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m-commerce (mobile commerce)

M-commerce (mobile commerce) is the buying and selling of goods and services through wireless handheld devices such as smartphones and tablets. As a form of [e-commerce](#), m-commerce enables users to access online shopping platforms without needing to use a desktop computer. Examples of m-commerce include in-app purchasing, mobile banking, virtual marketplace apps like the Amazon mobile app or a [digital wallet](#) such as Apple Pay, Android Pay and Samsung Pay. Over time, content delivery over wireless devices has become faster, more secure and scalable. As of 2017 the use of m-commerce accounted for [34.5%](#) of e-commerce sales. The industries affected most by m-commerce include:

Mobile commerce or simply M-Commerce means engaging users in a buy or sell process via a mobile device. For instance, when someone buys an Android app or an iPhone app, that person is engaged in m-commerce. There are a number of content assets that can be bought and sold via a mobile device such as games, applications, ringtones, subscriptions etc.

Types of m-commerce

M-commerce can be categorized by function as either mobile shopping, mobile banking or mobile payments.

Mobile shopping allows for a customer to purchase a product from a mobile device, using an application such as Amazon, or over a web app. A subcategory of mobile shopping is app commerce, which is a transaction that takes place over a [native app](#). Mobile banking includes any handheld technology that enables customers to conduct financial transactions. This is typically done through a secure, dedicated app provided by the banking institution. Mobile payments enable users to buy products in-person using a mobile device. Digital wallets, such as Apple Pay, allow a customer to buy a product without needing to swipe a card or pay with physical cash.

How mobile commerce works

With most m-commerce enabled platforms, the mobile device is connected to a wireless network that can be used to conduct online product purchases. For those in charge of developing an m-commerce application, important [KPIs](#) to monitor include the total mobile traffic, total amount of traffic on the application, average order value and the value of orders over time. Similarly, tracking the mobile add to cart rate will help developers see if users are becoming customers. M-commerce developers may also be interested in logging average page loading times, mobile cart conversion rates and SMS subscriptions.

In terms of mobile payment products specifically, they operate through a form of peer-to-peer ([P2P](#)) sharing.

Advantages and disadvantages of mobile commerce

The advantages of m-commerce include:

- Added customer retention by being more easily accessible.
- More convenience for customers in comparing prices, reading reviews and making purchases without the need of a desktop computer.
- Wider variety of products and services.
- Automates a businesses' point of customer contact and sales.

Disadvantages of m-commerce include:

- A poorly executed mobile experience can deter customers from making purchases.
- Mobile payment options are not available in every geographic location and may not support every type of digital wallet.
- Businesses must know and comply with tax laws and regulations of all countries they ship to (some businesses will avoid this by only allowing purchases and shipping from their country of origin).

M-Commerce vs. E-Commerce

[Electronic commerce \(e-commerce\)](#) refers to the buying and selling of goods and services over the internet. E-commerce may be conducted via a desktop computer, laptop, smartphone, or tablet. However, e-commerce is typically associated with a computer in which a user has to find a location with an internet connection.

Conversely, m-commerce specifically refers to transactions done via a smartphone or mobile device. With m-commerce, users can transact anywhere provided there's a wireless internet provider available in that area.

M-commerce transactions tend to be done with a few clicks, while e-commerce done via a tablet, laptop, or desktop might involve more time and exploring a company's website.

Wireless Application Protocol (WAP) in Mobile Computing

Wireless Application Protocol or WAP is a programming model or an application environment and set of communication protocols based on the concept of the [World Wide Web \(WWW\)](#)

, and its hierarchical design is very much similar to TCP/IP protocol stack design. See the most prominent features of Wireless Application Protocol or WAP in Mobile Computing:

WAP stands for **Wireless Application Protocol**. It is a protocol designed for micro-browsers and it enables the access of internet in the mobile devices. It uses the mark-up language WML (Wireless Markup Language and not HTML), WML is defined as XML 1.0 application. It enables creating web applications for mobile devices. In 1998, WAP Forum was founded by Ericson, Motorola, Nokia and Unwired Planet whose aim was to standardize the various wireless technologies via protocols.

WAP Protocol stack / architecture :

1. **Application Layer:**

This layer contains the *Wireless Application Environment (WAE)*. It contains mobile device specifications and content development programming languages like WML.

2. **Session Layer:**

This layer contains *Wireless Session Protocol (WSP)*. It provides fast connection suspension and reconnection.

3. **Transaction Layer:**

This layer contains *Wireless Transaction Protocol (WTP)*. It runs on top of UDP (User Datagram Protocol) and is a part of TCP/IP and offers transaction support.

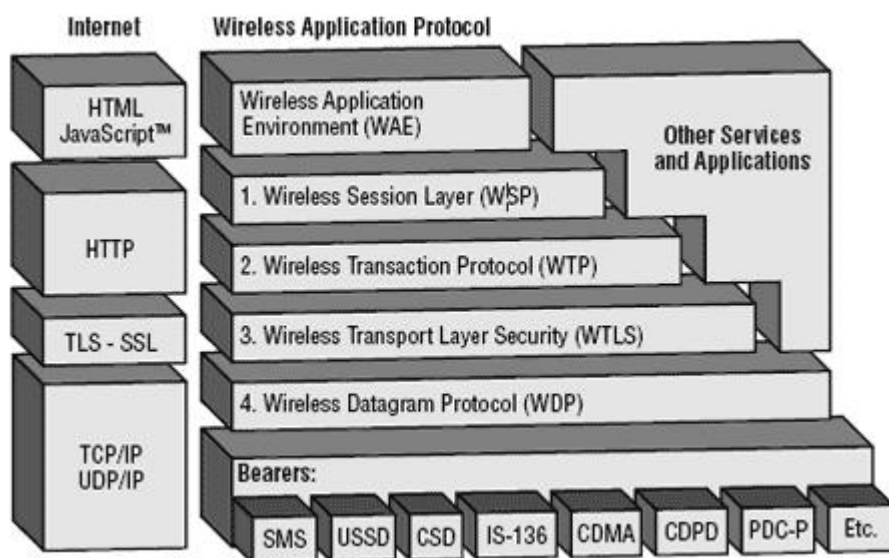
4. **Security Layer:**

This layer contains *Wireless Transaction Layer Security (WTLS)*. It offers data integrity, privacy and authentication.

5. **Transport Layer:**

This layer contains *Wireless Datagram Protocol*. It presents consistent data format to higher layers of WAP protocol stack.

The WAP protocol architecture is shown below alongside a typical Internet Protocol stack.



Note that the mobile network bearers in the lower part of the figure above are not part of the WAP protocol stack.

Advantages of Wireless Application Protocol (WAP)

Following is a list of some advantages of Wireless Application Protocol or WAP:

- WAP is a very fast-paced technology.

- It is an open-source technology and completely free of cost.
- It can be implemented on multiple platforms.
- It is independent of network standards.
- It provides higher controlling options.
- It is implemented near to Internet model.
- By using WAP, you can send/receive real-time data.
- Nowadays, most modern mobile phones and devices support WAP.

Disadvantages of Wireless Application Protocol (WAP)

Following is a list of some disadvantages of Wireless Application Protocol or WAP:

- The connection speed in WAP is slow, and there is limited availability also.
- In some areas, the ability to connect to the Internet is very sparse, and in some other areas, Internet access is entirely unavailable.
- It is less secured.
- WAP provides a small User interface (UI).

Types of Wireless networking

Wireless Local Area Network (WLANs): WLANs allows users to linking of two or more devices using a wireless distribution method that providing a connection through access points to the wider Internet. It provides mobility function to its users to covers local area such as a university campus, library or canteen, small offices or home to maintaining a network or gain access to the internet. In this technology a temporary network can be formed by a small number of users without the need of an access point (APs); given that they do not need access to network resources. Sometimes it calls a local area wireless network (LAWN).

Wireless Metropolitan Area Networks (WMANs): WMANs technology allows connecting several wireless LANs. In this connection of multiple networks includes metropolitan area such as different buildings in a city, which can be an alternative or backup to laying copper or fiber cabling. WMAN networking technology is also known as Wireless Local Loop (WLL). It allows communication in between two or more terminals (nodes) with the help of single access point, within a radius up to 40 km. The most well-known WMAN wireless networking technology includes WiMAX (WorldWide Interoperability for Microwave Access) created by WiMAX Forum which was founded by Esemble, Nokia, Harri and CrossSpan in 2001. This wireless network is also known as IEEE 802.16 (Institute of Electrical and Electronics Engineers), standard which defines the technology.

Wireless Wide Area Network (WWANs): Wireless Wide Area Network types of networks can be maintained over large areas, such as neighboring towns, cities or countries, via multiple satellite systems or antenna sites looked after by an ISP. These types of systems are referred to as 2G (2nd Generation), 3G (3rd Generation), 4G (4th Generation) systems and upcoming generation. WWAN services are typically delivered to smart phones and other handheld devices sold by cellular service providers. In the family of WWAN technologies includes GSM/UMTS, CDMA One/CDMA2000 etc.

Wireless Personal Area Network (WPANs):

WPAN is one another wireless technology that interconnects devices in a short span, generally within a person's reach. The two current technologies that are part of WPAN technology are Infra Red (IR), Bluetooth (IEEE 802.15.1) and Zigbee (802.15.4). These will allow the connectivity of personal devices within an area of about 30 feet. However, IR requires a direct line of site and the range is less.

Compression of WLAN, WMAN, WWAN and WPAN wireless technology:

Type	Coverage	Performance	Standards	Applications
Wireless LAN	Within a building or campus	High	IEEE 802.11, Wi-Fi, and HiperLAN	Mobile extension of wired networks
Wireless MAN	Within a city, two or more buildings	High	Proprietary, IEEE 802.16, and WIMAX	Fixed wireless between homes and businesses and the Internet
Wireless WAN	Worldwide	Low	CDPD and Cellular 2G, 2.5G, and 3G	Mobile access to the Internet from outdoor areas
Wireless PAN	Within reach of a person	Moderate	Wireless PAN Within reach of a person Moderate Bluetooth, Zigbee, IEEE 802.15, and IrDa Cable replacement for peripherals	Cable replacement for peripherals

Mobile computing is not only limited to mobile phones, but there are various gadgets available in the market that are built on a platform to support mobile computing. They are usually classified in the following categories –

Personal Digital Assistant (PDA)

The main purpose of this device is to act as an electronic organizer or day planner that is portable, easy to use and capable of sharing information with your computer systems.

PDA is an extension of the PC, not a replacement. These systems are capable of sharing information with a computer system through a process or service known as synchronization. Both devices will access each other to check for changes or updates in the individual devices. The use of infrared and Bluetooth connections enables these devices to always be synchronized.



With PDA devices, a user can browse the internet, listen to audio clips, watch video clips, edit and modify office documents, and many more services. The device has a stylus and a touch sensitive screen for input and output purposes.

Smartphones

This kind of phone combines the features of a PDA with that of a mobile phone or camera phone. It has a superior edge over other kinds of mobile phones.

Smartphones have the capability to run multiple programs concurrently. These phones include high-resolution touch screens, web browsers that can access and properly display standard web pages rather than just mobile-optimized sites, and high-speed data access via Wi-Fi and high speed cellular broadband.

The most common mobile Operating Systems (OS) used by modern smartphones include Google's Android, Apple's iOS, Nokia's Symbian, RIM's BlackBerry OS, Samsung's Bada, Microsoft's Windows Phone, and embedded Linux distributions such as Maemo and MeeGo. Such operating systems can be installed on different phone models, and typically each device can receive multiple OS software updates over its lifetime.



Tablet PC and iPads

This mobile device is larger than a mobile phone or a PDA and integrates into a touch screen and is operated using touch sensitive motions on the screen. They are often controlled by a pen or by the touch of a finger. They are usually in slate form and are light in weight. Examples would include iPads, Galaxy Tabs, Blackberry Playbooks etc.



They offer the same functionality as portable computers. They support mobile computing in a far superior way and have enormous processing horsepower. Users can edit and modify document files, access high speed internet, stream video and audio data, receive and send e-mails, attend/give lectures and presentations among its very many other functions. They have excellent screen resolution and clarity.