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# Exploring Oracle Application Express

## Technology for development enterprise applications with the electronic invoicing system prototype

*Autor- Jorge Luis Quiguango Terán*

Universidad Técnica del Norte, Ibarra, Imbabura

jorjoluiso@gmail.com

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**Summary.** *Oracle Application Express works with the Oracle database, is a rapid web application development tool. This document shares the knowledge about Oracle Application Builder is part of Oracle Application Express. This tool allows the easy creation of web screens with minimal knowledge of HTML, JavaScript or CSS languages that are necessary for the development of web screens. The programming language PL/SQL is required, it is a language that combines the SQL query language for data manipulation and ease of data processing.*

### Keywords

Oracle Application Express, Oracle database, web application, tool, PL/SQL, SQL.

### Introduction

In Imbabura province has many medium and small companies from using partially or totally of software for automate the processes of billing, accounting, inventory, or otherwise do not have any tools beyond spreadsheets.

On the technology can be said that the software currently used by these companies have problems with information fragmentation, for example systems where information is stored in separate files or spreadsheets are used, must also be the software used is platform dependent or even the operating system version also is not good for the web, managing security can cause vulnerable systems, you can also mention the fact that the information is scattered in different computers and, the backup inconsistencies.

Be solved grounds through the Oracle Application Express tool as it fits well with the purpose of having a tool for easy management, development and deployment of the application will let you through the web browser, does not depend on components by the customer and the ease with which program this tool is similar to the Oracle Forms. It should clearly identify the problem and fit it into the present moment, brief expose mind most relevant jobs, and

highlight the contributions of others to the topic under study, justifying the reasons why the research is conducted and formulating hypotheses and relevant objectives.

Oracle is one of the largest software companies database, now you can download the tools Oracle 11g XE and Oracle Application Express for study and develop applications 100% web, without the need to pay licensing, and is a technology that been in development since 2004, today Oracle recommends migrating from Oracle Forms to Oracle Application Express, means that this tool is deemed capable of replacing the Forms that have been in development since the 80s, before the birth of the client first - server. Forms run a Java applet that is called from the web browser, not HTML, Forms can not keep up with modern web applications.

Learning new software to develop applications that can run on many devices technologies are mobile as today and those to come, and that there is still untapped, or desktop we use in places work and home. It's technology enables applications to run on any architecture with an operating system with a Web browser without plugins, not is the case of the known Oracle Forms, which have the disadvantage is not 100% web and also the high cost of licenses.

In the career of Engineering in Computer Systems has made similar applications as mentioned in this proposal, the most significant contributions will be learning a new technology that can be used to in subjects of career are related to web development is also includes the Oracle Application Express as an alternative. Electronic invoicing is an option that in Ecuador there for a couple of years ago, and had not made a prototype or a real application. Finally the most significant contribution is the prototype one with other possible graduate thesis within or outside the university, and independent contributions mentioned above, try to make possible the application licensing a free software license and publishing tool a repository or website.

## Theoretical Frame

The Management System Database is software that allows the storage, handling and control of information. The SGBD<sup>1</sup> allows:

Define the data at different levels of abstraction; physical, logical and external.

Manipulates data in the database allowing; insert, modify, delete, and query the data.

Maintains integrity.

Controls the security database.

## Client - server model

The client - server model is a model system in which the services are located on servers are demanded by some clients. The client requests to another program, the server is who gives answer. In the Figure 1 the client makes a request from the Web browser or an application that is running on the server, these requests and responses form a repeating cycle while there is a connection between client and server is shown.

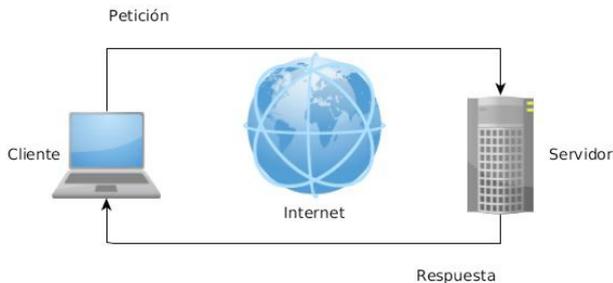


Figure 1. Client – Server Architecture.

## Development model Oracle Application Builder

Oracle Application Express is a tool for rapid development of web applications for the Oracle database. Using only web browser and limited programming experience, you can develop professional applications that are both fast and secure. Thanks to its characteristics such as; user interface themes, navigational controls, form handlers, flexible reporting. The development is easier and dynamic. From the end user perspective, the implemented applications only need a browser and access to an Oracle database running on Oracle Application Express. In the Figure 2 it is shown to Oracle Application Express installed on a server with Oracle database and how they can access managers, developers and end users of the applications.

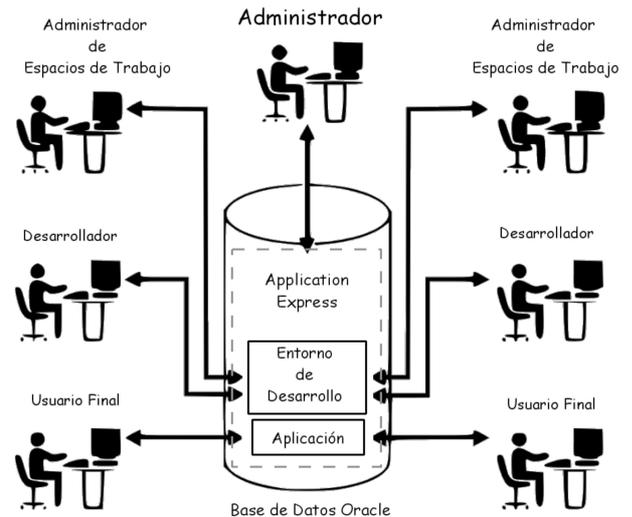


Figure 2. Oracle Application Express schema.

The Oracle Application Builder is a component of Oracle Application Express, this component is specifically for the development of forms, reports, maps, menus, lists, and other objects used in a Web application, this may be through the use of assistants or not, mostly from objects in the database.

## Oracle Application Express architecture

It was mentioned in earlier subjects all that Oracle Application Express is a tool for rapid development of web applications with declarative programming language, which makes this tool easy to use in the development and production applications. It is fully supported with all editions of Oracle Database.

The architecture of Oracle Application Express is very simple and yet powerful architecture. It is called Oracle HTTP Server as shown in the Figure 3 as a whole, web server that sits between the web browser and the database, is responsible for managing requests from passing them web browser to the database, then Oracle Application Express processes the request and generates a response HTML to send back to the browser, is used to Figure 3 the mod\_plsql is an extension to Apache Oracle HTTP Server that is not used in this development, in place it will be the Glassfish server, which is explained later. (Scott, Aust, D’Souza, Gault, & Gielis, 2011)

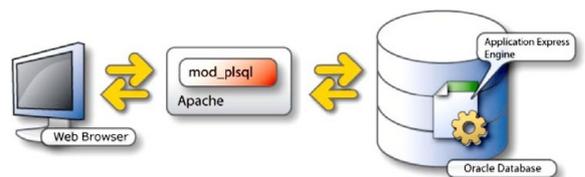


Figure 3. Oracle Application Express architecture.

<sup>1</sup> Management system database



## Electronic Signature

The electronic signature is the digital equivalent of a handwritten signature has the same legal validity and is covered by the Law on Electronic Commerce, Electronic Signature and Data Messages.

From the technical standpoint, the signature is a set of digital data that is added to a digital file and encryption obtained therefrom by computer programs.

The digital signature enables secure electronic transactions and operations in computer applications, guarantee the following aspects:

Identity, author of the message sender is recognized as univocal.

Integrity, the document can not be altered in any way during transmission.

Non-repudiation, the sender can not deny in any case that a document was not signed.

Confidentiality, only the sender and receiver can read the document if necessary.

Electronic signature can perform different types of transactions across the Internet without moving, no lines so that the public procedures are streamlined to increase transparency, which translates into significant savings of time and money. The applications of digital signatures are different, such as, public purchases, procedures citizens, document management, banking, e-payment, judicial and notary procedures, e-commerce and the principal in this investigation, electronic invoicing.

## Results

For the publication of the sources of the applications developed, the site was built in Drupal<sup>2</sup>, your address is [www.quijotelu.com](http://www.quijotelu.com), from this site you can download and distribute GPL, then the published files are described:

Application source code to sign electronic invoices in XadES\_BES format.

Backup database contain tables, views, functions, procedures and packages.

Backup application developed in Oracle Application Express version 4.

Source application that communicates with the web services of Servicio de Rentas Internas.

## Conclusions

The Oracle Application Builder tool is easy to learn and use for developers with experience to both novice

developers. It is a good tool to start learning and developing Web applications, requires no knowledge beyond the SQL query language and programming language PL / SQL.

The graphical interface for the end user, in version 4, it is built with the idea of blocks containing elements. It is a construction of the interface so that the developer does not need more knowledge of HTML, an advantage for those who start because the time it takes to build the interface is significant, but a limitation form requires more complex screens.

As the prototype made was sought an application to help a segment of the economically active society, with a current topic such as electronic invoicing.

For starting production applications developed in Oracle Application Express, you need only database and a container of Java applications, you can work on any operating system and tools of free distribution on Linux systems is where it was found greater fluidity compared to windows, as appreciation in the application development.

Looking up Oracle Application Express infrastructure in Glassfish application server, you can scale the application or applications using Java technology. If necessary, it can be developed in Java that can not be or do more complex in Oracle Application Express, and integrate applications on a single server, using the Glassfish application server.

## Recommended

As for business intelligence application to develop, it is recommend that all or most of the programming you do directly in the database in this way only reference to the functions, procedures and packages from the web interface. The program editor Oracle Application Builder is pretty bad compared to other development environments, and is easier to perform maintenance and troubleshooting of the application if the source code is created from the database and not from Oracle Application Builder .

About advanced web development techniques, Oracle Application Express provides features that integrate with AJAX and jQuery, important to develop more complex and recommended for more advanced applications developers. In times that mobile devices have access to the web, so applications it develops. But mobile devices have a weakness, is its energy autonomy. Software technologies have evolved in favor for the present web content much faster and with less energy use of these devices, AJAX and jQuery help the web pages does not have to be recharged again and only transfer the necessary information, resulting in optimum performance and less power consumption, good for demanding end users, but for developers difficult.

<sup>2</sup> Content management framework, whose information is stored in a database and managed using a web environment.

## Thanks

I express my sincere thanks to my parents for giving me everything and be what I am as a person, my values, my principles, my perseverance and my determination.

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## About the Author

**Autor - Jorge Quiguango**, graduate career of Engineering in Computer Systems of Universidad Técnica del Norte.

