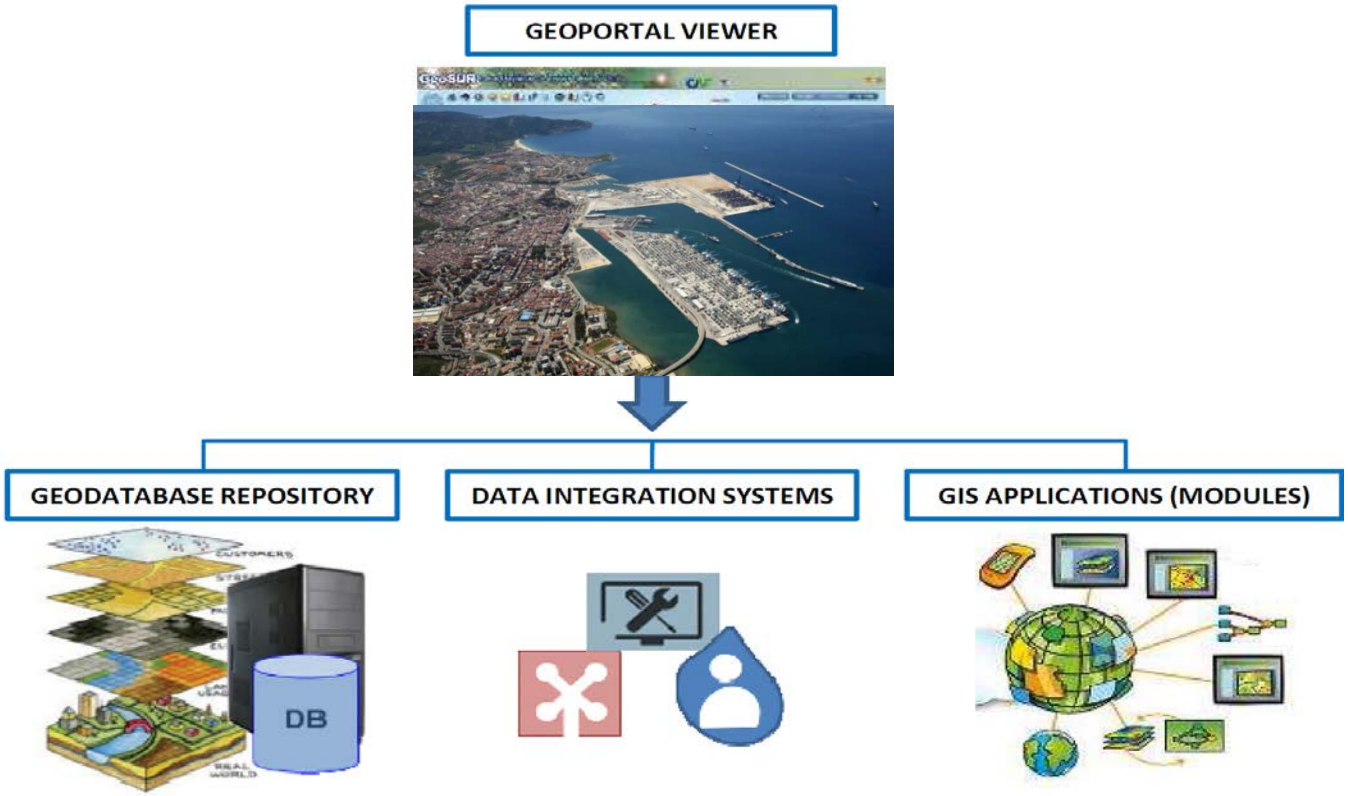
Geoportal viewer

Web and Intranet Geoportal viewer composed by a Geodatabase repository, GIS applications and integrate existing data systems



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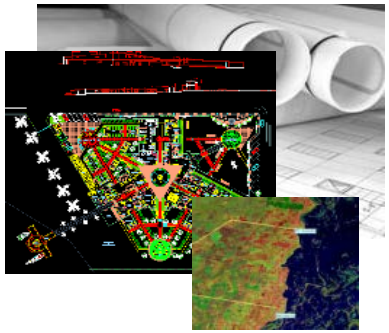
Data Integration

It has achieved an integrated cartographic and alphanumeric information management, based on a model for harbor master data objects



Cartographic Information

- ✓Paper Maps
- ✓CAD files
- ✓orthophotos
- ✓Others

Alphanumeric Information

- ✓Information on paper
- ✓Excel files
- ✓Databases
- ✓Others

Integrated Information

Multiple data sources
Real time monitoring
geospatial analysis
Business logic
Indicators and Dashboard
Information
multiple possibilities

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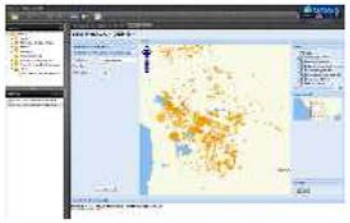
Geodashboard

Geodashboard module to generate custom interactive reports and dashboards in tabular, graphic and map formats



Functionality

- Dashboard
- Geographical component
- Statistics
- Interactive Reports
- Tabular, graphic & map formats

Data source

GDB data: Environment and water layers and variables

Integration data from other systems

Thank you

Hussein Harahsheh, UAE- Dubai

Engineering, Architect, and IT Consulting, Spain