

Creating Web and Mobile Apps

Deploy your applications on virtually any device, on any platform, using Omnis Studio and the JavaScript Client.



Omnis

White Paper

July 2013 (updated 2015)

No part of this publication may be reproduced, transmitted, stored in a retrieval system or translated into any language in any form by any means without the written permission of Omnis Software.

© Omnis Software, and its licensors 2013. All rights reserved.

Portions © Copyright Microsoft Corporation.

Regular expressions Copyright (c) 1986,1993,1995 University of Toronto.

© 1999-2013 The Apache Software Foundation. All rights reserved.

The Omnis product includes software developed by the Apache Software Foundation (<http://www.apache.org/>).

OMNIS® and Omnis Studio® are registered trademarks of Omnis Software Ltd.

Microsoft, MS, MS-DOS, Visual Basic, Windows, Windows 95, Win32, Win32s are registered trademarks, and Windows NT, Visual C++ are trademarks of Microsoft Corporation in the US and other countries.

SAP, R/3, mySAP, mySAP.com, xApps, xApp, and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP AG in Germany and in several other countries all over the world.

IBM, DB2, and INFORMIX are registered trademarks of International Business Machines Corporation.

ICU is Copyright © 1995-2003 International Business Machines Corporation and others.

UNIX is a registered trademark in the US and other countries exclusively licensed by X/Open Company Ltd.

Sun, Sun Microsystems, the Sun Logo, Solaris, Java, and Catalyst are trademarks or registered trademarks of Sun Microsystems Inc.

J2SE is Copyright (c) 2003 Sun Microsystems Inc under a licence agreement to be found at:

<http://java.sun.com/j2se/1.4.2/docs/relnotes/license.html>

MySQL is a registered trademark of MySQL AB in the United States, the European Union and other countries (www.mysql.com).

ORACLE is a registered trademark and SQL*NET is a trademark of Oracle Corporation.

SYBASE, Net-Library, Open client, DB-Library and CT-Library are registered trademarks of Sybase Inc.

Acrobat, Flash, Flex are trademarks or registered trademarks of Adobe Systems, Inc.

Apple, the Apple logo, AppleTalk, and Macintosh are registered trademarks and MacOS, Power Macintosh and PowerPC are trademarks of Apple Computer, Inc.

HP-UX is a trademark of Hewlett Packard.

OSF/Motif is a trademark of the Open Software Foundation.

CodeWarrior is a trademark of Metrowerks, Inc.

Omnis is based in part on ChartDirector, copyright Advanced Software Engineering (www.advsofteng.com).

Omnis is based in part on the work of the Independent JPEG Group.

Omnis is based in part of the work of the FreeType Team.

Other products mentioned are trademarks or registered trademarks of their corporations.

Table of Contents

INTRODUCTION	4
IT'S A MOBILE WORLD: HOW DID WE GET HERE?.....	4
SO YOU WANT TO WRITE AN APP.....	4
NATIVE OR WEB... WHY NOT BOTH?	5
FUTURE PROOF YOUR APP WITH OMNIS	5
CREATING WEB AND MOBILE APPS	6
THE RIGHT TOOLS FOR THE JOB	6
RESPONSIVE FORMS FOR WEB AND MOBILE DEVICES	7
BUILT ON WEB STANDARDS AND FUTURE PROOF	8
READY-MADE COMPONENTS THAT SPEED UP DEVELOPMENT.....	8
EASY TO CODE AND TEST.....	9
YOUR APPS WILL BE "RESPONSIVE"	9
DYNAMIC, INTERACTIVE USER INTERFACES	10
PRINT TO PDF ON ANY DEVICE.....	10
WEB OR STANDALONE MOBILE APP DEPLOYMENT	11
ACCESSING MOBILE DEVICE FEATURES	12
CLIENT-SIDE DATA AND SYNCHRONIZATION	12
FURTHER INFORMATION.....	13
APPENDIX: CASE STUDY	14
COMPANY: CNM SECTOR: HEALTHCARE	14

*“With the Omnis JavaScript Client a dream came true for us.
We only have to develop one client from now on.”*

Dr. Lars Schärer, Managing Director of CNM who created a mobile patient diary system for the treatment of bi-polar disorder.

See the Appendix for a full case study of this application.

Introduction

This white paper introduces the web and mobile client technology available in Omnis Studio, and is aimed at application developers and technology professionals. It focuses specifically on the cross-platform capabilities of the Omnis *JavaScript Client*, which is a browser based client technology that can present software applications in a web browser on virtually any device, on any platform, including desktop computers, tablets, and smartphones. This paper does not delve into the programming techniques needed to implement the JavaScript Client technology (these are documented in the Omnis manuals and technical notes available on the Omnis website), rather it explores the benefits of using a browser based client technology for creating and deploying web and mobile apps in today's enterprises, and provides you with an overview of the JavaScript Client and App Server technologies available in Omnis Studio.

It's a mobile world: how did we get here?

Single-handedly the iPhone changed everything, and while many vendors and operating systems have since caught up with Apple, that first truly “smart” phone caused a revolution, not only in the consumer mobile phone market, but also across the corporate IT world and the application development market. Soon after the iPhone was released the demand for “apps” sky rocketed and the migration to mobile, for enterprises and developers, had begun. And if changing the mobile phone market wasn't enough for Apple, with the launch of the iPad tablet they further accelerated the march towards mobile computing for consumers and corporate users. So, as the internet revolutionized business, now mobile computing is changing most areas of leisure and commerce, including retail, banking, insurance, real estate, advertising and social media, and likewise the application development market is adapting rapidly to the new mobile paradigm. As an application developer or technology professional, you need to address this revolution and arm yourself with the right tools to take advantage of it.

So you want to write an app...

The use of the internet and mobile devices have become so pervasive, and so much a part of business and our leisure time, that more-or-less any software development project will now require some kind of web or mobile functionality. Indeed, those applications that used to be created and deployed to desktops across a local network may now be better deployed as web or mobile applications, to better suit the needs of the modern mobile enterprise. Having decided you need or want to create an app, what technology do you use?

There are a great many ways of developing applications for the web and mobile devices. This is a constantly changing area of software development and one that presents many difficult challenges for you in deciding which technology is relevant to your needs now and, just as important, into the future.

Native or Web... Why not both?

A lot of debate in the IT press and among software vendors about mobile app development focuses on the question “should you develop Native or Web?” More specifically the discussion revolves around the benefits of creating native apps that are built specifically for a particular device or platform such as Android, iOS, BlackBerry, or Windows (the native option), *versus* creating apps that will launch in a web browser on more or less any device or platform (the web option). As an application developer, the “Native app vs. Web app” issue just gives you another thing to worry about. However, as you read through this whitepaper, we hope to illustrate that with Omnis Studio and the JavaScript Client you don’t need to choose between a Native or Web solution: you can do both, and from the same code base.

The Omnis JavaScript Client is a browser based client which means you can deploy your application easily to the web, and run the app in a browser on more or less any device, including a whole range of mobile devices as well as desktops or laptops. However, we do provide *application wrappers* that allow you to “package up” the same application and run it directly on mobile devices: such applications have the possibility of running “offline” and with direct access to the hardware features and services on the device. With this hybrid approach you get all the benefits of creating and deploying a web application, with the added option of being able to create and deploy standalone mobile apps if your solution requires it.

Future proof your app with Omnis

Omnis Studio has enjoyed success as a tool for creating desktop, client-server (LAN), and web based applications, but with the introduction of the JavaScript Client, now provides a powerful and flexible choice for creating all types of business solutions for the web and mobile devices. Once you spend a little time evaluating and learning to program in Omnis Studio, you will find that most application development tasks, including those for the web and mobile devices, can be achieved relatively quickly and easily. If you design your application in Omnis Studio correctly, you can entirely separate the application and database layers from the client presentation layer, which means you can satisfy virtually any potential customer, wherever they are and whatever device they are using, now and in the future.

“The outstanding productivity of the Omnis web client technology enabled us to develop the ‘TradersGuide’ system in a short time and with relatively few resources. We would not have been able to achieve such high functionality and performance over the web with any other development environment.”

Holger Küchenmeister, Managing Director, comTeam ITServices GmbH (www.comteam.de), which is part of ElectronicPartner, one of Europe’s leading electrical retailers.

Creating Web and Mobile Apps

Increasingly businesses need to access their information (data and content) and processes on the move: today's applications need to be accessible via the web or even more on a range of different mobile devices. The need for applications that will run on the web and mobile devices is clear enough, but you need the right tools to create those web and mobile apps.

The right tools for the job

To create applications that can be accessed on the web and mobile devices, you will need a powerful and flexible development tool and the means to deploy your app to web and mobile users. Omnis Software provides exactly that with Omnis Studio and the JavaScript Client technology.

- **Software Development Kit**

The **Omnis Studio SDK** (currently version 6.x) is used for creating applications and is available for Windows (Vista and version 7/8) and OS X (10.7/10.8): the application file is platform independent, so you can have a team of developers working on the same application code on Windows or OS X.



- **Application Server**

To deploy your applications to web and mobile users Omnis Software provides the **Omnis App Server** which hosts and runs your application (via a web server), and connects to your database backend to manage the data and content served to clients: the Omnis App Server is available for Windows, OS X, and Linux.



- **Web Server**

For most production grade applications you will need an industry standard **Web Server**, such as Apache or IIS, to host your HTML pages and forms. For access from a browser, either on a desktop computer or a mobile device where access to device features is not required, your application is embedded in a standard HTML page which end users access just like any other web page by navigating to the page via a URL. For mobile apps where native device feature access is required, the page is embedded into one of the application wrappers.



- **Database Management System**

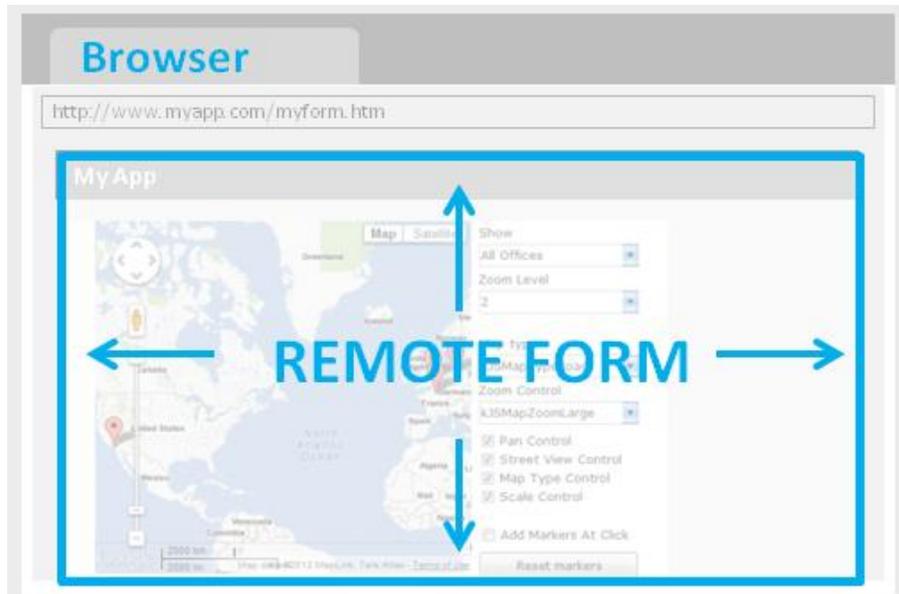
The data and content for your application can be managed by any of the leading **Databases**, including Oracle, MySQL, PostgreSQL, and many others via JDBC and ODBC. Unlike many mobile app development tools, Omnis Studio provides a special connector called a **Data Access Module (DAM)** for each leading database to allow a direct and fast connection to your data on any of these databases via the Application Server.



Omnis Software provides the first two pieces of the whole solution outlined above. You will need to download and install the Omnis SDK and Omnis App Server, and purchase the appropriate licenses, depending on the number of developers who will be working on your app, and how many web and mobile based end users you expect to use your application. You will have to find and install a Web Server and Database that most suits your requirements, although for most businesses you may already have these resources at your disposal.

Responsive forms for web and mobile devices

In most business applications you will need to present your data or content to the end user, and allow the end user to analyze and input data. The data and content is usually presented and edited in a form, which is a special type of web page containing text, fields and other controls. You can use the Omnis Studio SDK to create forms called **Remote Forms**, which can contain many types of GUI controls and have the same richness as desktop applications, but can be displayed in a browser on any web or mobile device.



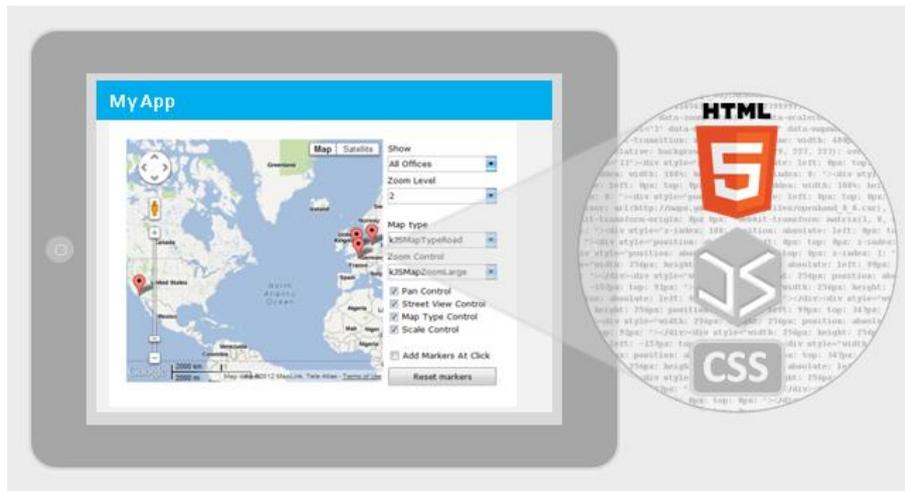
An Omnis remote form is embedded into a web page (a simple HTML file) that can be viewed in a standard web browser and is like a window or frame containing your application. The application and the remote forms it contains are displayed in the end user's browser using the Omnis **JavaScript Client**, which is a browser based thin client that can render forms and controls in a browser using JavaScript, HTML5 and CSS technologies (the JavaScript Client object is embedded into a div tag in the HTML file). All the necessary script files, style sheets and business data are managed by the Omnis App Server. The web page containing your app (remote form) can contain other content around the JavaScript Client object, while for some applications, especially those for mobile devices, you may want the whole JavaScript Client area to stretch to fit the whole browser/device screen.

When you deploy your application, the end user navigates to the web page containing your app either on their desktop computer, tablet, or smartphone, and the remote form is opened in the browser on their device. End users access the initial remote form in your application and they may be able to navigate within the app to other forms, and interact with the data and content in many different ways. The size and layout of a remote form for different devices is stored in the same design form, and the appropriate size and layout is chosen automatically when the app is opened on a device.



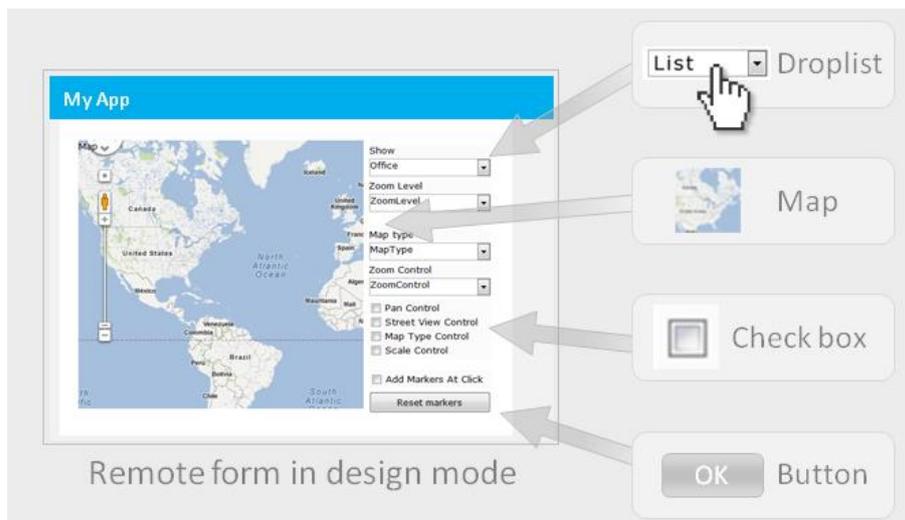
Built on web standards and future proof

Omnis web and mobile apps are displayed on the end user's device using modern Web Standards including JavaScript, HTML5, and CSS, which support transparency, transitions, animations, and styling, which all make your apps more interactive, engaging and ultimately easier to use. Using web based technologies to create applications means they are highly portable and will adapt to virtually any device since they use world-wide approved standards and specifications. Devices with browsers that support JavaScript will be able to run your Omnis web or mobile app, and that includes devices not yet on the market!



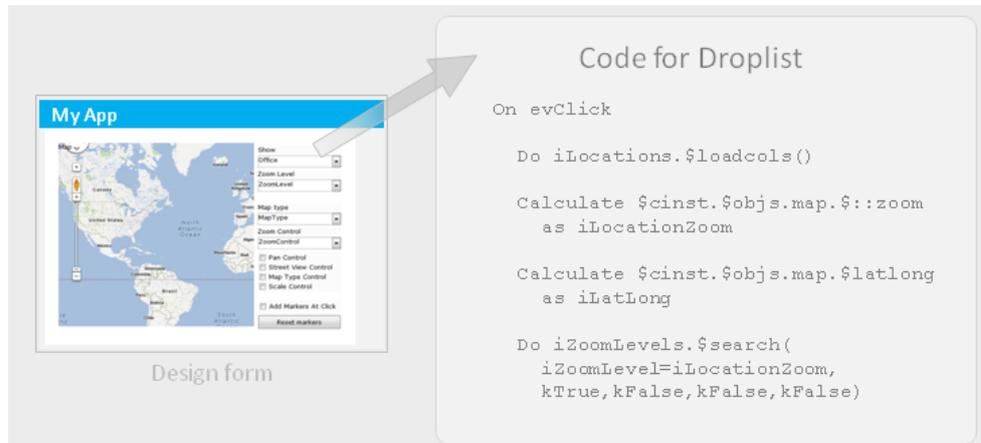
Ready-made components that speed up development

As part of creating an Omnis remote form, you will need to add components to your forms, to allow end users to navigate your application, to manipulate the data, and generally make your application easy and engaging to use. Omnis Studio provides over 30 ready-made **JavaScript Components** (or controls) which you can add to your web and mobile apps, including buttons, fields, lists, menus, nav bars, sliders, data grids, maps, and charts. When you are designing a form you can drag components from the **Component Store** and drop them onto your remote form: you won't even need to know JavaScript to use any of the components since they are ready for you to use.



Easy to code and test

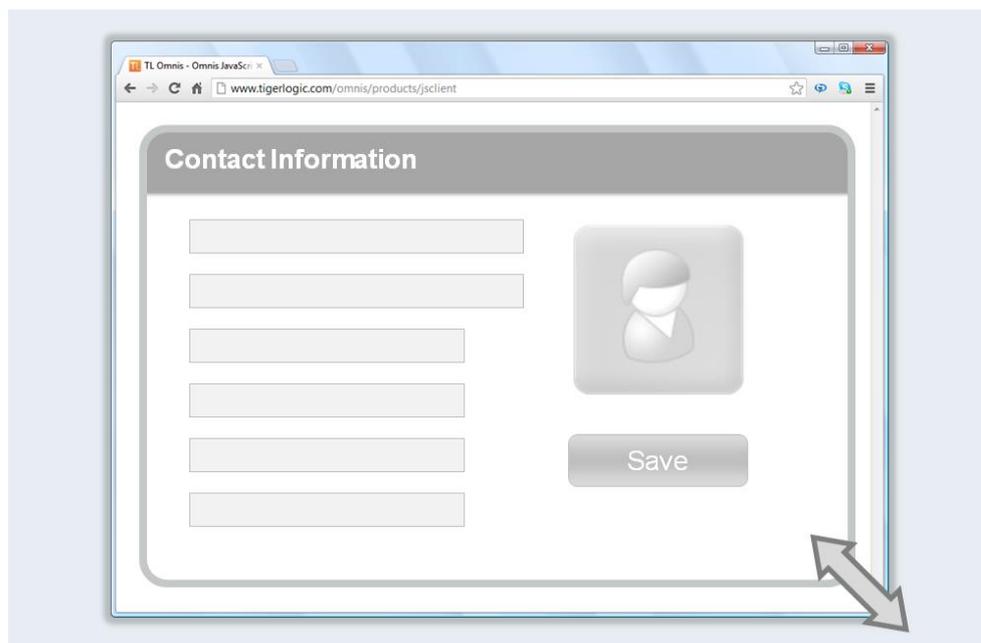
Once you have added a JavaScript component to your remote form, you can add code behind the object to enhance functionality. Omnis has a comprehensive programming language for manipulating objects and accessing data, and provides a powerful method editor and debugger in the Omnis Studio development environment.



When you have finished designing your remote form you can test it in Omnis Studio very easily, just by pressing Ctrl/Cmnd-T or selecting the **Test Form** option. During development the form will be opened in the web browser on your development computer: your app is embedded into an HTML page which is created for you automatically and you can use the code from the same HTML template to deploy your application.

Your apps will be “responsive”

You can store the layout and content of forms for different devices in a single remote form; as the end user opens the form on any particular device the correct layout is chosen automatically. In addition, by setting various properties of forms and components, your apps can resize dynamically as the end user resizes the browser window. For mobile devices, the app will change size and orientation automatically depending on the current device, while for web browsers, the application window and its content will resize automatically to the appropriate screen size.



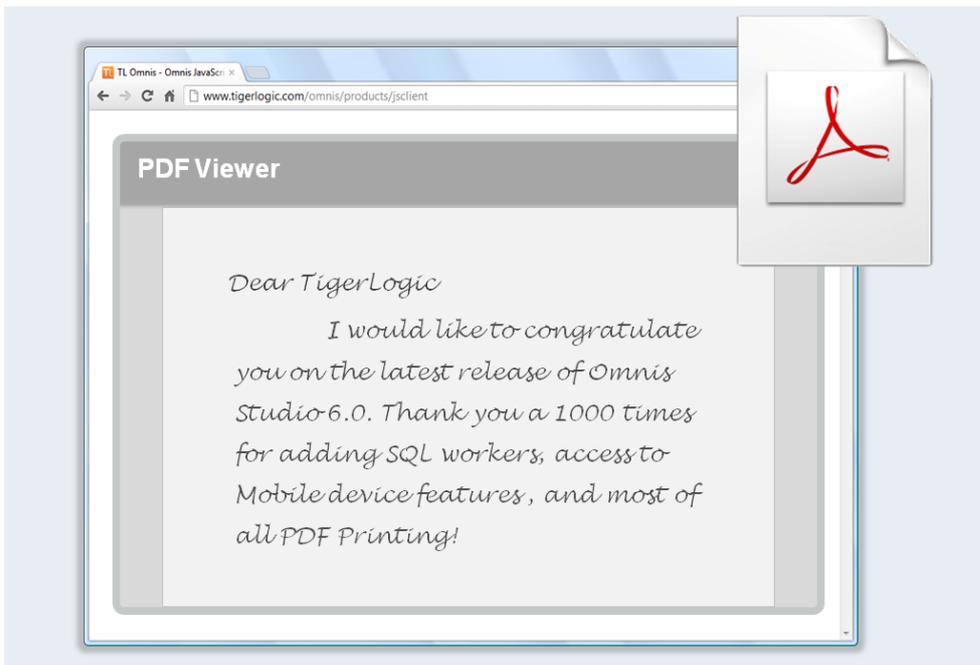
Dynamic, interactive user interfaces

You can create very rich and interactive user interfaces for your web and mobile apps using a special kind of JavaScript based subform, which is opened as part of a **Subform set**. Each subform in the set has a title bar and resizable borders, and can be opened and moved around within the “main” JavaScript remote form. Each subform can be resized, minimized or closed by the end user, and any individual subform can be brought to the front simply by clicking on it, therefore such subforms provide a similar end-user experience as desktop apps, but all in a single web browser window.



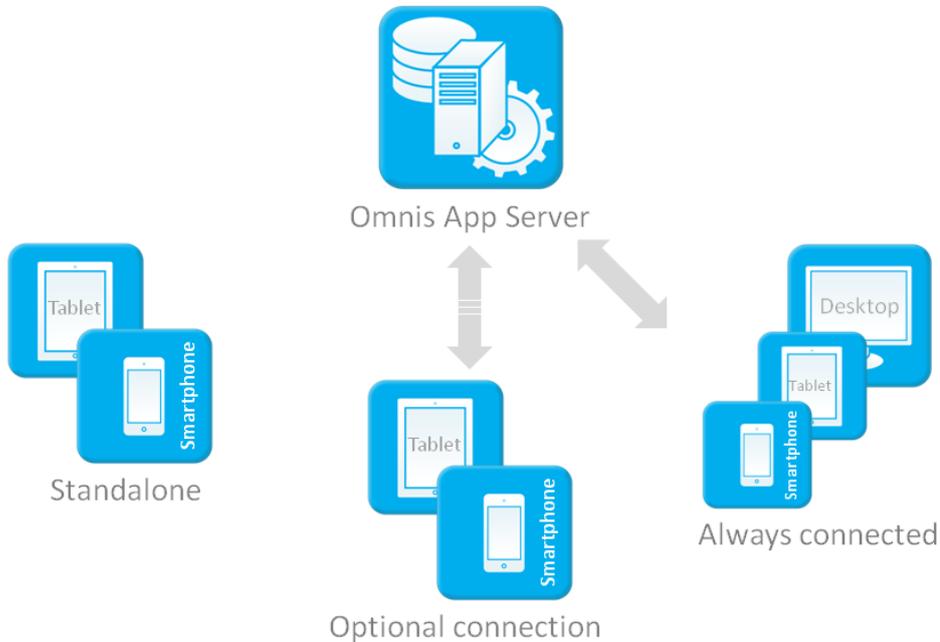
Print to PDF on any device

The common format for exporting or displaying content on the web or mobile devices is PDF format. You can print any report to a **PDF file** which can be displayed in a browser on the web or any mobile device in the JavaScript Client.

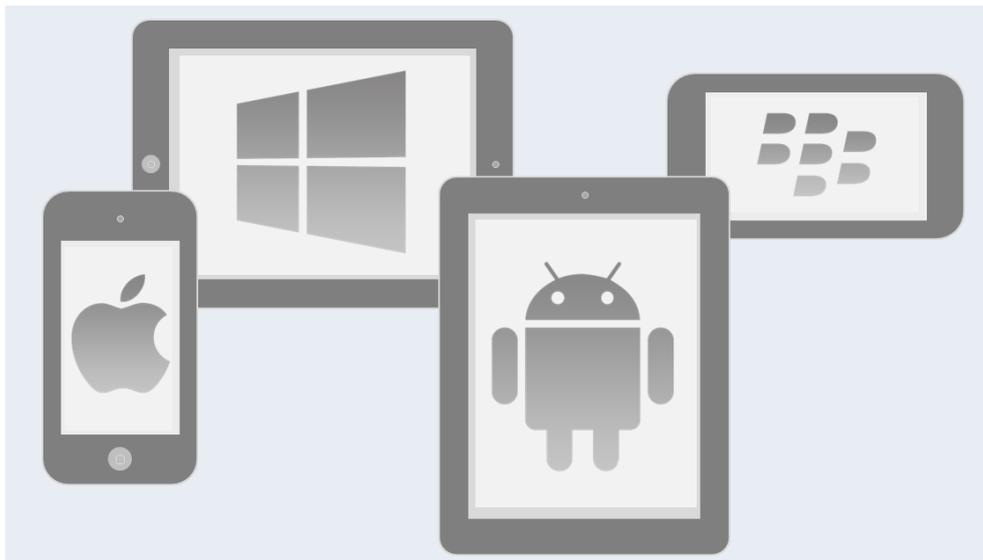


Web or standalone mobile app deployment

When you are ready to deploy your web or mobile app you run it on the Omnis App Server in conjunction with your chosen web server: your app will run in a standard web browser on virtually any device, including laptops, tablets, and smartphones, and in order to function your app must always be connected to the Omnis App Server. For most enterprise and web applications this setup is ideal with easy maintenance.



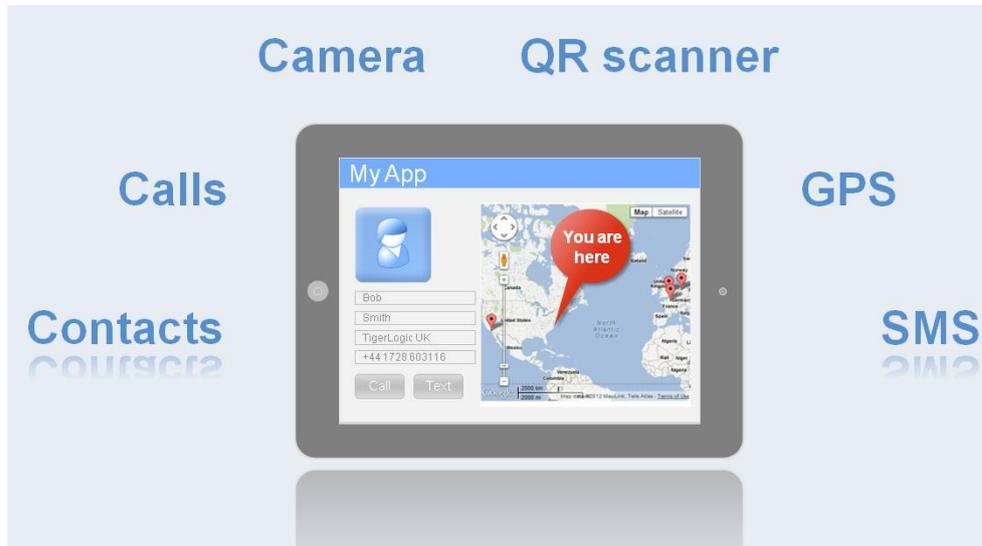
As well as deploying and running your Omnis apps in a standard web browser, you can “wrap” your application into an **Application Wrapper** that allows you to run the app directly on a mobile device. The application wrappers are available for all popular mobile platforms including Android, iOS, and BlackBerry (with Windows coming soon) and the wrapper source code is available to download from the Omnis website.



The wrappers contain a WebView control which loads the web page containing your mobile app (remote form). The wrappers allow your app to run either without any connection to the Omnis App Server, or when a connection is intermittent. This allows end user data and application content to be synchronized with the server backend once a connection is re-established.

Accessing mobile device features

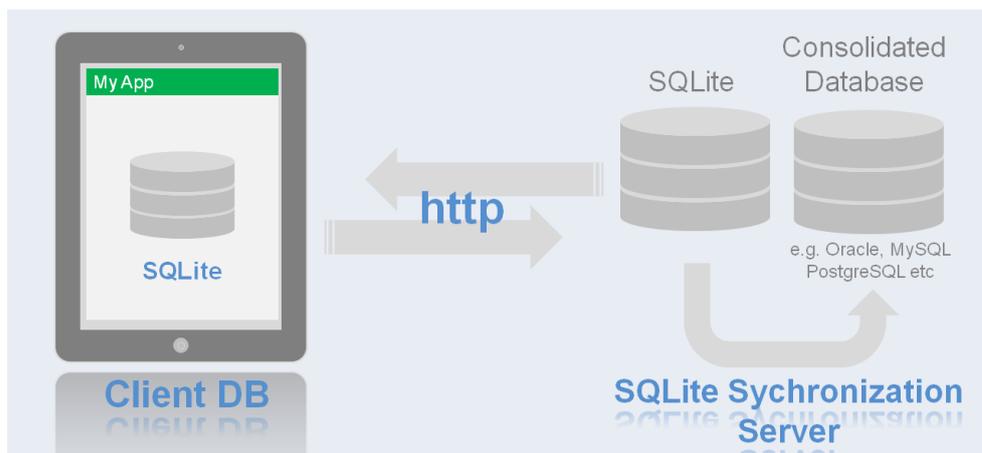
When your app is running standalone inside one of the application wrappers, you can access the hardware features and software services on the end user's mobile device, such as GPS, camera, and Contacts information. Access to the device is enabled using the **Device Control** which has many built-in actions to access the device features.



The Device control allows deeper integration with the device and opens up many possibilities for your mobile apps. For example, you can access the QR code scanner on the phone to create a stock control system in which end users can check-in and check-out items.

Client-side data and synchronization

When the JavaScript Client is running in standalone mode it has the provision for a local **client-side database**, which can be a SQLite database. This can be used for storing local data in your app, or it can be used to synchronize with an online Consolidated Database which handles the merging of data and transactions. The local database is used for storing tables held in the server-side database and for caching SQL transactions performed when the Omnis App Server is not available.



The synchronization between the local SQLite database and the consolidated database is handled by the SQLite Synchronization Server, available from Omnis Software. Alternatively, the local client database can be UltraLite and the synchronization with a consolidated database handled using a MobiLink server, both available from Sybase (now part of SAP).

Further information

For more information about developing web and mobile applications in Omnis Studio, please see the ***Creating Web & Mobile Apps*** manual, available from the Omnis web site: <http://www.omnis.net>

In addition, you can sign up for one our regular **Webinars**, or download a 90-day trial version of Omnis Studio and try it for yourself. You may also like to try out some of our sample web apps in the Omnis **JavaScript Apps Gallery** at: <http://www.omnis.net>

Appendix: Case Study

This appendix illustrates a real-life case study showing how one company has used the JavaScript Client to create a successful web and mobile application.

Company: CNM

Sector: Healthcare

Patient Diary mobile app is available for all platforms in record time thanks to new JavaScript Client

“With the Omnis JavaScript Client a dream came true for us. We only have to develop one client from now on.”

Dr. Lars Schärer, Managing Director of CNM who created a mobile patient diary system for the treatment of bi-polar disorder.

Patient diaries have proved their worth in medicine for a long time, both in monitoring and in therapy, mainly for diseases with unstable pathology, such as diabetes, asthma and coronary heart diseases, but especially for bipolar disorder and depression. However, until now the patient diaries have been created on paper and then transcribed to computer, a process which is very time consuming and creates the possibility for errors – this does not benefit the patient, their doctor or hospital staff. Due to modern software and communication technologies, patients are now able to enter their experiences into electronic patient diaries, which means that monitoring and diagnosis can be done much quicker and more accurately.

The University Hospital Freiburg in Germany is one of the largest medical facilities in Europe and was recently ranked by the German magazine “Focus” as the top provider of treatment therapy for manic-depressive and bipolar patients. Throughout the treatment of depression and bipolar disorder, the hospital makes extensive use of electronic patient diaries and so-called “Life Charts” which have multiple benefits for patients, including early warning of health impairment, better planning for treatments, and improved data for monitoring and research purposes. The electronic system that manages the diaries and Life Charts for patients at University Hospital Freiburg was created in Omnis Studio by the Freiburg based developer CNM (“Computer nach Maß” or “Computer made-to-Measure”) in cooperation with the German Society for Bipolar Disorder (DGBS), with an increasing number of patients in many different countries using the system.



The electronic patient diary system started ten years ago with an Omnis application for Palm handheld computers. In the following years many different “thin” clients were developed, including one for the Omnis Web Client (a web browser plug-in), for WAP, an ultra thin client,

a PDF client, an SMS version, then Windows Mobile and more recently an iOS version. Using Omnis Studio, CNM was able to develop the platform independent code for these different clients while keeping up with technical developments and the changing needs of patients. Nevertheless it always required a large amount of work to build and continuously maintain all these different clients. However, thanks to the new JavaScript Client technology in Omnis Studio, CNM was able to build a platform independent JavaScript Client for the patient diary system that runs on all web browsers and all mobile devices.

“Without Omnis we would not have been able to control the complexity of the system,” said Dr. Lars Schärer, Managing Director and head developer of CNM. “With the Omnis JavaScript Client a dream came true for us. We only have to develop one client from now on. The porting of the patient diary system to the new JavaScript Client succeeded in record time. It really worked with the same code as the native iOS Client without any problems.”

In its original form the electronic patient diary system was the first research project sponsored by the German Society for Bipolar Disorder (DGBS). Today it has become the most comprehensive database about bipolar disorder worldwide with over eight million records, allowing the system to respond to medical questions by data mining and simulation studies. Therefore studies with patients can be made safer and more meaningful or even fully eliminated. The electronic patient diary developed by CNM is a non-commercial project that is also sponsored by IBM. Omnis Software supports this project with free of charge licenses.

About CNM: Computer nach Maß Systemhaus GmbH has been creating software solutions for 25 years. As well as creating individual solutions like the electronic patient diary, CNM also handles the evaluation and analysis of survey data, amongst others, for the State government of Baden-Württemberg in Germany. A special focus is in the area of data capture and data mining, including the annual survey of 35,000 selected people throughout Europe, which is managed using Omnis.

Contact details:

Computer nach Maß (CNM)
Systemhaus GmbH
Rieselfeldallee 20
79111 Freiburg, Germany

Tel: +49 - 761 - 20 20 460
Email: cnm@computer-nach-mass.de
Web: www.computer-nach-mass.de