

# Glossary

**3G (Third Generation):** A networking standard that uses cell phone frequencies to send Internet data to handheld devices at up to 144 Kbps. Although not as fast as Wi-Fi (802.11x), it offers broader coverage. A 3G wireless system can provide packet-switched wide-area wireless Internet access to support multimedia applications.

**Adobe CodeFusion:** An application server and software development framework used for the development of computer software in general, and dynamic web sites in particular.

**Adobe Dreamweaver:** A WYSIWYG (What You See Is What You Get) authoring software that allows web developers to generate HTML and JavaScript source code while viewing the site as they work.

**Adobe Flash:** An authoring environment for creating animation, advertisements, various web-page components to integrate video into web pages and to develop rich Internet applications. Flash Professional is an IDE (Integrated Development Environment), while Flash Player is a virtual machine used to run, or parse, the Flash files.

**Adobe Photoshop:** A software package for editing images and creating graphics.

**Android:** A software stack for mobile devices that includes an operating system, middleware, and key applications such as contacts. It is a project proposed by the Open Handset Alliance, a group of more than 30 technology and mobile companies including Google, Inc.

**Association Rule Discovery:** An association rule takes the form of “if this then that” and is used to associate events in a database. Association rule discovery can be used to find unordered correlations between items found in a set of database transactions. One example is the association between purchased items in a department.

**Automatic Indexing:** Describes a process that algorithmically examines information items to build a data structure that can be quickly searched.

**Bluetooth:** An evolving wireless networking protocol that connects various digital devices—from mobile phones to PDAs to computers. It can transmit wireless signals over a range of about 35 feet and does not require a line-of-sight connection. Bluetooth will not itself allow users to go online, but instead is a way to wirelessly connect to printers, computers, cell phones, and other devices.

**BREW (Binary Runtime Environment for Wireless):** An application development platform created by Qualcomm for CDMA (Code Division Multiple Access)-based mobile phones. The complete BREW solution includes:

- BREW client software and porting tools for device manufacturers;
- BREW Distribution System (BDS). This is controlled and managed by operators and enables them to easily get applications from developers to market and coordinate the billing and payment process; and
- BREW SDK (software development kit) for application developers.

**CDMA (Code Division Multiple Access):** A type of mobile phone network. Also known as spread spectrum, CDMA cellular systems utilize a single frequency band for all traffic, differentiating the individual transmissions by assigning them unique codes before transmission. This is used by Sprint in the USA and Telus in Canada, for example.

**CGI (Common Gateway Interface):** A specification providing a method of executing server-side programs from a web page. A CGI program is any program designed to accept data from the web page, process the data, and return the results, usually in an HTML format, to the web page for display.

**Client-Side Handheld Computing:** The use of handheld devices to perform mobile, handheld operations that do not need the power of server-side computing. Some application examples of this type of computing include (a) address books, (b) stand-alone video games, (c) note pads, and (d) to-do-lists.

**CPU (Central Processing Unit):** The central unit of a computer, which includes both arithmetic and control units. The CPU of a microcomputer is usually a microprocessor.

**Crawler/Spider:** A program that automatically scans various Web sites and collects Web documents from them. It follows the links on a site to find other relevant pages and is usually used to feed pages to search engines.

**Device Independent Authoring Language (DIAL):** DIAL provides a markup language for the filtering and presentation of web page content available across different delivery contexts. It uses a language profile based on existing W3C XML vocabularies and CSS modules and provides standard mechanisms for representing web page structure, presentation and form interaction.

**Digital Certificate:** A document issued by a certificate authority (a trusted third party) that contains the certificate holder's name, a serial number, expiration dates, a copy of the certificate holder's public encryption key, and the digital signature of the certificate-issuing authority so that a recipient can verify that the certificate is genuine.

**Digital Signature:** An electronic signature that can be used to authenticate the identity of the sender of a message or the signer of a document. The sender uses a private encryption key to encrypt their identification and (possibly) some additional information derived from the message that is being signed. The receiver uses a sender's public key to recover the identification and additional information, which is used to check the integrity of the received message.

**Electronic Commerce or E-Commerce:** The exchange or buying and selling of commodities, services, or information or the transfer of funds on the Internet using desktop or notebook computers.

**Expansion (Card) Slot:** The opening found on handheld devices where expansion cards are inserted, allowing users to add applications such as games, memory such as flash memory, and even peripherals such as keyboards to the device.

**Expansion Card:** A postage stamp-sized add-on memory that can be inserted into the expansion slot of a Palm device. Expansion cards can contain applications, songs, videos, pictures, and other information in a digital format. There are three types: MultiMediaCard (MMC), SD (Secure Digital) and SDIO (Secure Digital Input/Output).

**Flash Memory:** Non-volatile memory that can be electrically erased and reprogrammed. It can be either non-removable, such as a built-in flash drive, or remov-

able, such as a USB flash drive for portable data. Its capacity is usually between a couple of hundreds of Kb and a few GB.

**Flexible Screens:** The company Polymer Vision has developed a new rollable display technology that enables a screen to be rolled up into a pen-sized case. The rollable screen is equipped with various connectivity options, including Bluetooth.

**Fuel Cells:** A device that turns fuel such as hydrogen into electricity via a chemical reaction. It offers a greener method of generating electricity because no fossil fuels are used, no combustion takes place, and no pollutants are emitted.

**GSM/GPRS (Global System for Mobile Communications/General Packet Radio Service):** A type of mobile phone network used throughout most of the world. GPRS enabled networks offer “always-on,” higher capacity, Internet-based content and packet-based data services. This enables services such as color Internet browsing, email on the move, powerful visual communications, multimedia messages and location-based services. Wireless Service providers on a GSM/GPRS network include Cingular Wireless and T-Mobile in the USA and Rogers Wireless and Fido in Canada.

**Handheld Computing:** The use of handheld devices such as smart cellular phones and PDAs (Personal Digital Assistants) to perform wireless, mobile, handheld operations such as personal data management and making phone calls.

**Hard Drives:** Storage devices containing a read-write mechanism plus magnetic disks inside a sealed unit. At the time of writing (in 2007), a hard drive for handheld devices is capable of storing data up to a couple of gigabytes. This compares with the capacity of a hard drive on a desktop computer, which could be several hundreds of gigabytes.

**HTML (HyperText Markup Language):** HTML, based on SGML (Standard Generalized Markup Language), is used for publishing hypertext on the World Wide Web. Tags such as `<p>` and `</p>` are used to structure and stylize text. Refer to W3C’s HyperText Markup Language (HTML) home page at <http://www.w3.org/MarkUp/> for more details.

**Hyperlinks:** A selectable connection from one word, phrase, picture, or information object to another. By clicking on a hyperlink, a Web user can move easily from one Web page to another page. Hyperlinks are most commonly indicated by a highlighted word, phrase, or picture.

**i-mode:** i-mode (<http://www.nttdocomo.com/corebiz/imode/index.html>) is the full-color, always-on, packet-switched Internet service for cellular phone users

offered by NTT DoCoMo. With i-mode, cellular phone users are able to access tens of thousands of Internet sites, as well as specialized services such as e-mail, online shopping and banking, ticket reservations, and restaurant advice. Users are charged based on the volume of data transmitted, rather than the amount of time spent connected.

**Infrared Port:** The component on a handheld device that is used to transmit and receive data between compatible infrared equipped devices via infrared signals. On some models the infrared port can also be used to communicate with a compatible, infrared-equipped mobile phone for connecting to the Internet.

**Java ME (Java Micro Edition):** An environment for applications running on consumer devices, such as mobile phones, PDAs, and TV set-top boxes, as well as on a broad range of embedded devices. Like its counterparts for the enterprise (J2EE), desktop (J2SE) and smart card (Java Card) environments, J2ME includes Java virtual machines and a set of standard Java APIs defined through the Java Community Process by expert groups whose members include device manufacturers, software vendors, and service providers.

**JavaScript:** The *de facto* standard language used to add dynamic behavior to HTML documents. JavaScript is one of the originating technologies of ECMAScript.

**JDBC (Java Database Connectivity):** A standardized database interface for Java applications accessing database data. It allows a single database application to run on different platforms and interact with different SQL-compliant DBMSs.

**LAN (Local Area Network):** A computer network that provides data communications to users located in a limited area such as a building or city block.

**Linux:** A free, open-source, Unix-type operating system. Linux and other Linux-like OSs are developed based on the Linux kernel.

**Lithium-Ion Batteries:** Replaceable, rechargeable Lithium-Ion batteries are the batteries most commonly used by handheld devices. Although expensive when they were first introduced, their prices have since dropped rapidly.

**Micro PCs:** Mini versions of PCs that differ from handheld devices because they apply a different technology. For example, Windows OSes are for PCs and micro PCs but not for handheld devices, whereas Windows Mobile OSes are for handheld devices but not for PCs and micro PCs.

**Micro/Macro-Payment:** A mobile payment of approximately \$10 or less (often for mobile content such as video downloads or gaming) is called a micro-payment, while a macro-payment refers to larger value payment.

**Microbrowsers:** Miniaturized versions of desktop browsers such as Netscape Navigator or Internet Explorer. Due to the limited resources of handheld devices, microbrowsers differ from traditional desktop browsers in the following ways: (i) smaller windows, (ii) smaller footprints, and (iii) fewer functions and multimedia features.

**Microsoft ASP.NET:** Free technology that allows programmers to create dynamic web applications. ASP.NET is part of Microsoft's .NET platform and is the successor to ASP technology.

**Microsoft Expression Web:** A design tool used to create sophisticated standards-based web sites. It combines both FrontPage and Visual Studio technologies in a new user interface for creating XHTML, CSS, XML, XSLT, and ASP.NET 2.0.

**Microsoft SharePoint Designer:** Enables information workers to develop applications and solutions on top of the SharePoint platform to enable organizational agility, business process automation, and benefit from using Microsoft Office applications on the SharePoint platform.

**Microsoft Visual Studio:** Microsoft's flagship software development product, Visual Studio lets programmers create standalone applications, web sites, web applications, and web services that run on any platforms supported by Microsoft's .NET Framework.

**Mobile Commerce Security:** The technological and managerial procedures applied to mobile commerce to provide security services for mobile commerce information and systems.

**Mobile Commerce:** The exchange or buying and selling of commodities, services, or information or the transfer of funds on the Internet (wired or wireless) through the use of Internet-enabled mobile handheld devices.

**Mobile Handheld Devices:** Small general-purpose, programmable, battery-powered computers, that are small enough to be held in one's hand. There are two major kinds of handheld devices: (i) (voice-centric) smart cellular phones, and (ii) (data-centric) PDAs (Personal Digital Assistants). They differ from desktop or notebook computers in several important ways, namely their (i) low network bandwidth, (ii) small screen/body size, and (iii) mobility.

**Mobile Payment:** The transfer of financial value and corresponding services or items between different participants in mobile commerce systems.

**Navigator:** The two large, concentric buttons in the middle of the lower part of many Palm devices. Pressing the edges moves the cursor up, down, right, or left,

and the center button selects items. The navigator (sometimes referred to as the five-way navigator) works differently in different applications, but is usually an easy way to operate the device with one hand.

**NetBeans:** An open-source IDE (Integrated Development Environment) used to create professional cross-platform desktop, enterprise, web, and mobile applications. NetBeans is sponsored by Sun Microsystems, Inc.

**OMA (Open Mobile Alliance):** A large interest group of mobile operators, device and network suppliers, information technology companies, and content and service providers, it was founded by consolidating the WAP Forum, Location Interoperability Forum (LIF), SyncML Initiative, MMS-IOP (Multimedia Messaging Interoperability Process), Wireless Village, Mobile Gaming Interoperability Forum (MGIF), and the Mobile Wireless Internet Forum (MWIF) (<http://www.openmobilealliance.com/>). The OMA develops market driven, interoperable mobile service enabler specifications, promoting the creation of interoperable services across countries, operators and mobile terminals that will meet mobile users' needs.

**Palm Operating Systems:** An ARM-compliant, 32-bit operating system running on handheld devices developed by PalmSource Inc.. Currently, there are two versions of Palm OS: (i) Palm OS Garnet, an enhanced version of Palm OS 5 and (ii) Palm OS Cobalt, the next generation of Palm OS.

**Palm OS Developer Suite:** The official development environment and tool chain from PalmSource Inc., intended for software developers at all levels. It offers a complete IDE (Integrated Development Environment) for (i) Protein applications (all ARM®-native code) for Palm OS Cobalt and (ii) 68K applications for all shipping versions of the Palm OS.

**Persistent Storage:** Persistent (non-volatile) storage is a storage medium whose contents are preserved even when the power is off. Flash memory, a kind of persistent storage, is usually used for handheld devices. Hard disks are seen in some devices, but rarely.

**Public Key Encryption (PKI):** A technique that uses two different keys (a private key and a public key) for encryption. Messages encrypted with the private key can be decrypted with the public key, giving the owner of the private key a way to prove their identity to anyone who knows the public key. Messages encrypted with the public key can be decrypted with the private key, giving anyone who knows the public key a way of sending a confidential message to the owner of the private key.



**QWERTY:** The standard layout for letter keys on computer, handheld and smartphone keyboards used to type in English, modeled after the typewriter and named for the order of the first six keys on the top row.

**RAM (Random Access Memory):** Stores digital information temporarily and can be changed by the user. It constitutes the basic storage element in computer terminals and has replaced magnetic core memories in main frame computers.

**RISC (Reduced Instruction Set Computing):** Used in devices where the number of instructions a microprocessor runs for a specific application are reduced from a general purpose Complex Instruction Set Computing (CISC) device in order to create a more efficient operating system.

**ROM (Read Only Memory):** Stores information used repeatedly, such as tables of data, characters for electronic displays, etc. Unlike RAM, ROM cannot be altered.

**Ruby On Rails (ROR):** A full-stack framework for developing database-backed web applications using Model-View-Control patterns.

**Server-Side Handheld Programming:** The use of handheld devices to perform wireless, mobile, handheld operations that require additional input from a server. Typical applications of this type of computing include (a) instant messages, (b) mobile Web contents, (c) online video games, and (d) wireless telephony.

**SET:** The Secure Electronic Transaction (SET) protocol is a technical standard designed to provide security for payment transactions among cardholders, merchants, payment gateways, and certification authorities operating in the Internet environment.

**Smart Card:** A plastic card that uses a silicon chip as its storage mechanism, rather than the conventional magnetic strip, for increased security and functionality.

**SQL (Structured Query Language):** A standard interactive, programming language for accessing, manipulating, and administering a database. It is both an ANSI and an ISO standard, and most relational database products support SQL. Its commands include selection, insertion, update, deletion, finding out the location of data, and so forth.

**Stylus:** An input device used to write text or draw lines on a surface as input to a handheld device.



**Subscriber Identity Module (SIM):** A device in the mobile handset that contains the subscriber's authentication information, such as cryptographic keys, and a unique identifier called international mobile subscriber identity (IMSI).

**Sun Java Studio:** A development platform with features such as UML modeling, instant collaboration, and application profiling. Java Studio is used to develop, debug, tune, and deploy enterprise applications, web services, and portal components based on the Java EE platform.

**Symbian:** A software licensing company that develops and supplies an operating system—Symbian OS—for data-enabled mobile phones. It is an independent, for-profit company whose mission is to establish Symbian OS as the world standard for mobile digital data systems, primarily for use in cellular telecoms.

**Symmetric Encryption:** A technique that uses one secret code for both encryption and decryption. It is used to support confidential exchanges of messages between two parties who share knowledge of the common key.

**Synchronization:** Connects handheld devices to desktop computers, notebooks, and peripherals in order to transfer or synchronize data. Other than using serial cables to connect handheld devices and other computing equipment, many handheld devices use either an infrared (IR) port or Bluetooth technology to send information to other devices.

**Tablet PCs:** A mini version of PCs that differ from handheld devices as they utilize different technologies. For example, Windows OSs are for PCs and tablet PCs but not for handheld devices, whereas Windows Mobile OSs are for handheld devices but not for PCs and tablet PCs.

**TDMA (Time Division Multiple Access):** A digital transmission technology that operates in either the 800MHz or 1900MHz frequency bands. The frequency band is split into a number of channels, so that several calls or data can share a single channel without interfering with one another.

**Universal Connector:** A USB-enabled communications port and hardware attachment system on computers and some handheld devices that is used to connect to accessories like cables, cradles and keyboards.

**URL (Uniform Resource Locator):** The address of an object accessible on the Internet. The object could be an HTML document, a text file, an image file, a program such as a common gateway interface application, etc. They are mainly used in HTML documents to specify the target of a hyperlink.

**USB (Universal Serial Bus):** A standardized communications protocol that enables data exchange between electronic devices. It is often used to enable communications between handheld devices and computers for synchronization. USB supports data transfer rates of up to 12 megabytes per second.

**User Navigation Patterns:** Interesting usage patterns that are contained in Web log data. Most algorithms use a method of sequential pattern generation, while the remaining methods tend to be rather ad hoc.

**W3C (World Wide Web Consortium):** An international industry consortium created in October 1994 to develop open, unifying standards such as XML and semantic Web for the World Wide Web in order to avoid duplicating, competing standards (<http://www.w3c.org/>).

**WAN (Wide Area Network):** A computer network that provides data communications to more users than a local area network (LAN) can, and usually spans a greater geographical distance, such as a town or country.

**WAP (Wireless Application Protocol):** A suite of open, global specifications developed by the WAP Forum. It is used for developing applications that operate over wireless communication networks, and allows users with mobile handheld devices to easily access and interact with information and services instantly. The detailed specifications can be found at <http://www.openmobilealliance.org/tech/affiliates/wap/wapindex.html>.

**WAP Forum:** The official organization developing the WAP (Wireless Application Protocol) (<http://www.wapforum.org/>). It has now merged with the Open Mobile Alliance (OMA) (<http://www.openmobilealliance.org/>) and no longer exists as an independent organization.

**WAP Gap:** A known security weakness in Wireless Application Protocol (WAP) caused by the inclusion of the WAP gateway in a security session such that encrypted messages sent by end systems might temporarily become clear text on the WAP gateway when messages are processed.

**Web Logs:** Records activity information when a web user submits a request to a Web server. A log file can be located in three different places: (i) Web servers, (ii) Web proxy servers, and (iii) client browsers.

**Web Proxy Servers:** An intermediary that takes HTTP requests from users and passes them to a Web server; the proxy server then returns to users the results passed to them by the web server.

**Web Server:** An application software that uses HyperText Transfer Protocol. Its major task is to serve the requests of clients (browsers) by returning web pages.

**WEP (Wired Equivalent Privacy):** A data link-level protocol that provides security for the IEEE 802.11 WLAN standards. The encryption algorithm used in WEP is a stream cipher based on RC4.

**Wi-Fi:** Wi-Fi or 802.11x, is a family of wireless networking protocols, with 802.11b being the most common at present. It operates in an unlicensed radio frequency band at 2.4 GHz and provides data access at 11 Mbps.

**Windows Mobile:** A compact operating system for handheld devices based on the Microsoft Win32 API. It is powered by Windows CE 5.x and uses the .NET Compact Framework 2.0. Windows Mobile includes three major kinds of software: (i) Windows Mobile-based Pocket PCs, (ii) Windows Mobile-based Portable Media Centers, and (iii) Windows Mobile-based Smartphones.

**WML (Wireless Markup Language):** A markup language that formats and stylizes Web pages for being displayed on mobile handheld devices such as smart phones and PDAs. WML is part of Wireless Access Protocol (WAP) and it is based on XML (eXtensible Markup Language). Refer to *Wireless Markup Language (WML), Version 2.0* at <http://www.openmobilealliance.org/tech/affiliates/wap/wap-238-wml-20010911-a.pdf> for more details.

**WMLScript:** A procedural scripting language and an extended subset of the JavaScript scripting language. It is employed to complement WML, a markup language for mobile handheld devices. Refer to *WMLScript Language Specification, Version 1.2* at <http://enrico.seven.it/mans/wml/WAP-193-WMLScript-20000324-a.pdf> for more details.

**XHTML (eXtensible Hypertext Markup Language):** Reproduces, subsets, and extends HTML 4.0, which is used to publish hypertext on the World Wide Web, and has been reformulated in XML 1.0. Refer to the W3C's *HyperText Markup Language (HTML) Home Page* at <http://www.w3.org/MarkUp/> for more details.

**XML (eXtensible Markup Language):** Originally developed by the W3C, this is effectively a pared-down version of SGML, designed especially for Web documents. It allows designers to create their own customized tags, enabling the definition, transmission, validation, and interpretation of data between applications and between organizations. Refer to Extensible Markup Language (XML) at <http://www.w3.org/XML/> for more details.

**Zend's Core:** The production PHP 5 stack that provides the certified, enhanced capabilities with support and services that professionals need for PHP development and production.