



# M-Business Anywhere, an Introduction

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# About This Manual

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## Focus of this guide

This guide is an M-Business Anywhere, an Introduction. It first gives you a high-level overview of the application architecture, then you are presented with a description of development guidelines that you would need to follow to create mobile client applications. Lastly, you can review code samples for incorporating standard functionality in addition to code samples of more advanced techniques.

For actual implementation details and in-depth information, sections in this guide refer you to the appropriate topics in the other books in the M-Business Anywhere documentation set.

## Audience

This guide is designed for people who will be evaluating whether this technology is the solution to mobilizing their company's applications.

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# Conventions

## Formatting conventions

The following table lists the formatting conventions used throughout this guide.

Table 1: Formatting conventions

Item	Treatment	Example
Name of publication	Italic	<i>Administrator Guide for M-Business Server</i>
User interface items: buttons, links, keywords	Bold	Click the <b>Reset</b> button.
Multi-level menu selections	Bold with “ ► ” menu separator character	Select <b>Start ► Settings ► Control Panel</b> .
Text you type	Bold fixed width font	Type <b>Admin</b> in this field.
Text displayed in a file or on the screen	Fixed width font	The screen reads: Backup Complete
Variables	Angle brackets	http://<servername>:<port>
Keyboard key	Angle brackets	Press < <b>Enter</b> >.
File names and paths	Italic	<i> pods.h C:/Program Files</i>

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## Related publications

iAnywhere Solutions publications

In addition to this document, there are several other iAnywhere Solutions publications available that you may find useful in developing mobile applications in the M-Business Anywhere environment.

**Note**

Unless otherwise noted, all of these publications are available from: [http://www.ianywhere.com/developer/product\\_manuals/mbusiness\\_anywhere/](http://www.ianywhere.com/developer/product_manuals/mbusiness_anywhere/)

- ◆ *Developer QuickStart Guide for M-Business Anywhere*
- ◆ *Release Notes for M-Business Anywhere*
- ◆ *Administrator Guide for M-Business Anywhere Server*
- ◆ *User Guide for M-Business Anywhere Client*
- ◆ *Application Developer Guide for M-Business Anywhere*
- ◆ *API Reference for M-Business Anywhere*
- ◆ *UltraLite for M-Business Anywhere User Guide*, available from [http://www.ianywhere.com/developer/product\\_manuals/-sqlanywhere/0902/en/pdf/ulagen9.pdf](http://www.ianywhere.com/developer/product_manuals/-sqlanywhere/0902/en/pdf/ulagen9.pdf)
- ◆ *UltraLite for M-Business Anywhere Tutorial*, available from [http://www.ianywhere.com/developer/product\\_manuals/-sqlanywhere/0902/en/html/ulagen9/00000043.htm](http://www.ianywhere.com/developer/product_manuals/-sqlanywhere/0902/en/html/ulagen9/00000043.htm)
- ◆ *The CustDB Sample UltraLite Application* [http://www.ianywhere.com/developer/product\\_manuals/-sqlanywhere/0902/en/html/ulfoen9/00000017.htm](http://www.ianywhere.com/developer/product_manuals/-sqlanywhere/0902/en/html/ulfoen9/00000017.htm)
- ◆ *SQL Anywhere Studio* documentation, available from [http://www.ianywhere.com/developer/product\\_manuals/-sqlanywhere/0902/en/html/index.html](http://www.ianywhere.com/developer/product_manuals/-sqlanywhere/0902/en/html/index.html)
- ◆ *Ensuring Mobile Security from the Device to the Datacenter*, available from [http://www.ianywhere.com/whitepapers/ensuring\\_security.html](http://www.ianywhere.com/whitepapers/ensuring_security.html)

Recommended references

The M-Business Anywhere documentation set focuses on aspects of mobile Web application development that are unique to the M-Business Anywhere environment. For a list of references on the standards and third party software that are incorporated in the M-Business Anywhere architecture, see the “Recommended references” topic in the *Application Developer Guide for M-Business Anywhere*, referenced in “Related publications” on page viii.

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# Contacting iAnywhere Solutions

## Technical support

If you need assistance using iAnywhere software, in North America, please contact iAnywhere Technical Support by calling 1-800-8SYBASE (800-879-2273) and then selecting option 3. You can call Monday through Friday (except major US holidays) between 9:00 a.m. and 9:00 p.m. Eastern time. Services will be provided in accordance with your support agreement.

Outside of North America, for your local support number and hours, please see: <http://www.sybase.com/contactus/support>

## Registering as a Named Contact

Calling the 800-number during business hours should always work to get you technical support; a Customer Number is created for you as soon as your purchase is completed. You will find it faster and easier to get technical support, by phone or online, if you have registered as a Named Contact.

When you purchase an iAnywhere product, a *Sybase Technical Support Contact Form* will automatically be emailed to you within 7-10 days. If your company should need to add another Named Contact, or change the one initially registered, call the Technical Support 800-number and request a *Sybase Technical Support Contact Change Form*.

The *Sybase Technical Support Contact Form* will contain your Customer Number, with spaces for you to provide an email address and other identifying information for the Named Contact for your product. Fill in the requested information and fax the form back to the phone number indicated.

When your fax is received, an email will be sent to you, providing your Technical Contact ID number. You can then use this number to speed up the process when you call for technical support, and to access technical support online.

## Using the Sybase Online Support Services

A major benefit of using the Sybase Online Support Services is 24x7 availability. Online support also allows you to look up and review past and current support issues.

When you register as a Named Contact, the email sent to you with your Technical Contact ID number also contains instructions for registering and using the Sybase Online Support Services. Follow these instructions to register as a first-time user, or to update your account with information for

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the new product you have purchased.

If you have any trouble registering for the Sybase Online Support Services, you can of course call iAnywhere Technical Support for assistance!

## **Application development — customizing iAnywhere software**

If you need help with customizing iAnywhere software to better serve your enterprise, please contact iAnywhere Solutions Professional Services at [contact\\_us@iAnywhere.com](mailto:contact_us@iAnywhere.com).

## **Product information**

If you need information about other iAnywhere products for your enterprise, please contact iAnywhere Workforce Sales at [contact\\_us@iAnywhere.com](mailto:contact_us@iAnywhere.com).

## **Feedback on documentation**

If you have questions or suggestions about this document or other iAnywhere technical publications, please contact iAnywhere Technical Publications at [iasdoc@iAnywhere.com](mailto:iasdoc@iAnywhere.com).

We would like to receive your opinions, suggestions, and feedback on this documentation. Although we do not reply to individual emails, we read all suggestions with interest and attempt to incorporate them in future releases.

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CHAPTER 1

# M-Business Anywhere

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## Overview

M-Business Anywhere is a comprehensive platform for developing, deploying, and managing mobile applications using Web technology on a variety of devices, including handheld PDAs (Personal Digital Assistants) running the Palm or Windows Mobile Pocket PC operating systems; the Microsoft Smartphone (2000, 2002, 2003, and 2004 Phone Editions); Windows Mobile 5 devices; and Windows XP devices.

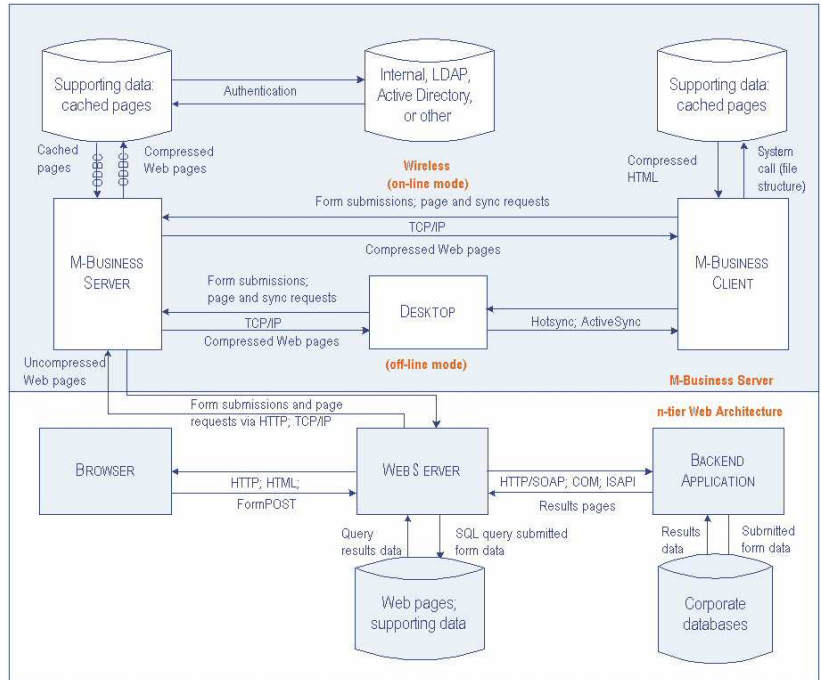
This is the industry's most reliable, scalable, secure and open mobile applications platform. It uniquely supports an Always Available model of seamless online and offline connectivity modes.

Using this industry-leading platform, you, the application developer, can today create and deliver useful information and applications to mobile users wherever and whenever your users need them.

This chapter discusses this platform's architecture by first presenting an architectural overview diagram followed by a discussion of each major architectural component. We provide references to the various books in the product documentation set that will enable you to research additional information about specific features you want to implement.

## Architecture

Refer to the following architectural diagram for an illustration of the M-Business Anywhere environment. The following sections in this chapter will discuss each component at a high level and provide you with references on where to find detailed information.



### M-Business Server components

#### M-Business Server

The M-Business Server accepts form submissions and page and synchronization requests from the M-Business Client. It then returns compressed Web pages to the M-Business Client.

#### M-Business SOAP API

The M-Business SOAP API supports Web services that allow developers to programmatically perform any task that can be performed through the Administrator Console UI. The SOAP API also allows customers or independent software vendors to re-brand or customize the Administrator Console, or to completely replace it, making it possible to OEM or embed M-Business Anywhere with a completely custom interface.

For more information, see the “M-Business SOAP API Reference” chapter in the *API Reference for M-Business Anywhere*, referenced in “[Related publications](#)” on page viii.

Supporting data; cached Web pages	Both and M-Business Client cache Web pages for an administrator-specified amount of time. This allows the system administrator to decide how often a channel needs to be refreshed, based upon the type of content that is being accessed.
M-Business Connect	<p>The desktop component of M-Business Client is M-Business Connect, which is the conduit that allows you to synchronize your device with the M-Business Server. The settings in M-Business Connect provide the information that the M-Business Client uses to communicate with the M-Business Server.</p> <p>M-Business Connect also installs on your mobile device, allowing you to configure settings for M-Business Server directly on your device and to synchronize remotely (if your device is equipped with a modem, network, or wireless connection).</p> <p>For additional information, see the “Introduction” chapter in the <i>User Guide for M-Business Anywhere Client</i>, referenced in <a href="#">“Related publications” on page viii</a>.</p>
M-Business Client	M-Business Client is usually installed on a handheld or mobile device such as a Palm Treo 650, Pocket PC, or Microsoft Smartphone. The mobile device can be used as a Web browser, for forms submission — where forms are filled in on the device and later submitted to the server via a synchronization — and for data access to an on-device datastore.

## Web server components

This section lists the components of the Web server.

Web server	M-Business Anywhere supports the use of the following Web servers for third-party software applications: Apache, IIS, IIS.Net, TomCat, WebLogic (BEA), and WebSphere (IBM).
SQL query submitted form data	Web servers query data using ADO, ADO.NET, .NET, ODBC, OLEDB, PBI, and SQL connectivity, among others, to the back-end database(s).
Query results data	A Web server may use ADO, ADO.NET, .NET, ODBC, OLEDB, PBI, and SQL connectivity to retrieve data from the back-end database(s). This is abstracted from the Web server. The results data is incorporated into HTML or saved as XML.
Web pages: supporting data	The supported Web servers listed above can use a variety of databases, including: ASA, ASE, DB2, Oracle, and SQL Server.
Back-end application	Application servers can be used to support back-end applications, such as: Lotus Notes, Oracle, PeopleSoft, Salesforce.com, Siebel, SQL Server, SQL, SOAP, and Siebel.

Submitted form data	A Web server or back-end application can use ADO, ADO.NET, .NET, ODBC, OLEDB, PBI, and SQL connectivity to the back-end corporate database(s).
Results data	A Web server can use ADO, ADO.NET, .NET, ODBC, OLEDB, PBI, and SQL connectivity to retrieve data from the back-end database(s).
Corporate database(s)	The supported back-end applications listed above can use a variety of databases, including: ASA, ASE, DB2, SQL Server, and Oracle.

## Understanding channels

### What is an M-Business channel?

In its most basic form, an M-Business channel is just another Website. There is more to it than that, of course. An M-Business channel page does not contain all the bells and whistles you might see on, say, a Web page in Internet Explorer 5.x. But if you know how to create a Web page, you can make yourself an M-Business channel.

As a simple introduction, look at what happens when you subscribe to and subsequently download an M-Business channel. Some elements have been simplified for the sake of brevity, but you will get a basic understanding of the process. See the “Testing your M-Business Channel” topic in the *Application Developer Guide for M-Business Anywhere*, referenced in “Related publications” on page viii.

The first thing you need to do is open up and configure an account on the M-Business Server. This account contains certain relevant information: your username and password, what channels you want to subscribe to, and so on.

After that, you install the software necessary to view M-Business channels. This software includes:

- ◆ **M-Business Client.** This is a Web browser (and a mini Web server) that is installed on your Palm OS, Pocket PC, or other mobile device. Some information about your account is also stored here.
- ◆ **M-Business Connect.** This is installed on both your desktop computer and device. It is the software that enables you to connect to the M-Business Server whenever you synchronize your device.

### What happens when you synchronize?

When you synchronize your mobile device, M-Business Connect takes over and connects to M-Business Server. M-Business Server, after looking up what channels you are subscribed to, downloads those pages from the Web server(s) where they reside. In most cases, these sites are distinct areas that contain pages optimized specifically for M-Business channels.

M-Business Server downloads all these pages and performs some pre-processing on them. This includes shrinking images that are too large for the mobile device’s screen, discarding pieces that cannot be used by M-Business Client (such as Java applets), and compressing the rest of the HTML. This compressed HTML is compared with what is on the device. If necessary, the pages are transferred to the device. For additional

information, see the “What is an M-Business Channel?” topic in the *Application Developer Guide for M-Business Anywhere*, referenced in “[Related publications](#)” on page viii.

## HTML page development

M-Business Client supports a rich palette of features that Web designers can use to create effective HTML pages. To make more effective use of the limited memory available on mobile devices, some of the least used features found in desktop browsers, such as Microsoft’s Internet Explorer, have been omitted. The majority of features that are used in most Websites are fully supported.

Web designers for mobile devices will find that they can continue to use most of the features they are accustomed to using in pages designed for desktop browsers. The greatest challenge is posed by the inherent limitations of mobile devices: small screens, limited color depth, or no color at all in older models.

There is also greater variation in the way a page displays on different mobile devices, as compared with the variations in how the same page may display on PCs running different browsers on different monitors. For guidance on designing HTML pages for M-Business Client, see the “Designing pages for the channel site” topic in the *Application Developer Guide for M-Business Anywhere*, referenced in “[Related publications](#)” on page viii.

HTML page development tools

You can use any tool with which you are comfortable to develop HTML pages. These tools include any text editor such as emacs, TextPad, Notepad, up to high-end products such as DreamWeaver.

JavaScript

JavaScript provides you, the Web developer, a quick and simple language to use for enhancing Web pages and servers. A segment of JavaScript functionality is embedded as a small program within a Web page which is in turn interpreted and executed by the Web client. JavaScript functions that can be called from within a Web document are often executed by mouse functions, buttons, or other user-initiated actions. For additional information about the JavaScript Engine Versus PODS, topic.

Screen widths

Mobile devices impose severe constraints on HTML page design due to limitations on device screen widths. The following table lists sample screen widths for supported devices.

Table 1.2: List of supported device screen widths

Device type	Older models	Newer models
Windows Mobile Pocket PC and Windows Mobile 5	240 x 320	480 x 640

Table 1.2: List of supported device screen widths

<b>Device type</b>	<b>Older models</b>	<b>Newer models</b>
Palm	160 x 160 (Treo 600; m500)	320 x 320 (Tungsten C; O/S 5.0)
Windows XP	N/A	Tablet PC - N/A Laptops - N/A
Microsoft Smartphone	N/A	176 x 220

## Custom branding for M-Business Client

In order to have M-Business Client use a custom icon and display a custom message if the home page is unavailable, it is necessary to write a launcher application for the operating system. You can write such a launcher application using any language you choose that can produce a binary executable for the target platform. iAnywhere, Inc. Professional Services also offers this service.

You can customize the M-Business Client home page by changing the home page URL in the ASA database to point to your home page's location.

For guidance on creating custom branding for M-Business Client, see the “Customizing and rebranding M-Business Client” topic in the *Application Developer Guide for M-Business Anywhere*, referenced in “[Related publications](#)” on page viii.

## When to use the M-Business client extension API

Use the M-Business client extension API to support your HTML pages. For additional information on the following topics, see the *API Reference for M-Business Anywhere*, PODS API Mechanics chapter:

- ◆ Roadmap to PODS Interfaces

This section summarizes the functionality provided by each M-Business client extension API (PODS) interface. From these summaries, you should be able to determine which interface you need to use to implement which types of application tasks in PODS.

- ◆ Interface Inheritance

A PODS interface can extend another PODS interface, meaning that the interface includes all of the methods of its parent interface(s). This section shows you how to define a sample interface to extend another hypothetical interface.

- ◆ PODS Data Types

The PODS data types, defined in the `podstypes.h` file, are described in the PODS Data Types table.

By using PODS data types, your code will be insulated from any future changes in the way these data types are defined; it also will make your PODS code more portable. Whenever possible, you should use PODS data types instead of any equivalent data type that may be available in C. Refer to this section to view a list of PODS data types and their descriptions.

- ◆ Deriving C Macro Method Syntax Directly From IDL Source

The source files for PODS are Interface Definition Language (IDL) files. The vast majority of header files in M-Business Anywhere are generated from these IDL files. The *API Reference for M-Business Anywhere* documents the details of calling each method in each interface, through the method's associated macro.

- ◆ PODSPodNew( ) Function Reference

`PODSPodNew( )` is the single entry point to the shared library containing a POD. It is comparable to a constructor for a C++ class.

`PODSPodNew( )` creates and returns a new `PODSPod` object. It allocates memory for the POD and tells the M-Business Client about this POD. Your implementation may also perform any other initialization functions that your POD requires.

## Built-in PODS

The following PODS are built into M-Business Anywhere.

### M-Business JavaScript engine

To view a list of supported ECMA and DOM features from standard JavaScript, see the JavaScript topic in the *Application Developer Guide for M-Business Anywhere*, referenced in “[Related publications](#)” on page viii. ECMA is core JavaScript specified in ECMA-262, 3rd Edition. DOM 0 is client-side JavaScript specified in the standard called DOM Level 0 API. W3C DOM consists of the document object model features specified in the W3C DOM 1.0+ standards. For more information, see the “Using DHTML” topic in the *Application Developer Guide for M-Business Anywhere*, referenced in “[Related publications](#)” on page viii. Use the Executive Dashboard sample to execute the example and view the described functionality.

Executive Dashboard



### Symbol scanner (Palm only)

M-Business Anywhere provides a `PODSymbolScanner` interface that implements the Symbol Technologies API for the Palm OS platform. See the “Using a Symbol scanner” topic in the *Application Developer Guide for M-Business Anywhere*, referenced in “[Related publications](#)” on page viii.

### Signature capture

M-Business Anywhere provides you with an in-line scribble widget that allows signature capture on the device at the scribble label level. There is no large dialog box that pops up, so the signer of the document is clearly signing the agreed-upon document. See the “Creating an in-line scribble

widget for signature capture” topic in the *Application Developer Guide for M-Business Anywhere*, referenced in [“Related publications” on page viii](#).

## Plug-in PODS

This section provides application details, including object tag parameters and APIs, for using the M-Business PODS listed below.

For application details, including examples of how the plug-ins appear on both a Pocket PC OS device and a Palm OS emulator, see the “Tools to add special features to a channel” topic in the *Application Developer Guide for M-Business Anywhere*, referenced in [“Related publications” on page viii](#).

## Date/Time Picker

The M-Business Date/Time Picker is a MIME player that allows the user to select a date and/or a time. A Date/Time Picker instance is initially displayed as a read-only text field. The user taps on the text field to expand the Date/Time picker inline; the user taps on the text field again to return the Date/Time Picker to its original state. See the “Using the Date/Time Picker” topic in the *Application Developer Guide for M-Business Anywhere*, referenced in [“Related publications” on page viii](#).

Date/Time Picker



## List Viewer

The List Viewer displays the contents of an `agddbset` or of an `ExtendedDBSet`. See the “Using the List Viewer” topic in the *Application Developer Guide for M-Business Anywhere*, referenced in [“Related publications” on page viii](#).

## List Viewer



## Symbol scanner (Microsoft OSes only)

M-Business Anywhere provides you with a `PODSSymbolScanner` interface that implements a Symbol Technologies API for Microsoft OSes. See the “Using a Symbol scanner” topic in the *Application Developer Guide for M-Business Anywhere*, referenced in “Related publications” on page viii.

## UltraLite for M-Business Anywhere

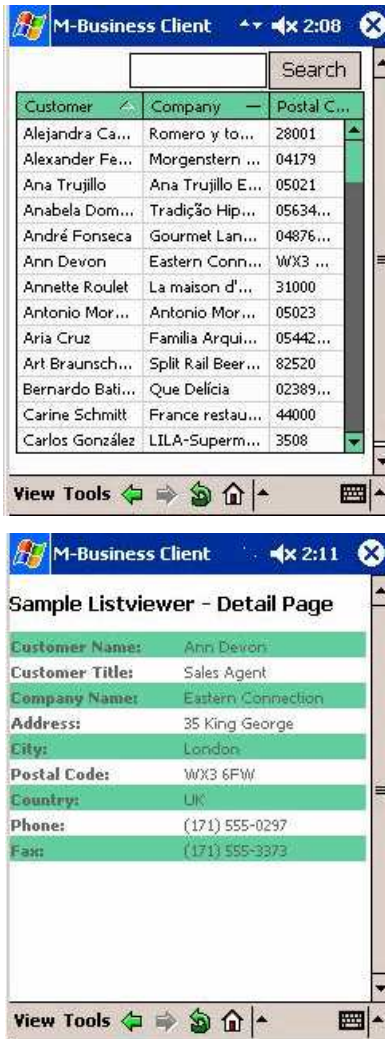
UltraLite technology provides the industry’s first application-optimized, ultra-small XML datastore that resides locally on mobile devices and can synchronize data with most central consolidated database management systems. This deployment option is aimed at mobile and embedded devices. See the tutorial for an overview of Ultralite for M-Business Anywhere at the following URL:

[http://www.ianywhere.com/developer/technotes/overview\\_ultralite.html](http://www.ianywhere.com/developer/technotes/overview_ultralite.html)

## M-Business XML datastore

M-Business Anywhere supports access to data stored in database systems and enterprise applications. The M-Business XML datastore is used to store relational data on-device.

Master-Detail page



See the following URL to view the detailed code sample:

[http://www.ianywhere.com/developer/code\\_samples/master\\_detail\\_mbus.-html](http://www.ianywhere.com/developer/code_samples/master_detail_mbus.-html)

## Security options

### Securing M-Business Client to M-Business Server sessions

You can secure M-Business Client/M-Business Server sessions by implementing industry-standard 128-bit SSL (Secure Sockets Layer) protocol (version 3.0). SSL is implemented through the M-Business Client's default proxy settings, unless you implement SSL through Microsoft Internet Explorer proxy settings .

### Securing M-Business Client/M-Business Server to on-device sessions

Elliptic curve cryptography is used to secure server to device connections. This helps with the on-device performance of your handheld. Elliptic curves are used in this cryptosystem to take a set of elements and perform arithmetic operations on them.

### Securing M-Business Server

The M-Business Server automatically provides some significant security features. For example, the M-Business Server stores user cookies encrypted using a 128-bit key. When SSL is enabled, the M-Business Server automatically performs transmission checks, monitoring all transmissions received to ensure that the SSL protocol is not being bypassed.

**Caution**

*To make the M-Business Server and its communications with Web servers and the M-Business Client as secure as possible, take all the standard precautions that security experts recommend for any server software that connects to the Internet.*

### Securing M-Business Server to Web server connection

In addition to enabling SSL for the connection between the M-Business Client and the M-Business Server, you also can enable SSL for the M-Business Server-Web server connection. SSL between the M-Business Server and Web servers is used to authenticate secure pages. M-Business Anywhere supports all industry standard certificates, including Thawte and RSA.

Other security-related product features include on-device password hashing, minimum password length option in the Admin UI, secure only connections, and available integration for NT domain, LDAP, and Active Directory.

## Implementing security options

For instructions on enabling the Secure Sockets Layer (SSL) security option for use with the M-Business Server, see the “Enabling SSL” topic in the *Administrator Guide for M-Business Anywhere Server*, referenced in [“Related publications” on page viii](#). The Security chapter discusses setting up security. For a general overview of this security option, see the “Securing M-Business Server: an overview” topic in the *Administrator Guide for M-Business Anywhere Server*, referenced in [“Related publications” on page viii](#).

Depending on whether you install an ECC or an RSA certificate, M-Business Connect will use either the Default or the Microsoft Internet Explorer proxy settings to provide users with a secure connection during synchronizations with M-Business Server.

## Securing the mobile device

M-Business Anywhere offers several ways to secure your data in M-Business Client on the mobile device. These include on-device encryption when you store data in an Ultralite datastore, user authentication when accessing the on-device application, and enabling client password protection globally on the M-Business Server where your channel is based.

For instructions on enabling client password protection, see the “Understanding channel properties” topic in the *Administrator Guide for M-Business Anywhere Server*, referenced in [“Related publications” on page viii](#).

## Caching to improve performance

M-Business Anywhere supports caching of channel page both on M-Business Server and on the mobile device where M-Business Client is running. In addition, the Web server hosting your channel supports caching at the source. You can significantly reduce the time it takes your typical user to synchronize a device with M-Business Server by fine tuning the caching settings at all three points. For detailed instructions on caching, see the “Caching to improve channel performance” chapter in the *Application Developer Guide for M-Business Anywhere*, referenced in [“Related publications” on page viii](#).



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## CHAPTER 2

# Mobile application design guidelines

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## Using dynamic HTML

For detailed implementation information that M-Business channel developers need to smoothly implement efficient channels to serve target audiences, see the *Application Developer Guide for M-Business Anywhere for M-Business Anywhere*. It provides guidance on creation of handheld-friendly channel content with basic HTML. It does not cover details of programming in C/PODS. You should read this guide if you are creating, administering, or trouble-shooting an M-Business channel.

For detailed information, see the *Application Developer Guide for M-Business Anywhere for M-Business Anywhere*, HTML 4 Support in M-Business Anywhere Client appendix.

### General page design considerations

For a list of references to information about how to use supported M-Business Client HTML 4 features, see the *Application Developer Guide for M-Business Anywhere for M-Business Anywhere*, HTML 4 Support in M-Business Anywhere Client appendix.

References include:

- ◆ World Wide Web Consortium, at: <http://www.w3.org/>
- ◆ W3 Schools, at: <http://www.w3schools.com/>
- ◆ Web Monkey, at: <http://hotwired.lycos.com/webmonkey/>

### Brief description of M-Business JavaScript engine

JavaScript is a compact, cross-platform, object-based scripting language that extends the capabilities of HTML. JavaScript is integrated with HTML to allow developers to create interactive Web pages. For example, you can create a JavaScript program to pre-validate a form before sending it back to the server, set options based on user preferences, update text displayed in a form's text box, etc. Because JavaScript is downloaded with the HTML page, its execution requires no further interaction with the server.

JavaScript is easy to learn, yet powerful enough for sophisticated scripting tasks. It uses syntax similar to C and C++ and has object-oriented features that use prototype-based inheritance.

M-Business JavaScript engine is the iAnywhere Solutions, Inc. implementation of client-side JavaScript. Many JavaScript features that are not considered high priority for handheld devices are not supported in order to conserve mobile device resources. At the same time, most of the features

of PODS are directly available to JavaScript Engine as if they were provided by JavaScript native objects. For details on what JavaScript Engine omits from JavaScript and what it adds from PODS, see the *Application Developer Guide for M-Business Anywhere for M-Business Anywhere*, M-Business JavaScript engine reference appendix.

## Specific features of M-Business JavaScript engine

JavaScript Engine enables developers to:

- ◆ Dynamically generate HTML pages
- ◆ Dynamically change the contents of HTML pages via DHTML
- ◆ Dynamically change the contents of forms on HTML pages
- ◆ Call a browser to perform various tasks, such as manipulating form fields or form submissions
- ◆ Support user interaction with HTML pages when disconnected, if the page is cached on the device

## Using M-Business client extension API

For information on the M-Business client extension API, including information on how JavaScript Engine can call this API, see the *API Reference for M-Business Anywhere*. Also review its Reference section for information describing the various PODS objects.

That chapter will present you with a roadmap to M-Business XML datastore API interfaces, a database inheritance diagram, and details of the available API interfaces.

### M-Business JavaScript engine (JavaScript) versus PODS (C code)

The JavaScript supported by M-Business JavaScript engine provides you, the Web developer, with a quick and simple language to use for enhancing Web pages that is device-independent. A segment of JavaScript functionality is embedded as a small program within a Web page which is in turn interpreted and executed by the Web client.

Using compiled C code to create your own PODS, on the other hand, provides you with better performance, the capability to perform file operations, interaction with native programs, and increased programming flexibility. The trade-off is that you must compile your C code separately for each device OS that you support, and then set up platform-specific delivery of the correct binaries to each platform. For more information on setting up a single channel that can deliver the correct platform-specific files to different devices, see the Application Developer Guide for M-Business Anywhere, referenced in [“Related publications” on page viii](#).

## Using offline form submissions

For a list of supported extensions to the JavaScript methods of the `Form` object for form submission, see the *Application Developer Guide for M-Business Anywhere for M-Business Anywhere*, Managing Channel Form submissions chapter.

For general form submission information, see the *Administrator Guide for M-Business Anywhere Server*. In particular, see the Creating a Personal Channel for a User topic in that guide.

The *Application Developer Guide for M-Business Anywhere for M-Business Anywhere* contains the following information:

- ◆ Customizing Content for Users and Devices chapter - the Using M-Business Anywhere client HTTP Request Headers to Customize Content topic contains information and examples concerning setting cookies.
- ◆ Managing Channel Form Submissions chapter – contains information about submitting forms offline and using the Forms Manager.

## Using M-Business Client HTTP request headers to customize content

There will be times when you want finer control of the display on the client. The best example of this would be with logos. Sure, a color logo looks great on a high-end color Palm or a Pocket PC device, but it looks dithered on a black-and-white Palm. And while a posterized 4-color grayscale logo looks nice on a black-and-white Palm, when you look at it on a color device, it looks like a 4-color grayscale logo. What you would really like is the ability to serve up different images based on the device that is viewing your channel.

That is where the M-Business Client headers come in. As you already know, when a browser accesses your Web server, it sends across several headers in the HTTP page request. These are informational headers telling your server a little about the browser; what type of browser it is, what host it thinks it is connecting to, the language the client prefers, and other parameters as follows: all of which can be used to customize content.

Table 2.2: List of M-Business-specific headers

Header	Description
User-Agent	Mozilla/4.0 (compatible; AvantGo 5.5; Windows NT)
X-AvantGo-Version	base64 encoded
X-AvantGo-ColorDepth	base64 encoded
X-AvantGo-ClientLanguage	en_US
X-AvantGo-ScreenSize	base64 encoded
X-AvantGo-DeviceOS	base64 encoded
X-AvantGo-DeviceOSVersion	base64 encoded
X-AvantGo-UserId	base64 encoded
X-AvantGo-DeviceId	base64 encoded
X-AvantGo-ChannelId	en_US

For additional information, see the *Application Developer Guide for M-Business Anywhere for M-Business Anywhere*, Using Server URL Macros to Customize content topic.

## AG\_USER example

Below are some simplified examples of mapping the AG\_USER URL macro to Web server directories and files. In these examples, it is assumed that the Web server's domain is `http://myserver.com`, that this domain maps to the file system path `D:\webserver\contentroot`, and that you have three user IDs: `aasmith`, `bjwong`, and `ccgomez`.

## Code samples

Refer to the following code samples for an illustration of the concepts described above.

- ◆ Different files for different users, in same directory:

Channel URL - `http://myserver.com/myapp/AG_USER.asp`

Files for different users -

`D:\webserver\contentroot\myapp\aasmith.htm`

`D:\webserver\contentroot\myapp\bjwong.htm`

`D:\webserver\contentroot\myapp\ccgomez.htm`

- ◆ Different directories for different users, with same file name:

Channel URL - `http://myserver.com/AG_USER/myapp.htm`

Files for different users -

`D:\webserver\contentroot\aasmith\myapp.htm`

`D:\webserver\contentroot\bjwong\myapp.htm`

`D:\webserver\contentroot\ccgomez\myapp.htm`

- ◆ User ID passed as parameter to web application:

Channel URL - `http://myserver.com/myapp.asp?id=AG_USER`

Files for different users -

`D:\webserver\contentroot\myapp.asp` (The same file, `myapp.asp`, generates different content when each user ID replaces AG\_USER in the channel URL.)

## Using URL macros to distribute content to multiple device types

URL macros on the M-Business Server allow you to set up a single channel that delivers different content to different users. The content differences can be based on the username, the user's device, or even the processor on the user's device. For a discussion on how to insert URL macros into your channel URL and a list of available URL macros, see the *Application*

*Developer Guide for M-Business Anywhere for M-Business Anywhere,  
Using Server URL Macros to Customize Content topic.*

## Designing applications to work both online and offline

For information on designing and managing channels that contain forms which users can submit, see the *Application Developer Guide for M-Business Anywhere for M-Business Anywhere*, Managing Channel Form Submissions chapter.

Follow the few simple guidelines presented in that chapter to give your users a much more elegant experience. You will also have complete control over the messages displayed and how the response pages are accessed after a user's next synchronization. The chapter contains the topics listed below.

### Forms in the online world

You should already have a sense of how forms work in the normal online world of desktop Web browsers. You create a form and associate it with an action; often a cgi-bin script of some sort. A user enters data into the form through text fields, check boxes, and so on. Using the M-Business Client capabilities, you also can create a form with fields pre-populated with a user's email address and zip code, and, if you feel like being clever, you can enter data for the user through hidden fields. Regardless of what elements are in the form, the data is passed on as parameters to the action associated with that form. The action will perform some sort of processing on the data received, and then outputs its results in the form of an HTML document.

### Forms in the offline world

The majority of mobile devices do not come with modems, so dealing with forms and user input is a little more tricky. Your users are viewing your forms offline. They can enter all their data into the forms using text fields, checkboxes, radio buttons, and all the usual form objects.

### What the Forms Manager does

When users submit a form in offline mode, the form is stored on the device in a repository called the Forms Manager. This is where your form is kept until your mobile device is synchronized again. At that point, the data is sent to the cgi-bin script (or other action) associated with the form. It is processed, then the resulting HTML page is sent back to the mobile device.

### Submitting forms the right way

If you want your channel form submissions to work nicely, whether the user

is online or offline, all you have to do is be sure that the form submissions work well in offline mode.

## **Avoiding collisions in multiple offline submissions**

When the same form is submitted more than once while the user is offline, cookies in the successive submissions can interfere with each other when the M-Business Sync Server processes them. There are several ways to avoid this problem.

## **Serializing forms: breaking one form into several pages**

Sometimes it is desirable to break a single form into several logical pages, which compose a single form submission. There are two basic approaches to doing this in M-Business Anywhere: Serialize from a single page, and Serialize using Submission Manager.

## **Using cookies to support personal channels**

Cookies through the M-Business Client and the M-Business Sync Server work similarly to cookies in other applications. The only difference is that cookies are not stored on the mobile device. They are stored on the M-Business Sync Server and are associated with the user's M-Business Anywhere account.

## Testing and deploying your mobile application

Most of the guidelines for testing and deploying any Web-based application apply equally to mobile applications using the M-Business Anywhere architecture.

### Testing

Initial application testing can be done in a desktop browser if M-Business Client extensions are not involved (M-Business client extension API, certain JavaScript engine features). Even if your application will use M-Business Client extensions, you may find it more convenient to do initial testing of the HTML and most of the JavaScript pieces in a desktop browser.

If you are developing an application for the Palm OS, initial testing can be done on the desktop in the Palm emulator software. If you are developing an application that will be used on RIM OS, in addition to other platforms, we recommend that you do initial development and testing on the RIM platform.

When you begin testing application components on a mobile device, you may be able to save time by copying files directly to the device, then opening HTML pages through the Open Page dialog box. This may be quicker than synchronizing the entire channel, especially for large applications.

### Setting up users and groups

Unless your application is intended for everyone in the company to use, you probably have in mind particular individuals or groups as the application's target audience. All the users for your application must be defined on your M-Business Server individually. For convenience, individual users can be assigned to groups so that the M-Business Server system administrator can provide the whole group access to the same content.

Groups may already be defined on your M-Business Server for functional workgroups, such as sales, human resources, and top management. There may even be a group for everyone in the company who uses a mobile device. You may be able to use some combination of existing groups to give users access to your application, or you may need to define a new group.

For instructions on setting up users and groups, see the *Administrator Guide for M-Business Anywhere Server*, Managing Users and Managing Groups chapters.

### Setting up a channel and subscribing users

Your application will be delivered to the mobile devices of the groups of

users that you specify through a channel. For an overview of how Managing Channels chapter.

When you set up a channel on the M-Business Server, you specify a single URL for the top level page of the channel content, and the Link Depth; the number of links away from that page for which pages should also be downloaded. For a graphic explanation of Link Depth, see the *Application Developer Guide for M-Business Anywhere for M-Business Anywhere*, The Link Depth Setting topic.

When you set up a channel, you may also specify the channel audience. Channels can be categorized according to the audience targeted, as follows:

- ◆ Group channels: A group is a collection of users to which you can assign Web channels. When you assign Web channels to a group, all members of that group will have access to those channels. You can also specify the type of channel you are creating: Managed, Optional, or Required.
- ◆ Personal channels: You specify a single user, and that user only is automatically subscribed to the channel.
- ◆ Public channels: By defining a channel as public, you allow any user to subscribe to it, but no one will be subscribed to it automatically. The channel will be listed in the M-Business Server's list of public channels and individual users may subscribe to them through the M-Business Server desktop user interface or directly from the mobile device.

For instructions on setting up these different categories of channels, see the *Administrator Guide for M-Business Anywhere Server*, Creating Channels for a Group, Creating a Personal Channel for a User, and Using Public Channel Publishing and Administration topics. For user instructions on self-subscribing to channels, see the *User Guide for M-Business Anywhere Client*.

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## CHAPTER 3

# Code samples

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	<a href="#">Samples</a>	33
	<a href="#">Online tutorial: Building an UltraLite application for M-Business Anywhere</a>	35
	<a href="#">Advanced techniques</a>	36

## Overview

Refer to the code samples in this Appendix to learn how to develop a data-driven Web application using the M-Business Anywhere platform. This information is geared towards the Web application developer who wants to develop mobile Web applications that are deployable onto mobile devices.

### Downloading sample code

Sample files are contained in downloadable zip files. For example, `pods.zip` is one downloadable zip file containing sample code. To download this file, navigate to the download page URL provided to you via email, or use the URL below to request a developer edition.

[http://www.ianywhere.com/developer/code\\_samples/index.html#mbus](http://www.ianywhere.com/developer/code_samples/index.html#mbus)

Each sample file is named as indicated by its heading as listed under “Samples” on page 33 below.

# Samples

For information on how to download and work with the PODS sample files, see the “PODS Code Samples” appendix in the *API Reference for M-Business Anywhere*, referenced in “[Related publications](#)” on page viii.

## Master Detail page example

This example demonstrates how to develop a data-driven master-detail Web application using the M-Business Anywhere platform. The sample code provided there demonstrates the use of the following iAnywhere technology:

- ◆ XMLDB on-device datastore to store relational data.
- ◆ MIMEList player to display data from XMLDB in tabular format.
- ◆ AvantGo Preferences object to store session information.

Refer to the following URL to view the detailed code sample:

[http://www.ianywhere.com/developer/code\\_samples/master\\_detail\\_mbus.-html](http://www.ianywhere.com/developer/code_samples/master_detail_mbus.-html)

## Forms sample: Serializing forms

This pair of code samples illustrate two approaches to breaking a single form into multiple logical pages: DHTML to selectively hide and display sections of a single form; and DOM to build sections of a form in the Forms Manger. Available online at:

[http://www.ianywhere.com/developer/code\\_samples/mbus\\_serializing\\_forms.htm](http://www.ianywhere.com/developer/code_samples/mbus_serializing_forms.htm)  
1

## One button sync

This sample application illustrates use of UltraLite for M-Business Anywhere for on-device data. It uses the MobiLink Redirector and one-button synchronization features of M-Business Client, version 5.5 and higher, along with MobiLink in Adaptive Server Anywhere, version 9.02. Available online at:

[http://www.ianywhere.com/developer/code\\_samples/master\\_detail\\_mbus.-html](http://www.ianywhere.com/developer/code_samples/master_detail_mbus.-html)

## Executive Dashboard

This sample application illustrates some of the features that you can

implement with DHTML, including expanding/collapsing menus and text hierarchies, an interactive calendars and charts, form submissions, and dynamically sorting a table. Available online at:

[http://www.ianywhere.com/developer/code\\_samples/mbus\\_dhtml.html](http://www.ianywhere.com/developer/code_samples/mbus_dhtml.html)

### Date/Time Picker sample

Use this sample to see a demonstration of how to use the `datetimepicker` element to easily add date and time selection to your M-Business Client application. For detailed information, see the *API Reference for M-Business Anywhere*, PODS Code Samples appendix.

### PODS sample: submitting forms

Use this sample source code to help you create PODS modules for iAnywhere Solutions software. For detailed information, see the *API Reference for M-Business Anywhere*, PODS Code Samples appendix.

### DocumentSrc sample: vending documents

This function is invoked when the document manager searches for a document. If the URL matches your `SAMPLE_URL`, a document is generated and returned to the document manager. For detailed information, see the *API Reference for M-Business Anywhere*, DocumentSrc Sample: Vending Documents topic.

### ObjectSrc sample: vending objects to JavaScript

This function is invoked when the object manager is searching for an object. If the name matches the `SAMPLE_NAME`, it returns the object (creating it if necessary) and returns it to the object manager. For detailed information, see the *API Reference for M-Business Anywhere*, PODS Code Samples appendix.

## Online tutorial: Building an UltraLite application for M-Business Anywhere

To learn how to build a cross-platform UltraLite application for M-Business Anywhere, see the online tutorial, *A Sample Application for M-Business Anywhere*, referenced in “[Related publications](#)” on page viii. At the end of the tutorial you will have an application and small XML datastore that synchronizes with a central consolidated database.

This tutorial guides you through the process of building an UltraLite application for M-Business Anywhere. It includes the following sections:

- ◆ Introduction: Provides you with a description of the tutorial, the amount of time it should take you to complete the tutorial, and a list of prerequisites you must have in place to be able to start the tutorial.
- ◆ Lesson 1: Create a project architecture - describes how to create an UltraLite database schema. The database schema is a description of the database. It describes the tables, indexes, keys, and publications within the database, and all the relationships between them.
- ◆ Lesson 2: Create the application files - shows you how to use a form to create a user interface.
- ◆ Lesson 3: Set up the M-Business Server and client - lists the steps you should take to create an M-Business Anywhere user, group, and channel for your application.
- ◆ Lesson 4: Add startup code to your application - instructs you on how to add startup code to your application that connects to an UltraLite on-device database. This will require adding HTML to the main page and adding JavaScript logic to control the application.
- ◆ Lesson 5: Add inserts to your application - shows you how to add data manipulation and navigation logic to your application.
- ◆ Lesson 6: Add navigation to your application - provides sample code for scrolling forwards and backwards through the rows of a result set.
- ◆ Lesson 7: Add updates and deletes to your application - provides sample code for updating and deleting rows.
- ◆ Lesson 8: Add synchronization to your application - provides a procedure to implement synchronization.

## Advanced techniques

M-Business Anywhere provides a clean superset of Web standards for dealing with the particular requirements of mobile applications development. For signature capture, an input field of type `scribble`, borrowed from the draft HTML 4.1 specification, is provided. For barcode scanning, a JavaScript interface to Symbol<sup>®</sup> scan-enabled devices is provided. The included Forms Manager (with a JavaScript API) provides the ability to manage offline form submissions. For additional information, see the *API Reference for M-Business Anywhere*, Utilities chapter.

### Signature capture

Use M-Business Anywhere to capture signatures on Pocket PC or Palm devices. The `scribble` input field has been implemented as specified in the draft HTML 4 standard. It allows the capture of signature data as well as (potentially) the timing information associated with each stroke. For additional information, see the *API Reference for M-Business Anywhere*, Utilities chapter.

### Scanner

Web-based applications can take advantage of device features such as barcode scanners and cameras. M-Business Anywhere offers a Symbol scanning API encapsulated in a JavaScript object. For additional information, see the *API Reference for M-Business Anywhere*, Utilities chapter.

### Other hardware

Cameras usually just place the photos in the file system. PODS allows customers to build plug-ins to the M-Business Client that can interface with any device hardware. For additional information, see the *API Reference for M-Business Anywhere*, Utilities chapter.

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