

# M-Business Anywhere

## An Introduction

Architecture

Design Guidelines

Channel Quick Start

Version 6.0



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# Table of Contents

## Before you begin

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<b>CHAPTER 1. About this guide</b> . . . . .	9
Focus of this guide . . . . .	10
Audience . . . . .	10
Conventions . . . . .	11
Formatting conventions . . . . .	11
Related publications . . . . .	12
Recommended references . . . . .	13
Contacting iAnywhere Solutions . . . . .	15
Technical support . . . . .	15
Application development — customizing iAnywhere software . . . . .	16
Product information . . . . .	16
Feedback on documentation . . . . .	16

## Concepts and development guidelines

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<b>CHAPTER 2. M-Business Anywhere</b> . . . . .	19
Overview . . . . .	20
Architecture . . . . .	21
M-Business Server components . . . . .	21
Web server components . . . . .	23
Understanding channels . . . . .	24
What is an M-Business channel? . . . . .	24
What happens when you synchronize? . . . . .	24
HTML page development . . . . .	25
HTML page development tools . . . . .	25
JavaScript . . . . .	25
Screen widths . . . . .	25
Custom branding for M-Business Client . . . . .	27
When to use the M-Business client extension API . . . . .	28
Built-in PODS . . . . .	29
Plug-in PODS . . . . .	29

Security options . . . . .	32
Securing M-Business Client to M-Business Server sessions. . . . .	32
Securing M-Business Client/M-Business Server to on-device sessions .32	32
Securing M-Business Server . . . . .	32
Securing M-Business Server to Web server connection . . . . .	32
Implementing security options. . . . .	33
Securing the mobile device . . . . .	33
Caching to improve performance . . . . .	33
<b>CHAPTER 3. Mobile application design guidelines . . . . .</b>	<b>35</b>
Using dynamic HTML . . . . .	36
General page design considerations. . . . .	36
Brief description of M-Business JavaScript engine. . . . .	36
Specific features of M-Business JavaScript engine. . . . .	37
Using M-Business client extension API . . . . .	38
M-Business JavaScript engine (JavaScript) versus PODS (C code) . . . . .	38
Using offline form submissions . . . . .	39
Using M-Business Client HTTP request headers to customize content. . . . .	40
Using URL macros to distribute content to multiple device types. . . . .	41
Designing applications to work both online and offline . . . . .	42
Forms in the online world . . . . .	42
Forms in the offline world . . . . .	42
What the Forms Manager does . . . . .	42
Submitting forms the right way . . . . .	42
Avoiding collisions in multiple offline submissions . . . . .	43
Serializing forms: breaking one form into several pages . . . . .	43
Using cookies to support personal channels . . . . .	43
Testing and deploying your mobile application . . . . .	44
Testing. . . . .	44
Setting up users and groups . . . . .	44
Setting up a channel and subscribing users . . . . .	45
<b>CHAPTER 4. Code samples. . . . .</b>	<b>47</b>
Overview . . . . .	48
Downloading sample code . . . . .	48
Samples . . . . .	49
Master Detail page example. . . . .	49
Forms sample: Serializing forms . . . . .	49
One button sync . . . . .	49
Executive Dashboard . . . . .	49
Date/Time Picker sample . . . . .	50
PODS sample: submitting forms . . . . .	50
DocumentSrc sample: vending documents . . . . .	50
ObjectSrc sample: vending objects to JavaScript. . . . .	50
Online tutorial: Building an UltraLite application for M-Business Anywhere	51
Advanced techniques . . . . .	52

Signature capture . . . . .	52
Scanner . . . . .	52
Other hardware . . . . .	52
<b>Index</b> . . . . .	<b>53</b>



# Before you begin

“About this guide” (page 9)



# CHAPTER 1. **About this guide**

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- n “Focus of this guide” (page 10)
- n “Conventions” (page 11)
- n “Related publications” (page 12)
- n “Recommended references” (page 13)
- n “Contacting iAnywhere Solutions” (page 15)

## Focus of this guide

This guide is an introduction to M-Business Anywhere. 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.

The sections in this guide will refer you to the appropriate chapters and sections located in the various books of the M-Business Anywhere documentation set for actual implementation details and in-depth information.

### Audience

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

## Conventions

### Formatting conventions

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

**Table 1-1**  
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 vertical hash	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	<Enter>
File names and paths	Italic	<i>pods.h</i> <i>C:/Program Files</i>

## Related 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.

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**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/)

- n *QuickStart Guide for M-Business Anywhere*
- n *Release Notes for M-Business Anywhere Server and Client*
- n *Administrator Guide for M-Business Anywhere Server*
- n *User Guide for M-Business Anywhere Client*
- n *Application Developer Guide for M-Business Anywhere*
- n *API Reference for M-Business Anywhere*
- n *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)
- n *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)
- n *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)
- n *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)
- n *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)

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## Recommended references

In addition to the related publications from iAnywhere Solutions, you may want to consult references on the standards and third party software that are incorporated in the M-Business Anywhere architecture.

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### Note

The *API Reference for M-Business Anywhere* documents in detail only those features of JavaScript, DOM, and CSS that differ from the published standards.

If you already have a favorite reference on any of these topics, there is no need to seek out another. However, if you need additional reference material and do not already have it at hand, the following list of sources is a good place to start.

### *Cascading Style Sheets (CSS)*

*W3C Cascading Style Sheets home page.*

HTML: <http://www.w3.org/Style/CSS/>

A comprehensive reference on CSS maintained by the W3C.

### *Document Object Model (DOM)*

*W3C Document Object Model (DOM) Level 1 Specification (Second Edition)*

PDF: <http://www.w3.org/TR/2000/WD-DOM-Level-1-20000929/DOM.pdf>

plain text: <http://www.w3.org/TR/2000/WD-DOM-Level-1-20000929/DOM.txt>

A basic reference on the DOM spec.

### *DOM Tutorial*

HTML: <http://www.w3schools.com/dom/default.asp>

A good introduction to DOM maintained by W3Schools.

### *Dynamic HTML (DHTML)*

*Introduction to Dynamic HTML .*

HTML: <http://msdn.microsoft.com/library/default.asp?url=/workshop/author/dhtml/dhtml.asp>

The Microsoft Developer Network's tutorial/reference on DHTML.

### *HTML*

*Dynamic HTML, the Definitive Reference*

Author: Danny Goodman

Publisher: O'Reilly, August 1998

Amazon.com online description: <http://www.amazon.com/exec/obidos/tg/feature/-/6779/103-8587514-0449445>

A good source of examples, with tutorials, organized more for learning than for reference; content is targeted at desktop browsers.

## *JavaScript*

### *Netscape Client-Side JavaScript Reference*

HTML: <http://devedge.netscape.com/library/manuals/2000/javascript/1.3/reference/>

A basic reference on JavaScript; free online, but not completely up-to-date.

### *JavaScript Bible, 4th Edition*

Authors: Danny Goodman and Brendan Eich

Publisher: Hungry Minds, Inc., April 2001

Publisher's online description: <http://catalog.hungryminds.com/product.asp?isbn=0764533428>

A more current popular basic reference on JavaScript, containing numerous coding examples.

## *XHTML*

### *XHTML™ 1.0: The Extensible HyperText Markup Language*

HTML: <http://www.w3.org/TR/xhtml1/>

A comprehensive reference on XHTML maintained by the W3C.

### *XHTML Tutorial*

HTML: <http://www.w3schools.com/xhtml/default.asp>

A good introduction to XHTML maintained by W3Schools.

## 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 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.

# Concepts and development guidelines

“M-Business Anywhere” (page 19)

“Mobile application design guidelines” (page 35)

“Channel creation QuickStart” (page 47)





## CHAPTER 2. M-Business Anywhere

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- n “Overview” (page 20)
- n “Architecture” (page 21)
- n “Understanding channels” (page 24)
- n “HTML page development” (page 25)
- n “Custom branding for M-Business Client” (page 27)
- n “When to use the M-Business client extension API” (page 28)
- n “Security options” (page 32)

## 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 PocketPC or Palm operating systems; the Microsoft Smartphone (2000, 2002, 2003, and 2004 Phone Editions); RIM (957 series devices), and Win32 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.

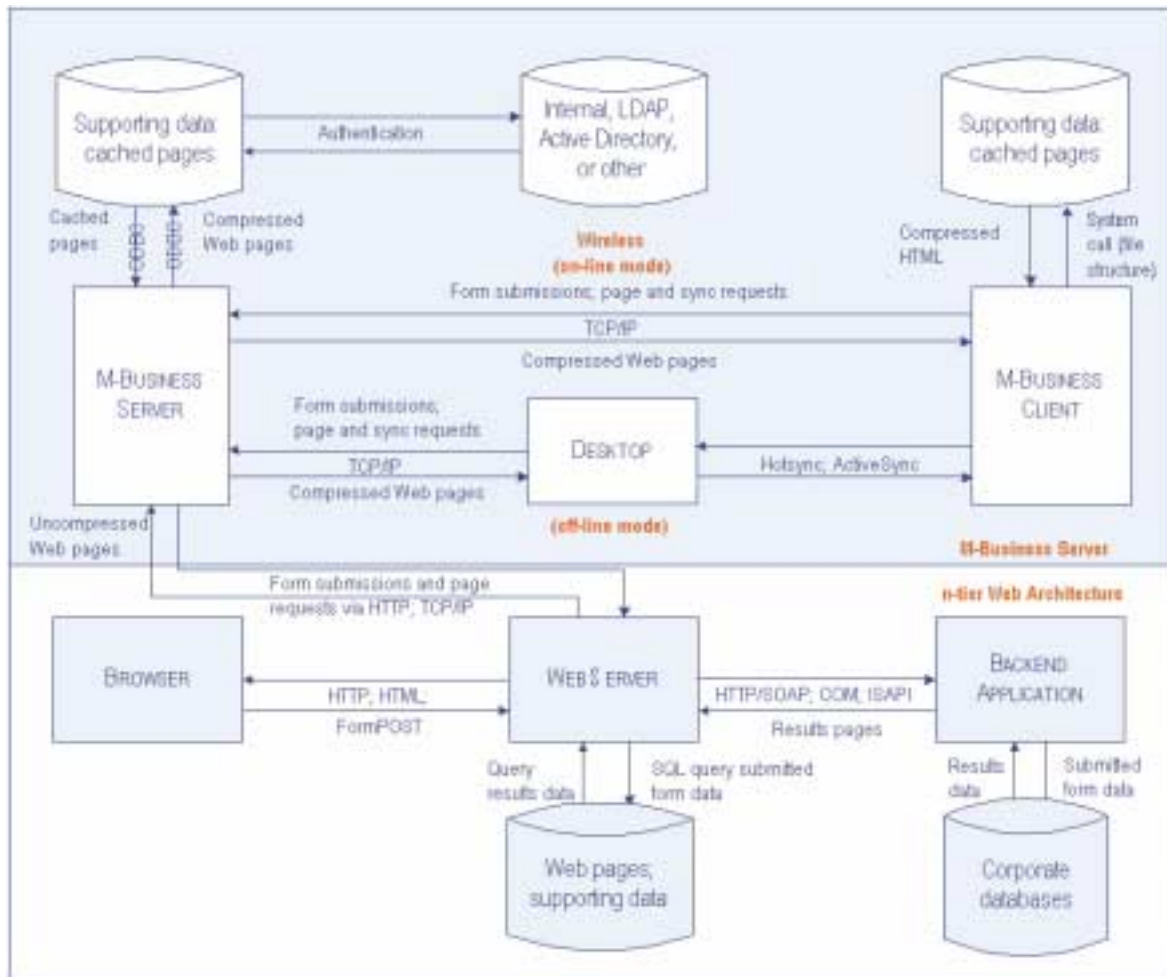
Using this industry-leading platform, you, the application developer, can today create and deliver useful information and applications to mobile users wherever and whenever your users need them.

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.

Figure 2-1 M-Business Anywhere architecture



### 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 *API Reference for M-Business Anywhere*, “M-Business SOAP API reference” chapter.

### ***Supporting data; cached Web pages***

Both the M-Business Server and the M-Business Client cache Web pages for a 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***

The desktop component of the 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.

If you use a Palm OS, Pocket PC OS, or Windows XP device, 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).

If you use a RIM 957 Series Wireless Handheld, you can configure M-Business Connect from your desktop only. M-Business Connect does not install on your mobile device.

For additional information, see the *User Guide for M-Business Anywhere Client*, “Introduction” chapter.

### ***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

### *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 backend 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 backend 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.

### *Backend application*

Application servers can be used to support backend applications, such as: Lotus Notes, Oracle, PeopleSoft, Salesforce.com, Siebel, SQL Server, SQL, SOAP, and Siebel.

### Submitted form data

A Web server or backend application can use ADO, ADO.NET, .NET, ODBC, OLEDB, PBI, and SQL connectivity to the backend 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 backend database(s).

### *Corporate database(s)*

The supported backend 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 *Application Developer Guide for M-Business Anywhere*, “Testing your M-Business channel” topic.

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:

- n **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.
- n **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 the M-Business Server. The M-Business Server, after looking up what channels you are subscribed to, downloads those pages from sites on the Internet. In most cases, these sites are distinct areas that contain pages optimized specifically for M-Business channels.

The M-Business Server downloads all these pages and performs some pre-processing on them. This includes shrinking images too large for the mobile device’s screen, discarding pieces that cannot be used by the 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 *Application Developer Guide for M-Business Anywhere*, “What is an M-Business channel?” topic.

## 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.

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 the M-Business Client, see the *Application Developer Guide for M-Business Anywhere*, "Designing pages for the channel site" topic.

### 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 2-1**  
List of supported  
device screen  
widths

Device type	Older models	Newer models
PPC	240 x 320	480 x 640
Palm	160 x 160 (Treo 600; m500)	320 x 320 (Tungsten C; O/S 5.0)
EPOC	176 x 208	208 x 320
Win32	N/A	Tablet PC - N/A Laptops - N/A
MS 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 *Application Developer Guide for M-Business Anywhere*, "Customizing and rebranding M-Business Client" topic.

## 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:

n “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.

n “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.

n “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.

n “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.

n “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 *Application Developer Guide for M-Business Anywhere*, “JavaScript” topic. 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. Refer to the *Application Developer Guide for M-Business Anywhere*, “Using DHTML” topic. Use the Executive Dashboard sample to execute the example and view the described functionality.

Figure2-2  
Executive  
Dashboard



### *Symbol scanner (Palm only)*

M-Business Anywhere provides you with a `PODSymbolScanner` interface that implements a Symbol Technologies API for the Palm OS platform. See the *Application Developer Guide for M-Business Anywhere*, “Using a Symbol scanner” topic.

### *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 *Application Developer Guide for M-Business Anywhere*, “Creating an in-line scribble widget for signature capture” topic.

## 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 *Application Developer Guide for M-Business Anywhere*, “Tools to add special features to a channel” chapter.

### 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 *Application Developer Guide for M-Business Anywhere*, “Using the Date/Time Picker” topic.

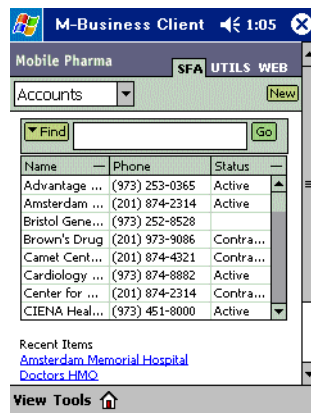
Figure 2-3  
Date/Time Picker



### List Viewer

The List Viewer displays the contents of an `agdbset` or of an `ExtendedDBSet`. See the *Application Developer Guide for M-Business Anywhere*, “Using the List Viewer” topic.

Figure 2-4  
List Viewer



### Symbol scanner (Pocket PC only)

M-Business Anywhere provides you with a `PODSSymbolScanner` interface that implements a Symbol Technologies API for the Pocket PC platform. See the *Application Developer Guide for M-Business Anywhere*, “Using a Symbol scanner” topic.

### *UltraLite for M-Business Anywhere*

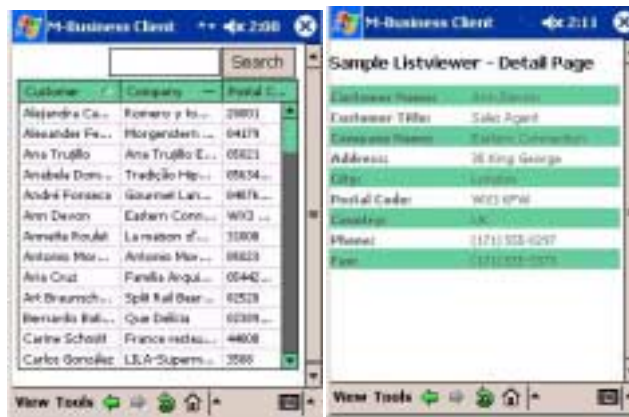
UltraLite technology provides the industry's first application-optimized, ultra-small XML datastore that resides locally on mobile devices and can synchronize data with most central consolidated database management systems. This deployment option is aimed at mobile and embedded devices. See the tutorial 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.

Figure 2-5  
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.

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**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 *Administrator Guide for M-Business Anywhere Server*. The “Security” chapter discusses setting up security. For a general overview of this security option, see the “Securing M-Business Anywhere server: an overview” topic.

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 *Administrator Guide for M-Business Anywhere Server*, “Understanding channel properties” topic.

## 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 *Application Developer Guide for M-Business Anywhere*, “Caching to improve channel performance” chapter.



## CHAPTER 3. **Mobile application design guidelines**

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- n “Using dynamic HTML” (page 34)
- n “Using M-Business client extension API” (page 36)
- n “Using offline form submissions” (page 37)
- n “Using M-Business Anywhere client HTTP request headers to customize content” (page 38)
- n “Designing applications to work both online and offline” (page 40)
- n “Testing and deploying your mobile application” (page 41)

## 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*. 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*, “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*, “HTML 4 support in M-Business Anywhere client” appendix.

References include:

- n WorldWide Web Consortium, at:  
<http://www.w3.org/>
- n W3 Schools, at:  
<http://www.w3schools.com/>
- n 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*, “M-Business JavaScript engine reference” appendix.

## Specific features of M-Business JavaScript engine

JavaScript Engine enables developers to:

- n Dynamically generate HTML pages
- n Dynamically change the contents of HTML pages via DHTML
- n Dynamically change the contents of forms on HTML pages
- n Call a browser to perform various tasks, such as manipulating form fields or form submissions
- n 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

## 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*, “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* contains the following information:

- n “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.
- n “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 3-1**  
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*, “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.

- n 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`

- n 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`

- n 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*, "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*, “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*, “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:

- n 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.
- n Personal channels: You specify a single user, and that user only is automatically subscribed to the channel.
- n 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*.



## CHAPTER 4. Code samples

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- n “Overview” (page 48)
- n “Samples” (page 49)
- n “Online tutorial: Building an UltraLite application for M-Business Anywhere” (page 51)
- n “Advanced techniques” (page 52)

## 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” (page 49) below.

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## Samples

For information on how to download and work with the PODS sample files, see the *API Reference for M-Business Anywhere*, “PODS code samples” appendix.

### 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:

- n XMLDB on-device datastore to store relational data.
- n MIMEList player to display data from XMLDB in tabular format.
- n 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.html](http://www.ianywhere.com/developer/code_samples/mbus_serializing_forms.html)

### 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.

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## 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” (page 12). 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:

- n 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.
- n 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.
- n Lesson 2: Create the application files – shows you how to use a form to create a user interface.
- n 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.
- n 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.
- n Lesson 5: Add inserts to your application – shows you how to add data manipulation and navigation logic to your application.
- n Lesson 6: Add navigation to your application – provides sample code for scrolling forwards and backwards through the rows of a result set.
- n Lesson 7: Add updates and deletes to your application – provides sample code for updating and deleting rows.
- n 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.

# Index

## Symbols

43

## A

- Administrator Console
  - custom branding 22
- advanced techniques 52
- AG\_USER example 41
- API
  - DOM Level 0 API 29
  - JavaScript API 52
  - M-Business client extension API 28, 38
  - M-Business SOAP API 22
  - M-Business XML datastore API 38
  - Symbol Technologies API
    - for Palm OS 29
    - for Pocket PC OS 30
- application development, getting help from iAnywhere Professional Services 16
- applications
  - designing to work offline and online 42
  - testing and deploying 44

## C

- caching 33
- channels
  - M-Business channel, definition 24
  - setting up a test 45
  - types 45
  - understanding 24
- contacting iAnywhere Solutions 15
- conventions, formatting 11
- cookies
  - setting 39
  - stored on M-Business Server 43
  - used to support personal channels 43
- CSS (cascading style sheets)
  - recommended references 13
- custom branding
  - Administrator Console 22
  - M-Business Client 27
- customizing content

- using M-Business Client HTTP request headers 40
- using URL macros 41

## D

- Date/Time Picker 30
  - example 50
- deploying your application 44
- DHTML (dynamic HTML)
  - page development 25
  - recommended references 13
- documentation, providing feedback on 16
- DocumentSrc document vending example 50
- DOM (document object model)
  - JavaScript (POD) 29
  - recommended references 13
- DOM Level 0 API 29

## E

- Executive Dashboard example 29

## F

- form submissions
  - Forms Manager 42
    - offline 39
    - online 42
    - serializing 43, 49
- formatting conventions, used in this guide 11
- Forms Manager 42
- forms, HTML
  - serializing 43
  - submissions, managing 42

## G

- group channels 45
- groups
  - channels for 45
  - setting up 44

**H**

## HTML

- 4.1 specification 52
- compression during synchronization 24
- recommended references 13

**I**

- iAnywhere Professional Services 16
- iAnywhere Solutions, contacting 15

**J**

- JavaScript
  - recommended references 14
  - see also* M-Business JavaScript engine
- JavaScript API 52
  - see also* M-Business JavaScript engine

**L**

- List Viewer plug-in 30

**M**

- Master-Detail page example 31, 49
- M-Business Client
  - caching 33
  - custom branding 27
  - HTTP request headers to customize content 40
  - M-Business client extension API 38
  - password protecting content 33
  - security options 32
- M-Business client extension API 38
  - using 38
  - when to use 28
- M-Business Client HTTP request headers, to customize content 40
- M-Business Connect 22
- M-Business JavaScript engine
  - built-in PODS 29
  - ECMA support 29
  - extensions to standard JavaScript 39
  - interface to Symbol scanner 52
  - specific features 37
  - vending objects to 50
- M-Business Server
  - caching 33
  - components 21
  - cookies stored on 43
  - security options 32
- M-Business SOAP API 22
- M-Business XML datastore 31
- M-Business XML datastore API 38

**O**

- ObjectSrc vending objects to JavaScript example 50

- offline form submissions 39
- one button sync example 49

**P**

- personal channels 45
  - using cookies to support 43
- PODS
  - built-in 29
  - Date/Time picker 30
  - List Viewer 30
  - M-Business JavaScript engine 29
  - M-Business XML datastore 31
  - plug-in 29–31
  - signature capture 29
  - Symbol scanner
    - Palm OS 29
    - Pocket PC OS 30
  - UltraLite for M-Business Anywhere 31
- PODS form submission example 50
- product information, obtaining 16
- public channels 45
- publications
  - recommended references 13
  - related 12

**R**

- recommended references 13
- related publications 12

**S**

- sample code 47–52
  - Date/Time Picker 50
  - DocumentSrc document vending 50
  - downloading 48
  - Executive Dashboard 29
  - Master-Detail page 31, 49
  - M-Business Client HTTP request headers 41
  - ObjectSrc vending objects to JavaScript 50
  - one button sync 49
  - PODS form submission 50
  - serializing forms 49
  - signature capture 52
  - UltraLite application 51
- screen widths, for different platforms 26
- scribble input field 52
- security options 32
- serializing forms 43
  - example 49
- signature capture 29
- signature capture example 52
- subscribing users 45
- Sybase Online Support Services 15
- Symbol scanner
  - plug-in, Pocket PC OS 30
  - POD, Palm OS 29
- Symbol Technologies API
  - for Palm OS 29
  - for Pocket PC OS 30

synchronizing  
  form submissions, online and offline 42  
  remotely 22  
  what happens during 24

## T

technical support, contacting 15  
testing your application 44

## U

UltraLite application example 51  
UltraLite for M-Business Anywhere 31  
URL macros, using to customize content for multiple  
  device types 41  
users  
  setting up 44  
  subscribing 45

## V

vending objects to M-Business JavaScript engine 50

## X

XHTML (extended HTML), recommended references  
  14

