Information Appliances and Technology

Johnette Thatcher

First Edition, 2012

ISBN 978-81-323-3473-6

Published by:
Research World
4735/22 Prakashdeep Bldg,
Ansari Road, Darya Ganj,
Delhi - 110002
Email: info@wtbooks.com

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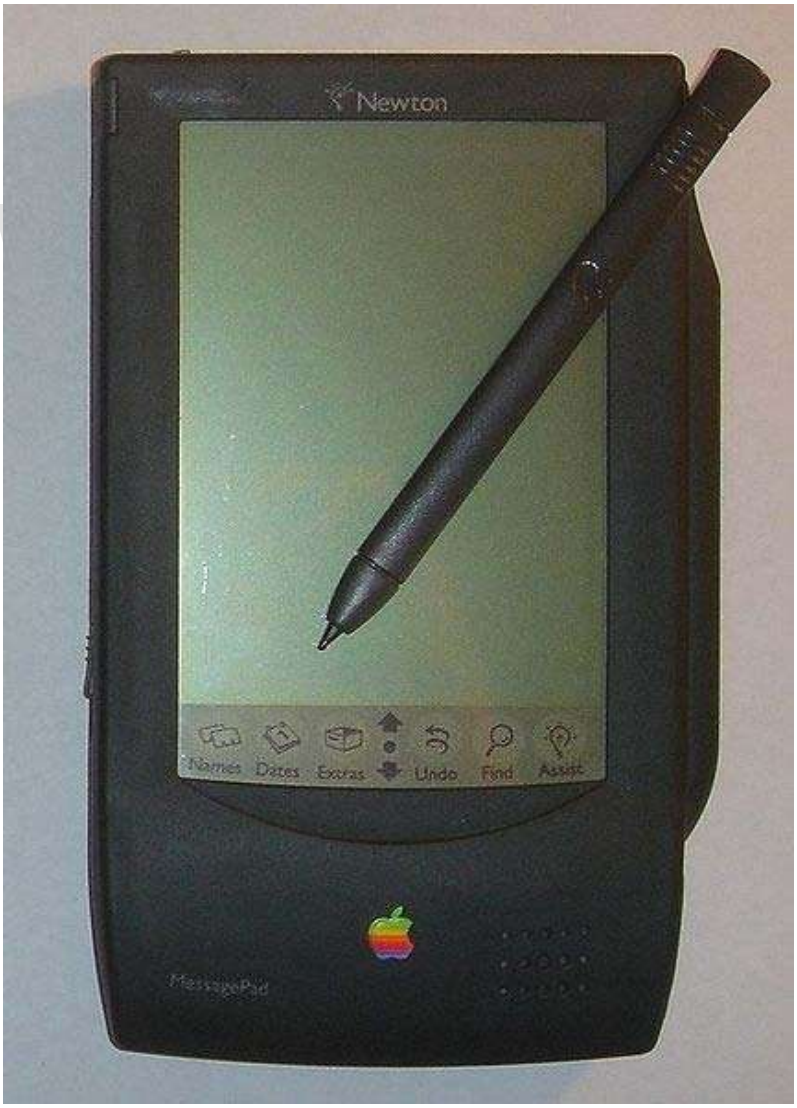
Introduction



A Newton PDA

In general terms, an **information appliance** or **information device** is any machine or device that is usable for the purposes of computing, telecommunicating, reproducing, and

presenting encoded information in myriad forms and applications. The common technical usage of "**information appliance**" (**IA**) is more specific — i.e., an appliance that is specially designed to perform a specific user-friendly function —such as playing music, photography, or editing text.

Typical examples are smartphones and personal digital assistants (PDAs). Information appliances partially overlap in definition with, or are sometimes referred to as smart devices, embedded systems, mobile devices or wireless devices.

Appliance vs computer

The term *information appliance* was coined by Jef Raskin around 1979. As later explained by Donald Norman in his influential *The Invisible Computer*, the main characteristics of IA, as opposed to any normal computer, were:

- designed and pre-configured for a single application (like a toaster appliance, which is designed only to make toast),
- so easy to use for untrained people, that it effectively becomes unnoticeable, "invisible" to them,
- able to automatically share information with any other IAs.

This definition of IA was different from today's. Jef Raskin initially tried to include such features in the Apple Macintosh, which he designed, but eventually the project went a quite different way. For a short while during the mid- and late 1980s, there were a few models of simple electronic typewriters with screens and some form of memory storage. These dedicated word processor machines had some of the attributes of an information appliance, and Raskin designed one of them, the Canon Cat. He described some properties of his definition of information appliance in his book *The Humane Interface*.

Larry Ellison, Oracle Corporation CEO, predicted that information appliances and network computers would supersede personal computers (PCs). This prediction has not yet come true.

Walled gardens versus open standards

In an ideal world, any true information appliance would be able to communicate with any other information appliance using open standard protocols and technologies, regardless of the maker of the software or the hardware. The communications aspects and all user interface elements would be designed together so that a user could switch seamlessly from one information appliance to another.

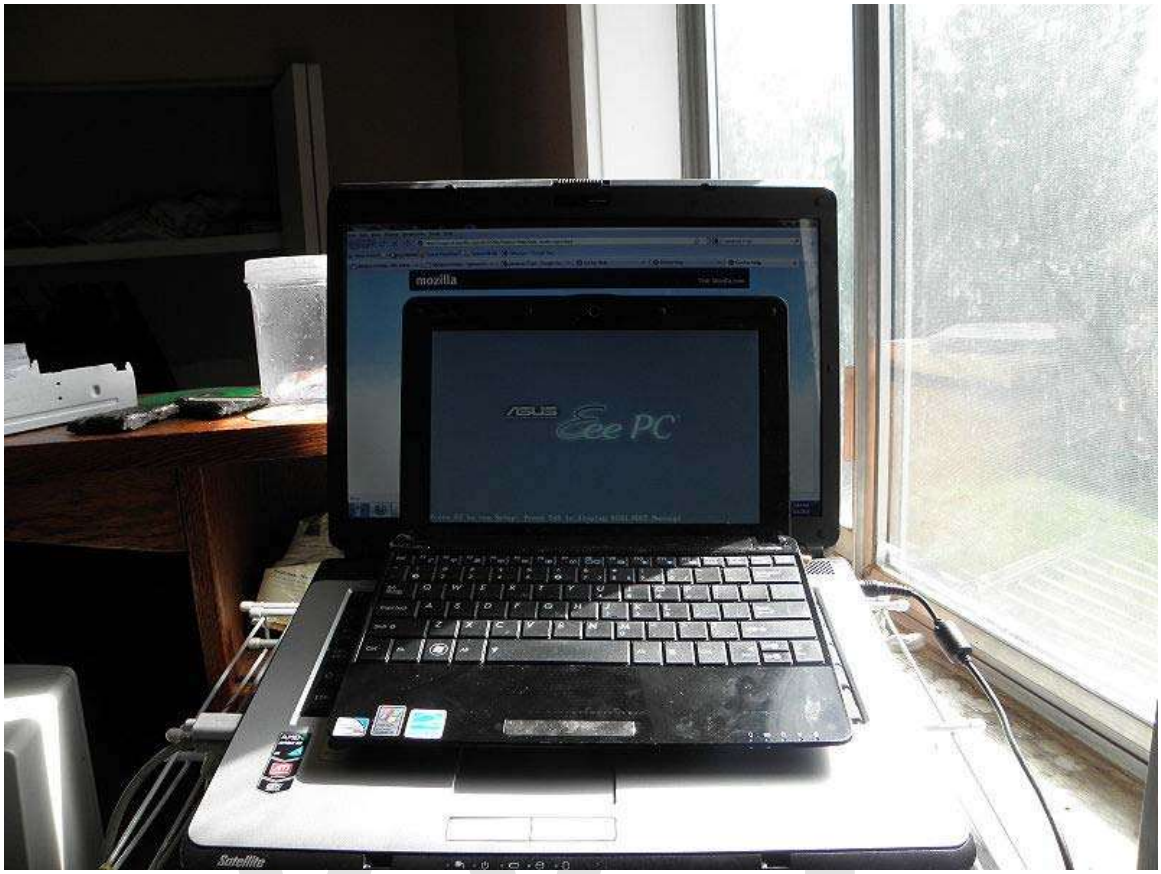
Some vendors are attempting to create "walled gardens" of closed proprietary content for information appliances, leveraging existing proprietary technologies. However, with the exception of NTT DoCoMo's i-mode, these efforts have been less successful than predicted, due to the willingness of most vendors to work together within open standards

frameworks, and the pre-existing widespread adoption of open standards such as GSM, IP, SMS and SMTP.

Chapter-1

Netbook

HP 2133 Mini-Note PC netbook (front view, compared to a pencil)



An Asus Eee PC 1005HA size comparison with a 15.4 inch laptop

Netbooks are a category of small, lightweight, legacy-free, and inexpensive laptop computers.

At their inception in late 2007 as smaller notebooks optimized for low weight and low cost — netbooks omitted certain features (e.g., the optical drive), featured smaller screens and keyboards, and offered reduced computing power when compared to a full-sized laptop. Over the course of their evolution, netbooks have ranged in size from below 5" screen diagonal to 12". A typical weight is 1 kg (2–3 pounds). Often significantly less expensive than other laptops, by mid-2009, some wireless data carriers began to offer netbooks to users "free of charge", with an extended service contract purchase.

ECS G10IL XP Netbook with a built-in GSM (HSDPA) module (europe use)

ASUS Eee PC 900

In the short period since their appearance, netbooks have grown in size and features, now converging with new smaller, lighter notebooks and subnotebooks. By August 2009, when comparing a Dell netbook to a Dell notebook, CNET called netbooks "nothing more than smaller, cheaper notebooks," noting, "the specs are so similar that the average shopper would likely be confused as to why one is better than the other," and "the only conclusion is that there really is no distinction between the devices." Initially offered with compact versions of Linux or the end-of-lifed Windows XP, netbooks now typically use Windows 7 Starter which Microsoft sells at a lower price but restricts to lower spec hardware.

History

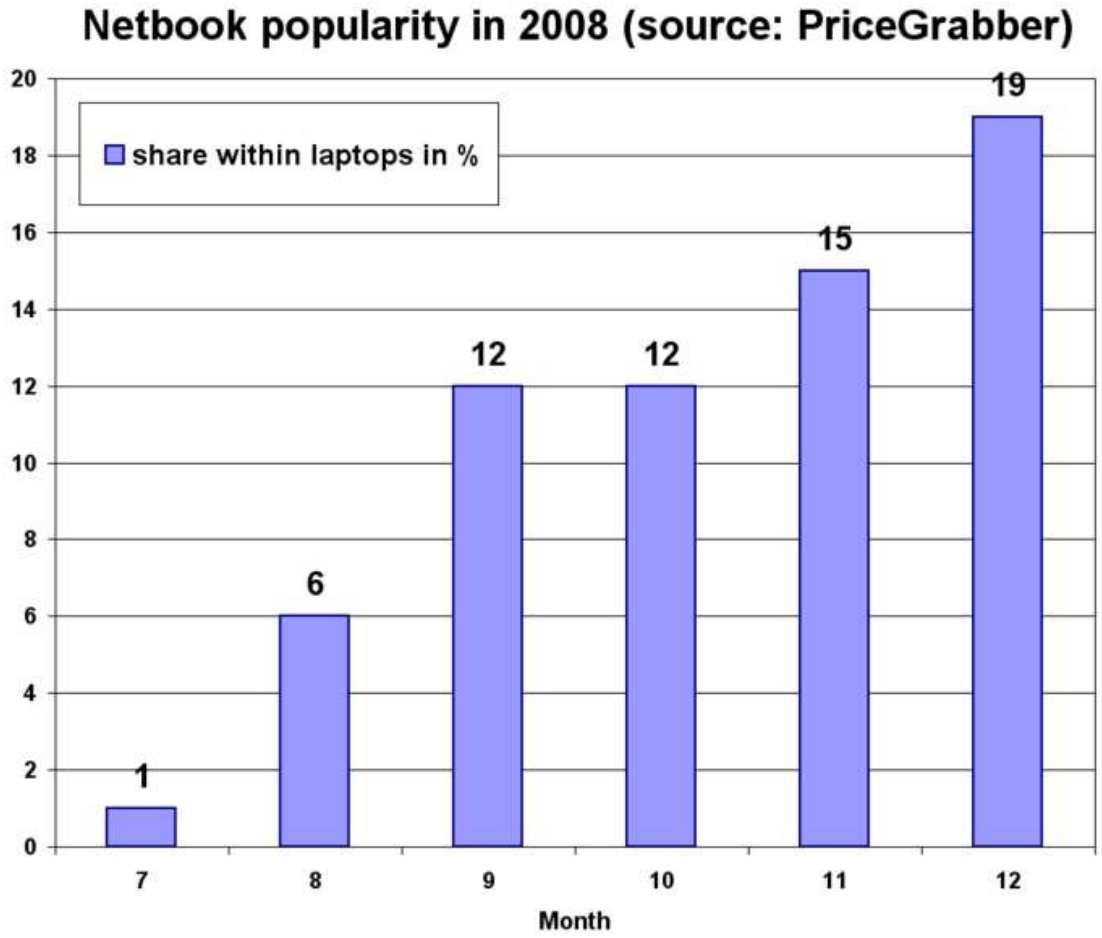
An ASUS Eee PC 700, the first mass-produced netbook, used a 7 inch screen.

Acer Aspire One

The origins of the netbook can be traced to the Network Computer (NC) concept of the mid-1990s. In March 1997, Apple Computer introduced the eMate 300 as a subcompact laptop that was a cross between the Apple Newton PDA and a conventional laptop computer. A year later the eMate was discontinued, along with all other Newton devices, with the advent of Apple's 'four boxes' product strategy that included the iMac and iBook. More recently, Psion's now-discontinued netBook line, the OLPC XO-1 (initially called US$100 laptop) and the Palm Foleo were all small, portable, network-enabled computers. The generic use of the term "netbook", however, began in 2007 when Asus unveiled the ASUS Eee PC. Originally designed for emerging markets, the 23 × 17 cm (9.1 × 6.7 in) device weighed about 0.9 kg (2 lb) and featured a 7 in (18 cm) display, a keyboard approximately 85% the size of a normal keyboard, a solid-state drive and a custom version of Linux with a simplified user interface geared towards netbook use. Following the Eee PC, Everex launched its Linux-based CloudBook; Windows XP and Windows Vista models were also introduced and MSI released the Wind - others soon followed suit.

The OLPC project, known for its innovation in producing a durable, cost- and power-efficient netbook for developing countries, is regarded as one of the major factors that led top computer hardware manufacturers to begin creating low-cost netbooks for the consumer market. When the first ASUS Eee PC sold over 300,000 units in four months,

companies such as Dell and Acer took note and began producing their own inexpensive netbooks. And while the OLPC XO-1 targets a different audience than do the other manufacturers' netbooks, it appears that OLPC is now facing competition. Developing countries now have a large choice of vendors, from which they can choose which low-cost netbook they prefer.



Netbook market popularity within laptops in second half of 2008 based on the number of product in the Laptop Subcategory per month by PriceGrabber

By late 2008, netbooks had begun to take market share away from notebooks. In contrast to earlier, largely failed attempts to establish mini computers as a new class of mainstream personal computing devices built around comparatively expensive platforms requiring proprietary software applications or imposing severe usability limitations, the recent success of netbooks can also be attributed to the fact that PC technology has now matured enough to allow truly cost optimized implementations with enough performance to suit the needs of a majority of PC users. This is illustrated by the fact that typical system performance of a netbook is on the level of a mainstream PC in 2001, at around one quarter of the cost. While this performance level suffices for most of the user needs, it caused an increased interest in resource-efficient applications such as Google's

Chrome, and forced Microsoft to extend availability of Windows XP in order to secure market share. It is estimated that almost thirty times more netbooks were sold in 2008 (11.4 million, 70% of which were in Europe) than in 2007 (400,000). For 2009, sales are expected to jump to 35 million, rising to an estimated 139 million in 2013. This trend is reinforced by the rise of web-based applications as well as mobile networking and, according to Wired Magazine, netbooks are evolving into "super-portable laptops for professionals". The ongoing recession is also helping with the growing sales of netbooks.

In Australia, the New South Wales Department of Education and Training, in partnership with Lenovo, are providing Year 9 (high school) students in government high schools with free Lenovo S10e netbooks in 2009 and Lenovo Mini 10 netbooks in 2010 preloaded with software including Microsoft Office and Adobe Systems' Creative Suite 4. This is provided under Prime Minister Kevin Rudd's Digital Education Revolution, or DER. The netbooks run Windows 7 Enterprise. They have unique tracking devices built-in that the police can use to track the device if it is lost or stolen. The NSW DET retains ownership of these netbooks until the student graduates from Year 12, when the student can keep it.

Dell Inspiron Mini 9

Zelybron Micro Nina

Greece is providing all 13 year old students (middle school, or *gymnasium*, freshmen) and their teachers with free netbooks in 2009 through the "Digital Classroom Initiative". Students are given one unique coupon each, with which they redeem the netbook of their choice, up to a €450 price ceiling, in participating shops throughout the country. These netbooks come bundled with localised versions of either Windows XP (or higher) or open source (e.g. Linux) operating systems, wired and wireless networking functionality, antivirus protection, preactivated parental controls, and an educational software package.

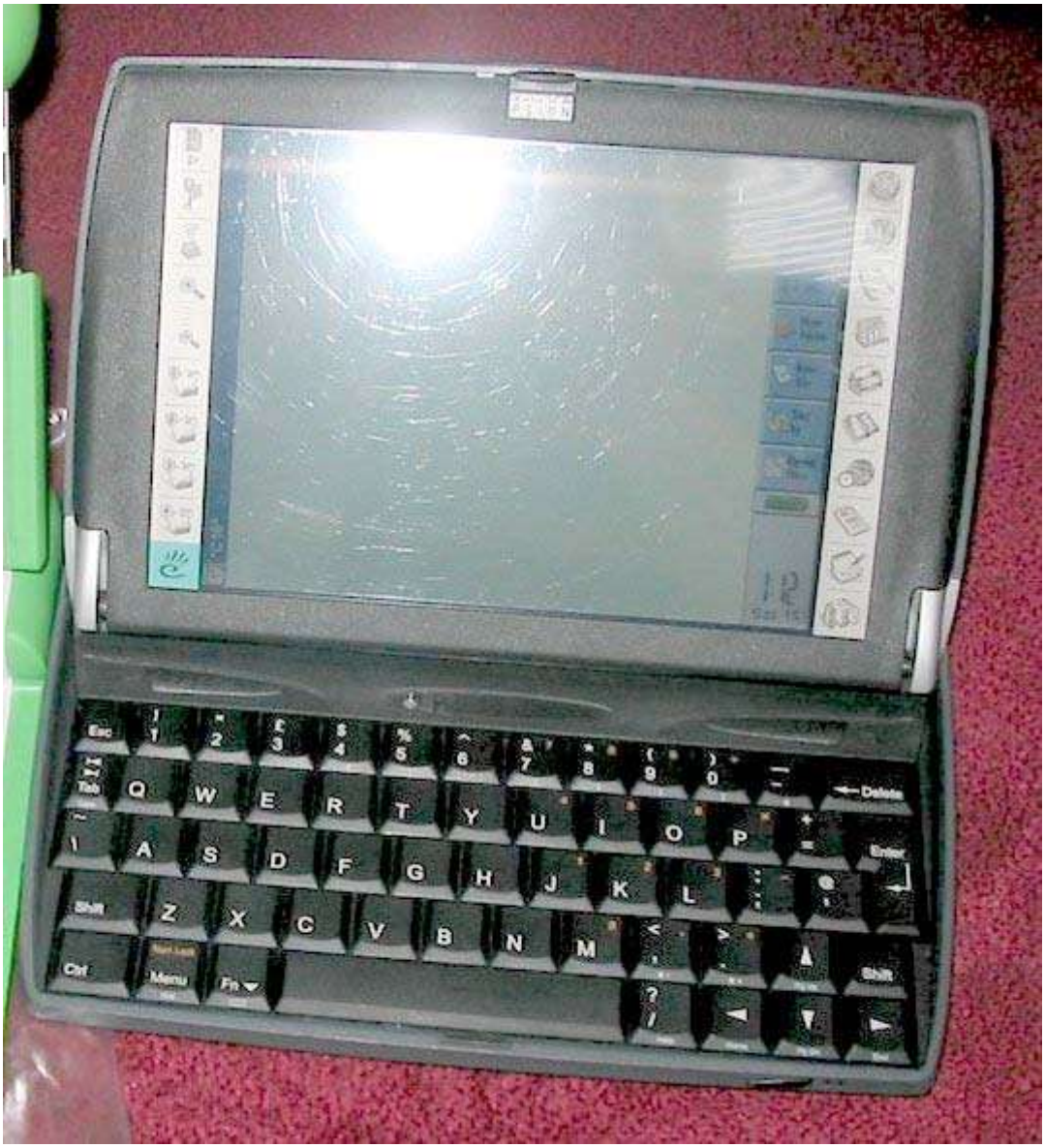
Microsoft and Intel have tried to "cement" netbooks in the low end of the market to protect mainstream notebook PC sales, because they get lower margins on low-cost models. The companies have limited the specifications of netbooks, but despite this original equipment manufacturers have announced higher-end netbooks models as of March 2009.

Ending in 2008 the report was that the typical netbook featured a 1.4 kg (3 lb) weight, a 9 in (23 cm) screen, wireless Internet connectivity, Linux or Windows XP, an Intel Atom processor, and a cost of less than $400 US. A mid-2009 newspaper article said that a typical netbook is 1.2 kg (2.6 lb), $300 US, and has a 10 in (25 cm) screen, 1 GB of random-access memory, a 160 GB hard disk drive, and a wireless transceiver for both home and a mobile network. Buyers drove the netbook market towards larger screens,

which grew from 7 in (18 cm) in the original Asus Eee PC 700 to 12 in (30.5 cm) models in the summer of 2009.

In early 2011 the New York Times said netbook sales had begun to decline, due in part to the arrival of tablet computers.

Trademarks



Psion netBook

In 1996 Psion started applying for trademarks for a line of *netBook* products that was later released in 1999. International trademarks were issued (including U.S. Trademark 75,215,401 and Community Trade Mark 000428250) but the models failed to gain popularity and are now discontinued (except for providing accessories, maintenance and

support to existing users). Similar marks were recently rejected by the USPTO citing a "likelihood of confusion" under section 2(d).

Despite expert analysis that the mark is "probably generic", Psion Teklogix issued cease and desist letters on 23 December 2008. This was heavily criticised, prompting the formation of the "Save the Netbooks" grassroots campaign which worked to reverse the Google AdWords ban, cancel the trademark and encourage continued generic use of the term. While preparing a "Petition for Cancellation" of U.S. Trademark 75,215,401 they revealed that Dell had submitted one day before on the basis of abandonment, genericness and fraud. They later revealed Psion's counter-suit against Intel, filed on 27 February 2009.

It was also revealed around the same time that Intel had also sued Psion Teklogix (US & Canada) and Psion (UK) in the Federal Court on similar grounds. In addition to seeking cancellation of the trademark, Intel sought an order enjoining Psion from asserting any trademark rights in the term "netbook", a declarative judgment regarding their use of the term, attorneys' fees, costs and disbursements and "such other and further relief as the Court deems just and proper".

On June 2, 2009, Psion announced that the suit had been settled out of court. Psion's statement said that the company was withdrawing all of its trademark registrations for the term "Netbook" and that Psion agreed to "waive all its rights against third parties in respect of past, current or future use" of the term.

Hardware

An MSI Wind netbook motherboard featuring the Intel Atom processor

Netbooks typically have less powerful hardware than larger laptop computers. Some netbooks do not even have a conventional hard drive. Such netbooks use solid-state storage devices instead, as these require less power, are faster, lighter, and generally more shock-resistant, but with much less storage capacity (such as 32, 64, or 128 GB compared to the 100 GB to 2 TB mechanical hard drives typical of many notebooks/laptop computers).

All netbooks on the market today support Wi-Fi wireless networking and many can be used on mobile telephone networks with data capability (for example, 3G). Mobile data plans are supplied under contract in the same way as mobile telephones. Some also include ethernet and/or modem ports, for broadband or dial-up Internet access, respectively.

Processor architectures

x86

Most netbooks, such as those from Asus, BenQ, Dell, Toshiba, Acer use the Intel Atom notebook processor (typically the N270 1.6 GHz but also available is the N280 at 1.66 GHz, replaced by the N450 series with graphics and memory controller integrated on the chip in early 2010 and running at 1.66 GHz), but the x86-compatible VIA Technologies C7 processor is also powering netbooks from many different manufacturers like HP and Samsung. VIA has also designed the Nano, a new x86-64-compatible architecture targeting lower priced, mobile applications like netbooks. Currently, one netbook uses the Nano; the Samsung NC20. Some very low cost netbooks use a System-on-a-chip Vortex86 processor meant for embedded systems, just to be "Windows compatible", but with very low performance. In 2011, AMD plans to launch netbook processors which should be included in Asus Eee PC 1015T and many others.

Comparison

By definition netbooks accommodate processors with little processing power. For comparison a common dual-core Core 2 Duo T5600 at 1.83 GHz with 2 MB L2 cache used in low-end laptops has a PassMark score of about 1000 points. The following table shows benchmarks for most common netbook CPUs:

Manufacturer	Name	Frequency/GHz	L2 cache/KB	TDP/W	Average PassMark score
Intel	Atom N270	1.6	512	2.5	310
Intel	Atom N450	1.66	512	5.5	320
Intel	Atom N550	1.5	1024	8.5	563
AMD	Athlon Neo MV-40	1.6	512	15	391

ARM

ARM Holdings designs and licenses microprocessor technology with relatively low power requirements and low cost which would constitute an ideal basis for netbooks. In particular, the recent ARM Cortex-A9 MPCore series of processor cores have been touted by ARM as an alternative platform to x86 for netbooks. These systems, when available, will be branded as smartbooks. Freescale, a manufacturer of ARM chips, has

projected that, by 2012, half of all netbooks will run on ARM. In June 2009, Nvidia announced a dozen mobile Internet devices running ARM based Tegra SoC's, some of which will be netbooks.

Smartbooks will deliver features including always on, all-day battery life, 3G connectivity and GPS (all typically found in smartphones) in a laptop-style body with a screen size of 5 to 10 inches and a QWERTY keyboard. These systems do not run traditional x86 versions of Microsoft Windows, rather custom Linux operating systems (such as Google's Android or Chrome OS). Other barriers for the adoption of ARM are slowly being removed, for example Adobe is finally working on an implementation of the full version of Flash player for ARM.

Lenovo IdeaPad S10

Samsung NC20

MIPS

Some netbooks use MIPS architecture-compatible processors. These include the Skytone Alpha 400, based on an Ingenic system on chip, and the EMTEC Gdium netbook, which uses the 64-bit Loongson processor capable of 400 million instructions per second. While these systems are relatively inexpensive, the processing power of current MIPS implementations usually compares unfavorably with those of x86-implementations as found in current netbooks. After the ARM version, Adobe is planning to release a version of the Adobe Flash Player (version 10.1) for the MIPS platform.

Operating systems

Windows

A Samsung N145 Plus netbook running Windows 7.

As of January 2009, over 90% (96% claimed by Microsoft as of February 2009) of netbooks in the United States are estimated to ship with Windows XP, which Microsoft was later estimated to sell ranging from US$15 to US$35 per netbook. Microsoft has extended the availability of Windows XP for ultra-low cost personal computers from June 2008 until June 2010. However, the discounted license costs only applies to reduced size and functionality netbooks, which effectively enables the production of low-cost PCs while preserving the higher margins of mainstream desktops and "value" laptops as well as avoiding increased use of Linux installations on netbooks. Microsoft also has Windows 7 Starter for this class of devices. As of the first quarter of 2009 many netbook models previously announced with Windows XP for the US market were in fact being released with Windows 7 Starter instead, at the same price point previously announced

for the Windows XP editions. However, unlike on regular desktops or notebooks that were sold with Vista but included a coupon for 7, users could not get a coupon for 7 Starter if they bought a netbook. Windows CE has also been used in netbook applications, due to its reduced feature design, that keeps with the design philosophy of netbooks.

Some netbooks have also been sold with Windows Vista (mostly prior to the release of Windows 7).

Many netbooks are by default unable to activate Windows in an enterprise environment using a Microsoft Key Management Service (KMS) as they lack System Locked Preinstallation (SLP) capability in their BIOS. The missing feature artificially segments enterprise customers from the lower end Netbook market; some hardware vendors offer an optional SLP-compliant BIOS to enterprise customers at additional cost.

Linux

As of November 2009, customised Linux distributions are estimated to ship on 32% of netbooks worldwide, making it the second most popular operating system after Windows. As Linux systems normally install software from an Internet software repository, they do not need an optical drive to install software.

As of August 2010, major netbook manufacturers no longer install or support Linux in the United States. The reason for this change of stance is unclear, although it coincides with the availability of Windows 7 Starter and a strong marketing push for the adoption of this OS in the netbook market. However, companies targeting niche markets, such as System76 and ZaReason, continue to pre-install Linux on the devices they sell.

Netbooks have sparked the development of several Linux variants or completely new distributions, which are optimized for small screen use and the limited processing power of the Atom or ARM processors which typically power netbooks. Examples include Ubuntu Netbook Edition, EasyPeasy, Joli OS and MeeGo. Both Joli OS and MeeGo purport to be "social oriented" or social networking operating systems rather than traditional "office work production" operating systems.

Android

Google's Android software platform, designed for mobile telephone handsets, has been demonstrated on an ASUS Eee PC and its Linux operating system contains policies for mobile internet devices including the original Asus Eee PC 701. ASUS has allocated engineers to develop an Android-based netbook. Freescale have also announced plans for a low-cost ARM-based netbook design, running Android. In May 2009 a contractor of Dell announced it is porting Adobe Flash Lite to Android for Dell netbooks. Acer announced Android netbooks to be available in Q3/2009.

In July 2009, a new project, Android-x86, was created to provide an open source solution for Android on the x86 platform, especially for netbooks.

Since the initial work on Android, Google announced a netbook specific operating system, Chrome OS, and future operating system development may be forked into Android for smartphones and similar handhelds, and Chrome OS for traditional keyboard driven machines like netbooks.

Chrome OS

Google's upcoming Chrome OS is expected to be loaded on some netbooks; some even speculate that Google will launch a Google-branded netbook running the Chrome OS.

MeeGo

MeeGo is a Linux-based open source operating system project. It was first announced at Mobile World Congress in February 2010 by Intel and Nokia in a joint press conference, with the stated aim being to merge the efforts of Intel's Moblin and Nokia's Maemo former projects into one new common project. It is programmed in C++ and comes from Linux OS Family. It was initially released on 26 May 2010.

Other

Netbooks have been demonstrated running other operating systems including FreeBSD, NetBSD, OpenBSD, Darwin, and only recently Google Chrome OS.

The Cloud operating system attempts to capitalize on the minimalist aspect of netbooks. The user interface is limited to a browser application only.

Mac OS X has been demonstrated running on various netbooks as a result of the OSx86 project, although this is in violation of the operating system's End User License Agreement. Apple has complained to sites hosting information on how to install OS X onto non-Apple hardware (including Wired and YouTube) who have reacted and removed content in response. One article nicknamed a netbook running OS X a "Hackintosh."

Usage

A June 2009 NPD study found that 60% of netbook buyers never take their netbooks out of the house.

Another NPD study indicated that by September 2009 netbooks accounted for 20% of all portable computer shipments.

Special "children's" editions of netbooks have been released under Disney branding; their low cost (less at risk), lack of DVD player (less to break) and smaller keyboards (closer

to children's hand sizes) are viewed as significant advantages for that target market. The principal objection to netbooks in this context is the lack of good video performance for streaming online video in current netbooks and a lack of speed with even simple games. Adults browsing for text content are less dependent on video content than small children who cannot read.

Netbooks in education

Netbooks are a growing trend in education for several reasons. The need to prepare children for 21st century lifestyles, combined with hundreds of new educational tools that can be found online, and a growing emphasis on student centered learning are three of the biggest contributing factors to the rising use of Netbook technology in schools. Dell were one of the first to mass produce a ruggedised netbook for the education sector, by having a rubber outlay, touchscreen and network activity light to show the teacher the netbook is online.

Netbooks offer several distinct advantages in educational settings. First, their compact size and weight make for an easy fit in student work areas. Similarly, the small size make Netbooks easier to transport than heavier, larger sized traditional laptops. In addition, prices ranging from $200–$600 dollars mean the affordability of Netbooks can be a relief to school budget makers. Despite the small size and price, Netbooks are fully capable of accomplishing most school-related tasks, including word processing, presentations, access to the Internet, multimedia playback, and photo management.

OLPC XO-1

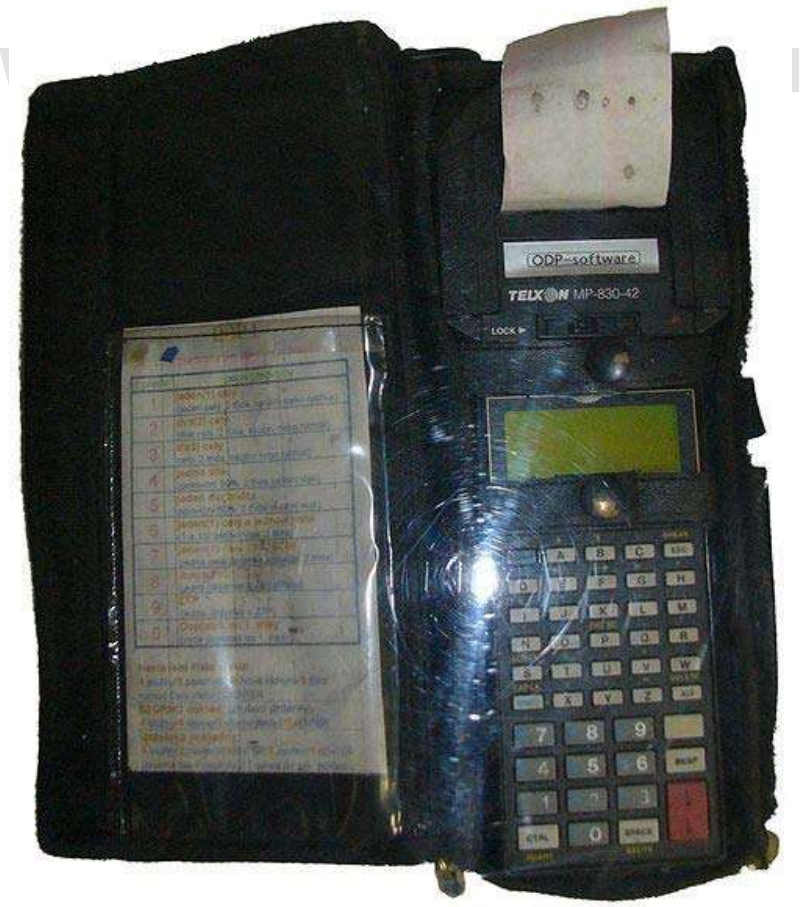
Classmate PC

Smartbook

A smartbook is a concept of a mobile device that falls between smartphones and netbooks, delivering features typically found in smartphones (always on, all-day battery life, 3G connectivity, GPS) in a slightly larger device with a full keyboard. Smartbooks will tend to be designed to work with online applications. Smartbooks are likely to be sold initially through mobile network operators, as mobile phones are today, with a wireless data plan.

Chapter-2

Mobile Computing



Telxon PTC-710 is a 16-bit mobile computer PTC-710 with MP 830-42 microprinter 42-column version. It was manufactured by the Telxon corporation since early 1990s. This one was used for example as portable ticket machine by Czech Railways (České dráhy) in the 1990s.

Datenerfassungsgerät

Mobile computing is a form of human–computer interaction where a computer is expected to be transported during normal usage. Mobile computing has three aspects: mobile communication, mobile hardware, and mobile software. The first aspect addresses communication issues in ad-hoc and infrastructure networks as well as communication properties, protocols, data formats and concrete technologies. The second aspect focusses on the hardware, i.e. mobile devices or device components. The third aspect deals with the characteristics and requirements of mobile applications.

Definitions

Mobile computing is "taking a computer and all necessary files and software out into the field."

"Mobile computing: being able to use a computing device even when being mobile and therefore changing location. Portability is one aspect of mobile computing."

1st pict

Devices

Many types of mobile computers have been introduced since the 1990s, including the

- Wearable computer
- Personal digital assistant/enterprise digital assistant
- Smartphone
- Carputer
- Ultra-Mobile PC

Technical and other limitations of mobile computing

- **Insufficient bandwidth**

Mobile Internet access is generally slower than direct cable connections, using technologies such as GPRS and EDGE, and more recently HSDPA and HSUPA 3G networks. These networks are usually available within range of commercial cell phone towers. Higher speed wireless LANs are inexpensive, but have very limited range.

- **Security standards**

When working mobile one is dependent on public networks, requiring careful use of VPNs.

- **Power consumption**

When a power outlet or portable generator is not available, mobile computers must rely entirely on battery power. Combined with the compact size of many mobile devices, this often means unusually expensive batteries must be used to obtain the necessary battery life.

- **Transmission interferences**

Weather, terrain, and the range from the nearest signal point can all interfere with signal reception. Reception in tunnels, some buildings, and rural areas is often poor.

- **Potential health hazards**

More car accidents are related to drivers who were talking through a mobile device. Cell phones may interfere with sensitive medical devices. There are allegations that cell phone signals may cause health problems.

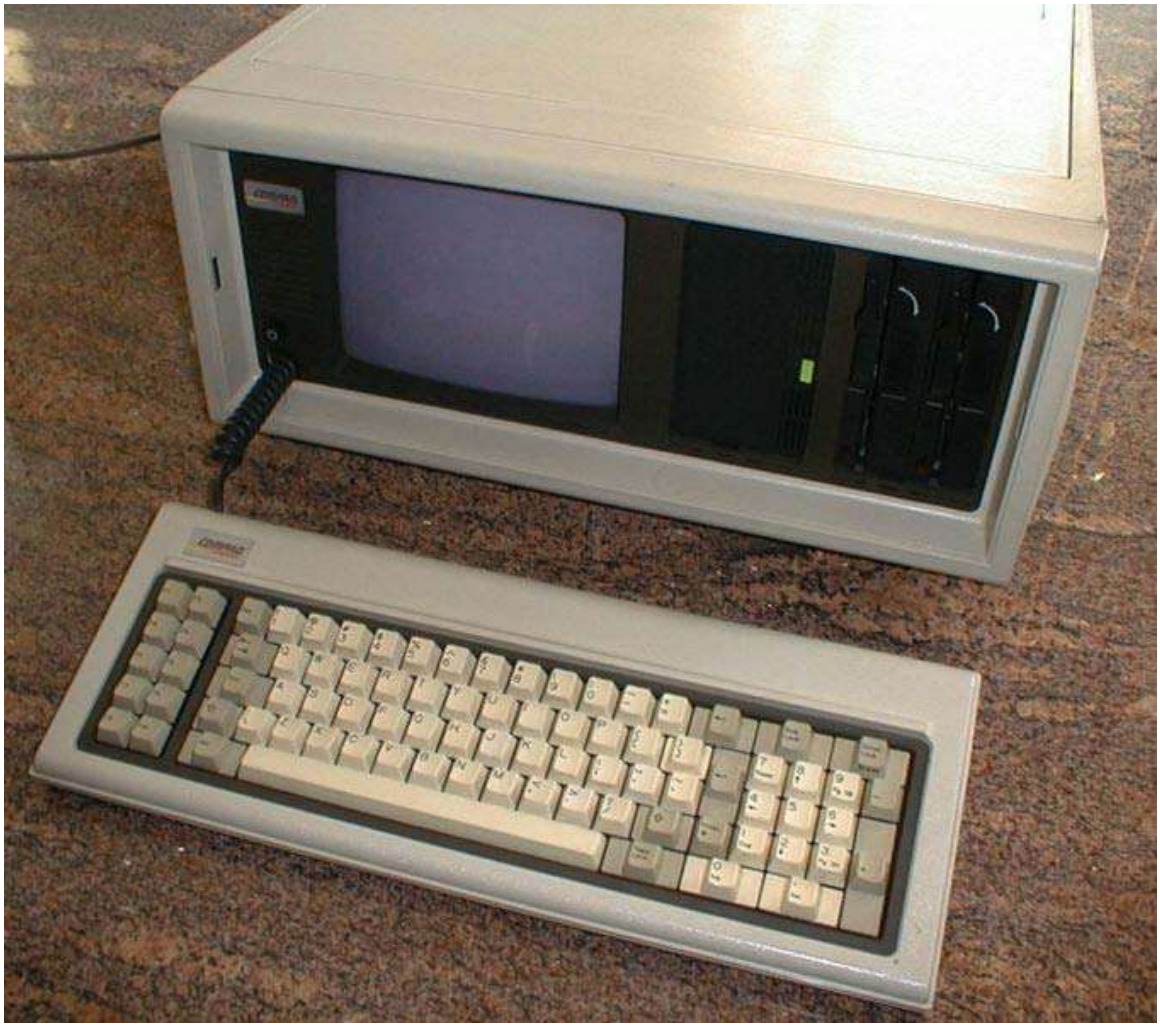
- **Human interface with device**

Screens and keyboards tend to be small, which may make them harder to use. Alternate input methods such as speech or handwriting recognition require training.

BD-Internals3

In-vehicle computing and fleet computing

Many commercial and government field forces deploy a ruggedized portable computer such as the Panasonic Toughbook or larger rack-mounted computers with their fleet of vehicles. This requires the units to be anchored to the vehicle for driver safety, device security, and user ergonomics. Ruggedized computers are rated for severe vibration associated with large service vehicles and off-road driving, and the harsh environmental conditions of constant professional use such as in emergency medical services, fire and public safety.



The Compaq Portable

Elektronika Mk90

Elektronika Mk90

Elektronika Mk90-9

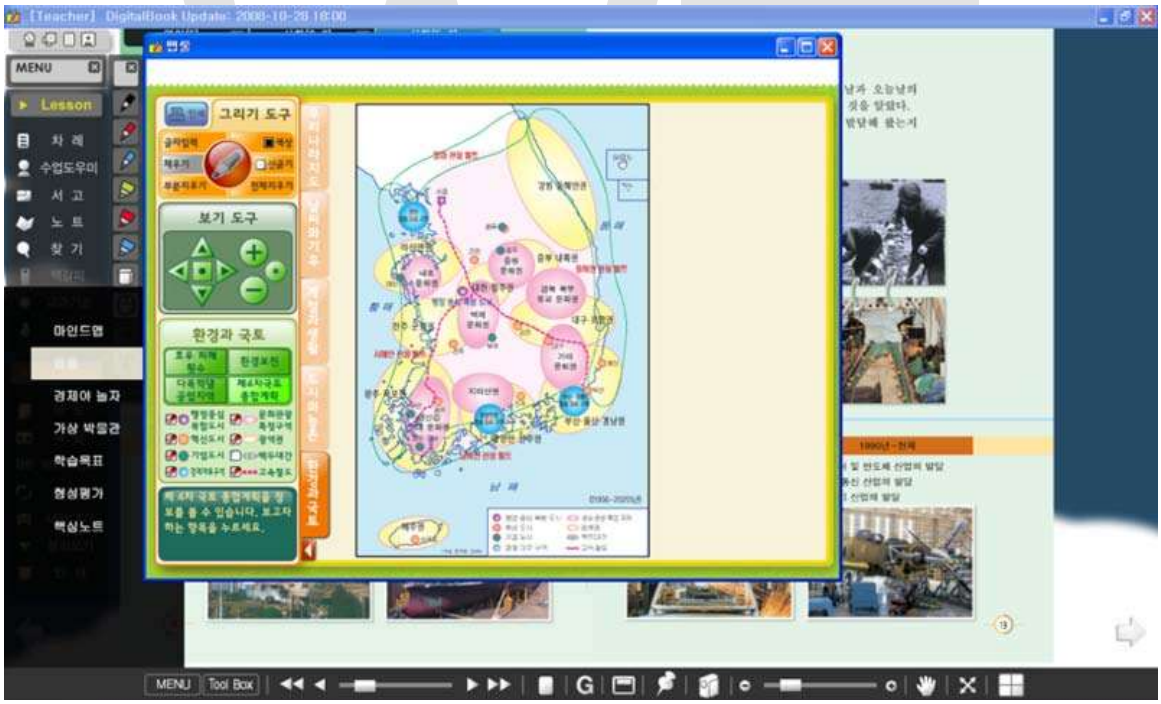
Other elements that enables the unit to function in vehicle:

- Operating temperature: A vehicle cabin can often experience temperature swings from -20F to +140F. Computers typically must be able to withstand these temperatures while operating. Typical fan based cooling has stated limits of 95F-100F of ambient temperature, and temperature below freezing require localized heaters to bring components up to operating temperature(based on independent studies by the SRI Group and by Panasonic R&D).
- Vibration: Vehicles typically have considerable vibration that can decrease life expectancy of computer components, notably rotational storage such as HDDs.
- Daylight, or sunlight readability: Visibility of standard screens becomes an issue in bright sunlight.
- Touchscreens: These enable users to easily interact with the units in the field without removing gloves.
- High-temperature battery settings:. Lithium ion batteries are sensitive to high temperature conditions for charging. A computer designed for the mobile environment should be designed with a high-temperature charging function that limits the charge to 85% or less of capacity.
- External wireless connections, and external GPS antenna connections: Necessary to contend with the typical metal cabins of vehicles and their impact on wireless

reception, and to take advantage of much more capable external tranception equipment.

Several specialized manufacturers such as First Mobile Technologies, National Products Inc (Ram Mounts), Gamber Johnson and LedCo build mounts for vehicle mounting of computer equipment for a wide range of vehicles. The mounts are built to withstand the harsh conditions and maintain ergonomics.

Specialized installation companies specialize in designing the mount design, assembling the parts, and installing them in a safe and consistent manner away from airbags, vehicle HVAC controls, and driver controls. Frequently installations will include a WWAN modem, power conditioning equipment, and WWAN/WLAN/GPS/etc. transceiver antennæ mounted external to the vehicle. Mobile internet access is generally slower than direct cable connections, using technologies such as general packet radio service (GPRS) and Enhanced Data for GSM Evolution (EDGE), and more recently 3G networks. These networks are usually available within range of commercial cell phone towers. Higher speed wireless LANs are inexpensive, but have very limited range



DT USE4

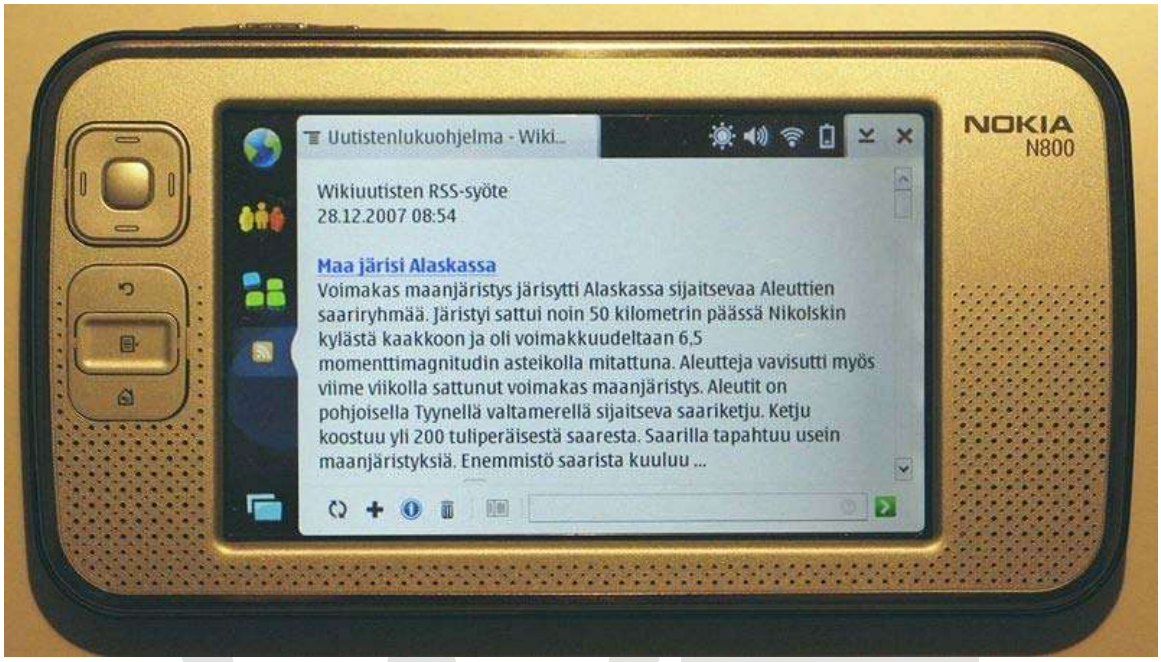

[Teacher] DigitalBook Update: 2008-10-28 18:00
review
Review
MENU
Lesson
Addition
그림과 낱말이 모두 맞게 짝지어진 것을 찾아봅시다.
월 화 수
Monday Thursday Wednesday
토 일 월
Saturday Monday Tuesday
수 목 금
Wednesday Thursday Friday
응답: 0명
접속: 0명
다시하기
정답확인
MENU
Tool Box

DT USE5

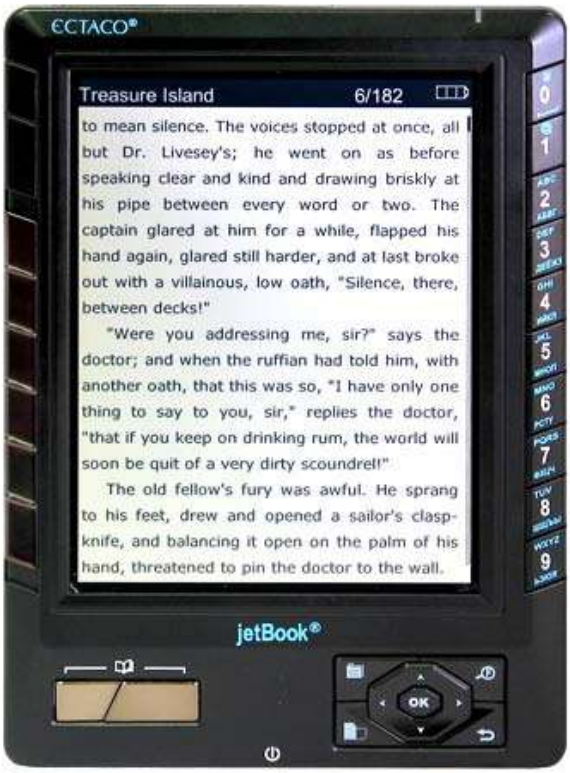
Elektronika MK-61

Portable computing devices

There are several categories of portable computing devices that can run on batteries but are not usually classified as laptops: portable computers, keyboardless tablet PCs, Internet tablets, PDAs, ultra mobile PCs (UMPCs) and smartphones.



A Nokia N800 Internet tablet



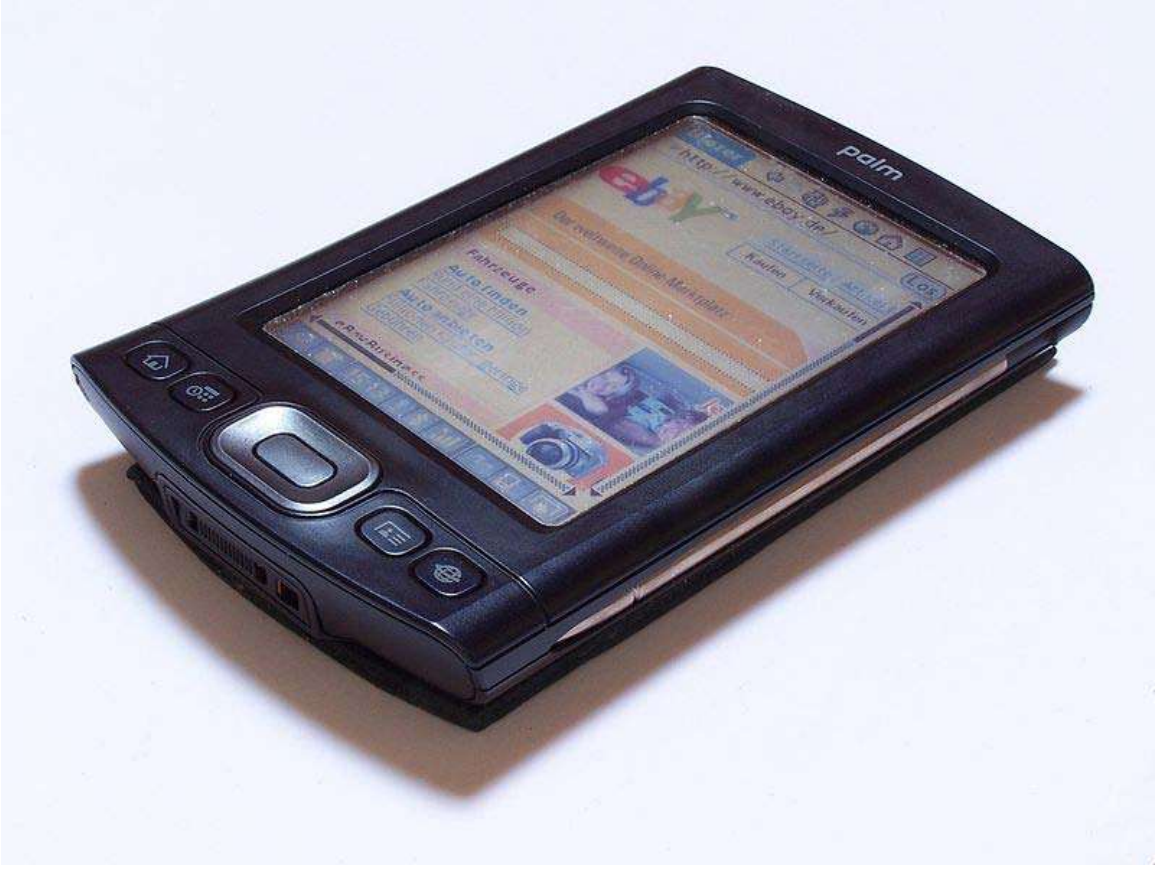
JetBook black

A portable computer is a general-purpose computer that can be easily moved from place to place, but cannot be used while in transit, usually because it requires some "setting-up" and an AC power source. The most famous example is the Osborne 1. Portable computers are also called a "transportable" or a "luggable" PC.

A tablet PC that lacks a keyboard (also known as a non-convertible tablet PC) is shaped like slate or a paper notebook, features a touchscreen with a stylus and handwriting recognition software. Tablets may not be best suited for applications requiring a physical keyboard for typing, but are otherwise capable of carrying out most tasks that an ordinary laptop would be able to perform.

An **Internet tablet** is an Internet appliance in tablet form. Unlike a tablet PC, an Internet tablet does not have much computing power and its applications suite is limited, and it can not replace a general purpose computer. Internet tablets typically feature an MP3 and video player, a web browser, a chat application and a picture viewer.

A personal digital assistant (PDA) is a small, usually pocket-sized, computer with limited functionality. It is intended to supplement and to synchronize with a desktop computer, giving access to contacts, address book, notes, e-mail and other features.



A Palm TX PDA

RTL Aceso with iPhone attached

An ultra mobile PC is a full-featured, PDA-sized computer running a general-purpose operating system.

A smart phone is a PDA with an integrated cellphone functionality. Current smartphones have a wide range of features and installable applications.

A carputer is a computing device installed in an automobile. It operates as a wireless computer, sound system, GPS, and DVD player. It also contains word processing software and is bluetooth compatible.

A Fly Fusion Pentop computer is a computing device the size and shape of a pen. It functions as a writing utensil, MP3 player, language translator, digital storage device, and calculator.

Boundaries that separate these categories are blurry at times. For example, the OQO UMPC is also a PDA-sized tablet PC; the Apple eMate had the clamshell form factor of a laptop, but ran PDA software. The HP Omnibook line of laptops included some devices small enough to be called ultra mobile PCs. The hardware of the Nokia 770 internet tablet is essentially the same as that of a PDA such as the Zaurus 6000; the only reason it's not called a PDA is that it does not have PIM software. On the other hand, both the 770 and the Zaurus can run some desktop Linux software, usually with modifications.

Chapter-3

Personal Digital Assistant

The Palm TX

EO Personal Communicator (440) from AT&T

A **personal digital assistant** (**PDA**), also known as a **palmtop computer**, or **personal data assistant**, is a mobile device that functions as a personal information manager. Current PDAs often have the ability to connect to the Internet. A PDA has an electronic visual display, enabling it to include a web browser, but some newer models also have audio capabilities, enabling them to be used as mobile phones or portable media players. Many PDAs can access the Internet, intranets or extranets via Wi-Fi or Wireless Wide Area Networks. Many PDAs employ touchscreen technology.

The term *PDA* was first used on January 7, 1992 by Apple Computer CEO John Sculley at the Consumer Electronics Show in Las Vegas, Nevada, referring to the Apple Newton. In 1996, Nokia introduced the first mobile phone with full PDA functionality, the 9000 Communicator, which grew to become the world's best-selling PDA. The Communicator spawned a new category of mobile phones: the "PDA phone", now called "smartphone". Today, almost all PDAs are smartphones. Over 150 million smartphones are sold each year, while "stand-alone" PDAs without phone functionality sell only about 3 million units per year.

2008TICA Press Conference 3JTecheCAMit PDA Phone

2008TICA Press Conference HP iPAQ Business Navigator

Acer P300

Typical features

A typical PDA has a touchscreen for entering data, a memory card slot for data storage, and IrDA, Bluetooth and/or Wi-Fi. However, some PDAs may not have a touch screen, using softkeys, a directional pad, and a numeric keypad or a thumb keyboard for input; this is typically seen on telephones that are incidentally PDAs.

In order to have the functions expected of a PDA, a device's software typically includes an appointment calendar, a to-do list, an address book for contacts, a calculator, and some sort of memo (or "note") program. PDAs with wireless data connections also typically include an email client and a Web browser.

Atari Portfolio Photomanipped

Touch screen

Many of the original PDAs, such as the Apple Newton and Palm Pilot, featured a touchscreen for user interaction, having only a few buttons—usually reserved for shortcuts to often-used programs. Touchscreen PDAs, including Windows Mobile devices, may have a detachable stylus to facilitate making selections. The user interacts with the device by tapping the screen to select buttons or issue commands, or by dragging a finger or the stylus on the screen to make selections or scroll.

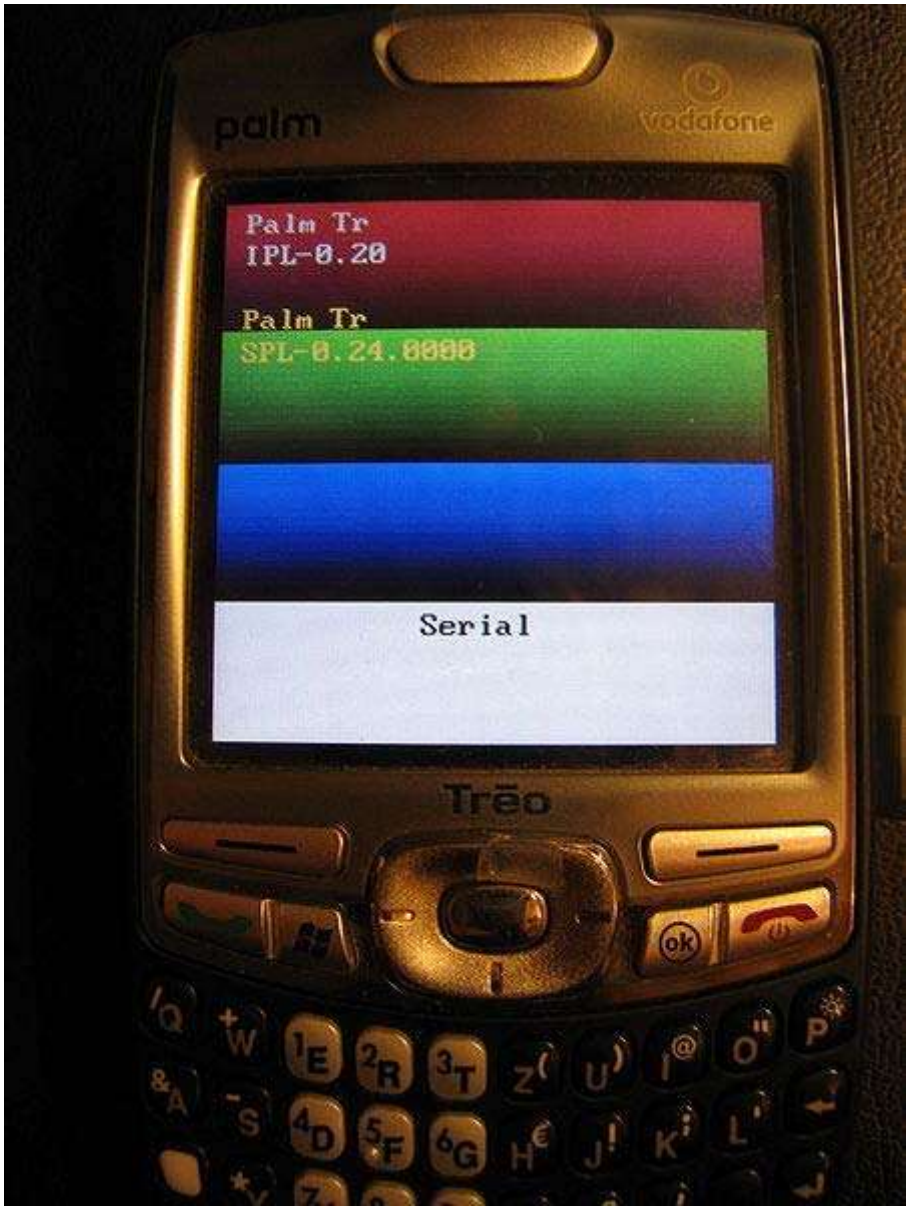
Typical methods of entering text on touchscreen PDAs include:

- A **virtual keyboard**, where a keyboard is shown on the touchscreen. Text is entered by tapping the on-screen keyboard with a finger or stylus.

- An **external keyboard** connected via USB, Infrared port, or Bluetooth. Some users may choose a chorded keyboard for one-handed use.
- **Handwriting recognition**, where letters or words are written on the touchscreen, and the PDA converts the input to text. Recognition and computation of handwritten horizontal and vertical formulas, such as "1 + 2 =", may also be a feature.
- **Stroke recognition** allows the user to make a predefined set of strokes on the touchscreen, sometimes in a special input area, representing the various characters to be input. The strokes are often simplified character shapes, making them easier for the device to recognize. One widely-known stroke recognition system is Palm's Graffiti).

Despite rigorous research and development projects, end-users experience mixed results with handwriting recognition systems. Some find it frustrating and inaccurate, while others are satisfied with the quality of the recognition.

Touchscreen PDAs intended for business use, such as the BlackBerry and Palm Treo, usually also full keyboards and scroll wheels or thumbwheels to facilitate data entry and navigation.


palm
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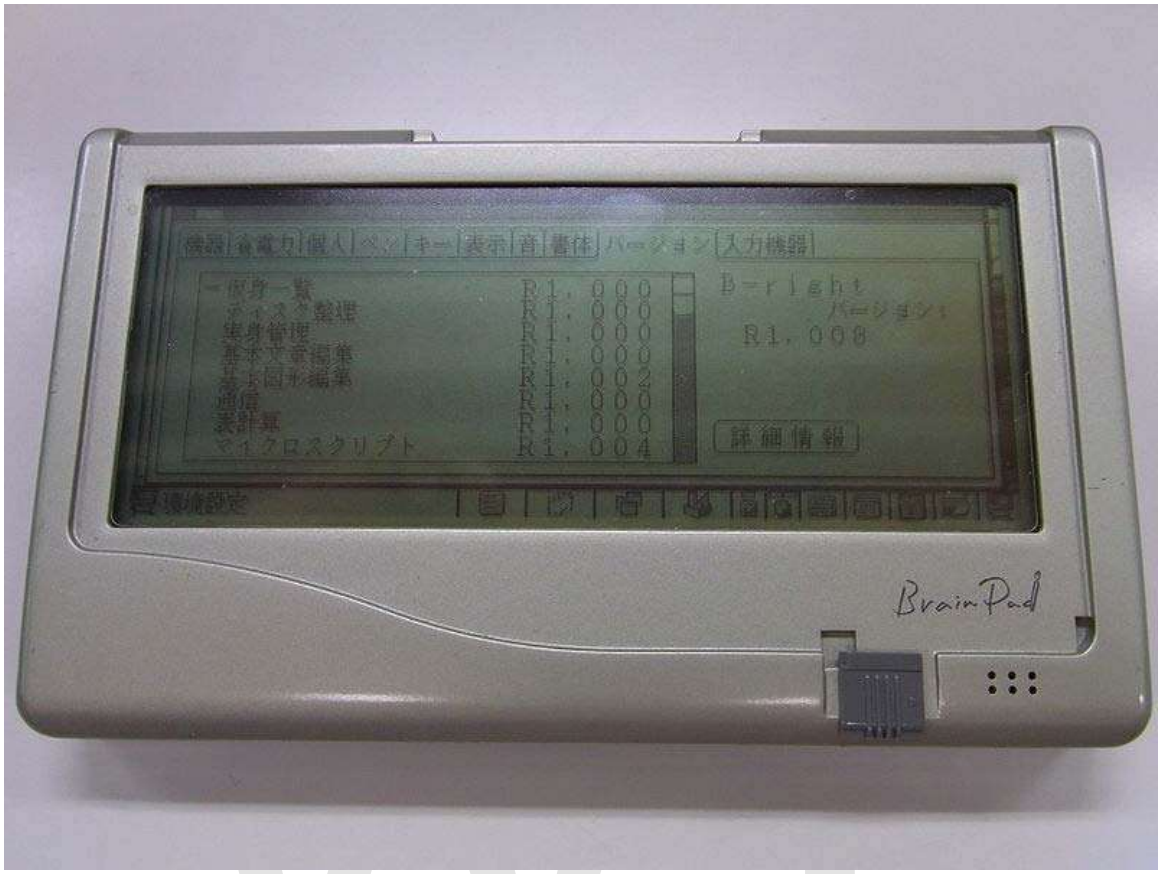
Bootloader



BrainPad-TiPO

Collection of old phones and PDA-BlackBerry

Many touchscreen PDAs support some form of external keyboard as well. Specialized folding keyboards, which offer a full-sized keyboard but collapse into a compact size for transport, are available for many models. External keyboards may attach to the PDA directly, using a cable, or may use wireless technology such as infrared or Bluetooth to connect to the PDA.

Newer PDAs, such as the HTC HD2, Apple iPhone, Apple iPod Touch, and Palm Pre, Palm Pre Plus, Palm Pixi, Palm Pixi Plus, include more advanced forms of touchscreen that can register multiple touches simultaneously. These "multi-touch" displays allow for more sophisticated interfaces using various gestures entered with one or more fingers.

Memory cards

Although many early PDAs did not have memory card slots, now most have either some form of Secure Digital (SD) slot or a CompactFlash slot. Although originally designed for memory, Secure Digital Input/Output (SDIO) and CompactFlash cards are available that provide accessories like Wi-Fi or digital cameras, if the device can support them. Some PDAs also have a USB port, mainly for USB flash drives. Some PDAs use microSD cards, which are electronically compatible with SD cards, but have a much smaller physical size.

Dellpda

Helio ocean telephone keypad

Wired connectivity

While early PDAs connected to a user's personal computer via serial ports or another proprietary connection, many today connect via a USB cable. PDAs are not typically able to connect to each other via USB, as USB requires one machine to act as a "host," which isn't a typical PDA function.

Some early PDAs were able to connect to the Internet indirectly by means off an external modem connected via the PDA's serial port or "sync" connector, or directly by using an expansion card that provided an Ethernet port.

Wireless connectivity

Most modern PDAs have Bluetooth a popular wireless protocol for mobile devices. Bluetooth can be used to connect keyboards, headsets, GPS receivers, and other nearby accessories. It's also possible to transfer files between PDAs that have Bluetooth.

Many modern PDAs have Wi-Fi wireless network connectivity, and can connect to Wi-Fi hotspots.

All smartphones, and some other modern PDAs like the Apple iPod touch, can connect to Wireless Wide Area Networks, such as those provided by cellular telecommunications companies.

Older PDAs from the 90s to 2006 typically had an IrDA (infrared) port allowing short-range, line-of-sight wireless communication. Few current models use this technology, as it has been supplanted by Bluetooth and Wi-Fi. IrDA allows communication between two PDAs, or between a PDA and any device with an IrDA port or adapter. Some printers have IrDA receivers, allowing IrDA-equipped PDAs to print to them, if the PDA's operating system supports it. Most universal PDA keyboards use infrared technology because many older PDAs have it. Infrared technology is low-cost and has the advantage of being allowed aboard aircraft.

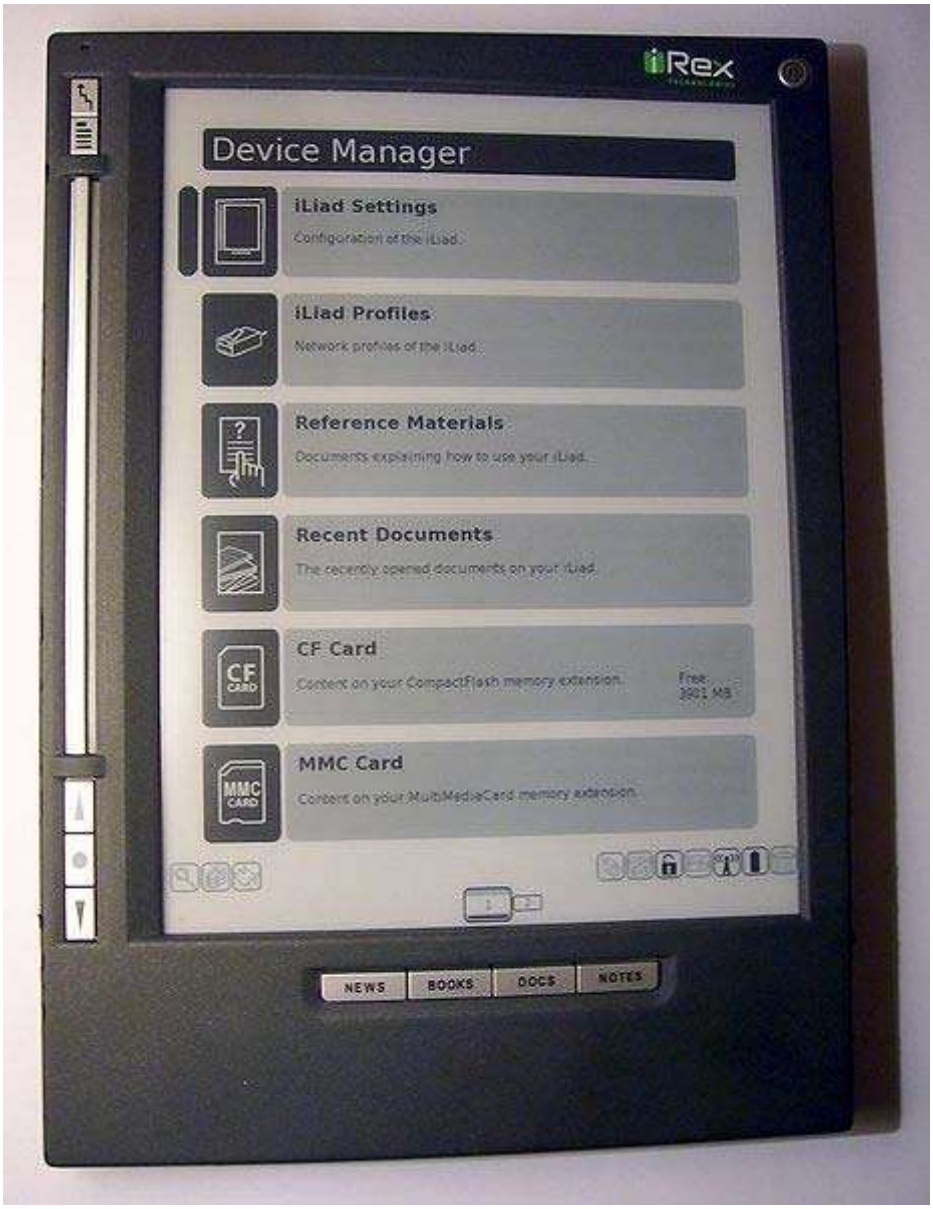
HP Jornada 720

HTC Touch Diamond

Synchronization

Most PDAs can synchronize their data with applications on a user's personal computer. This allows the user to update contact, schedule, or other information on their computer, using software such as Microsoft Outlook or ACT!, and have that same data transferred to PDA—or transfer updated information from the PDA back to the computer. This eliminates the need for the user to update their data in two places.

Synchronization also prevents the loss of information stored on the device if it is lost, stolen, or destroyed. When the PDA is repaired or replaced, it can be "re-synced" with the computer, restoring the user's data.



Irex Iliad (V2)

Some users find that data input is quicker on their computer than on their PDA, since text input via a touchscreen or small-scale keyboard is slower than a full-size keyboard. Transferring data to a PDA via the computer is therefore a lot quicker than having to manually input all data on the handheld device.

Most PDAs come with the ability to synchronize to a computer. This is done through *synchronization software* provided with the handheld, or sometime with the computer's operating system. Examples of synchronization software include:

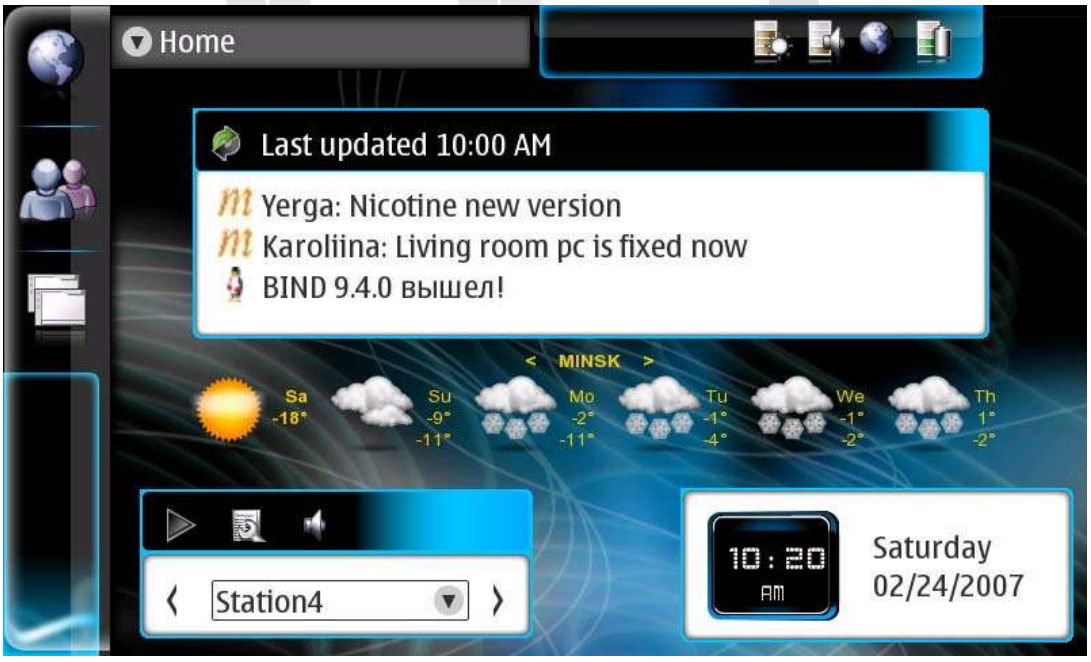
- **HotSync Manager**, for Palm OS PDAs

- **Microsoft ActiveSync**, used by Windows XP and older Windows operating systems to synchronize with Windows Mobile, Pocket PC, and Windows CE PDAs, as well as PDAs running iOS, Palm OS, and Symbian
- **Microsoft Windows Mobile Device Center** for Windows Vista, which supports Microsoft Windows Mobile and Pocket PC devices.
- **Apple iTunes**, used on Mac OS X and Microsoft Windows to sync iOS devices (such as the iPhone and iPod touch)
- **iSync**, included with Mac OS X, can synchronize many SyncML-enabled PDAs
- **BlackBerry Desktop Software**, used to sync BlackBerry devices

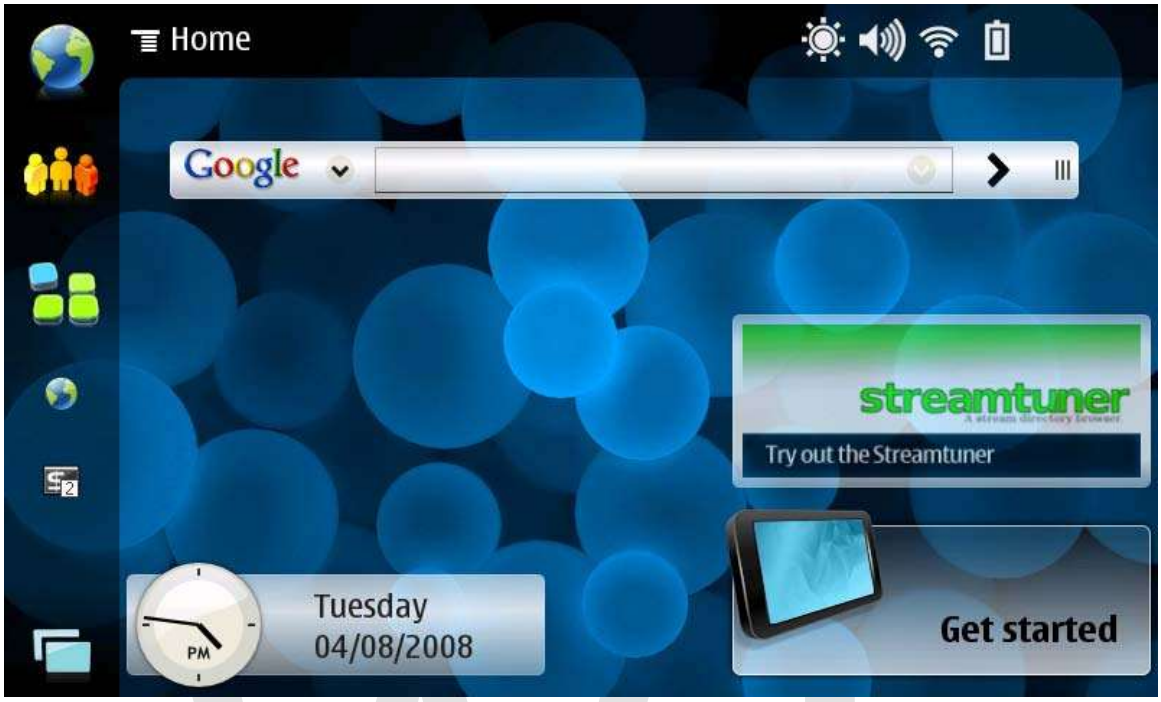
These programs allow the PDA to be synchronized with a personal information manager, which may be part of the computer's operating system, provided with the PDA, or sold separately by a third party. For example, the RIM BlackBerry comes with RIM's *Desktop Manager* program, which can synchronize to both Microsoft Outlook and ACT!.

Other PDAs come only with their own proprietary software. For example, some early Palm OS PDAs came only with Palm Desktop, while later Palm PDAs—such as the Treo 650—have the ability to sync to Palm Desktop or Microsoft Outlook. Microsoft's ActiveSync and Windows Mobile Device Center only synchronize with Microsoft Outlook or a Microsoft Exchange server.

Third-party synchronization software is also available for some PDAs from companies like CommonTime and CompanionLink. Third-party software can be used to synchronize PDAs to other personal information managers that are not supported by the PDA manufacturers (for example, GoldMine and IBM Lotus Notes).



Itos 2007 desktop



Itos 2008 desktop

Wireless synchronization

Some PDAs can synchronize some or all of their data using their wireless networking capabilities, rather than having to be directly connected to a personal computer via a cable.

Apple iOS devices, like the iPhone, iPod Touch, and iPad, can use Apple's MobileMe subscription service to synchronize calendar, address book, mail account, Internet bookmark, and other data with one or more Macintosh or Windows computers using Wi-Fi or cellular data connections.

Palm's webOS smartphones primarily sync with the cloud. For example, if Gmail is used, information in contacts, email, and calendar can be synchronized between the phone and Google's servers.

RIM sells BlackBerry Enterprise Server to corporations so that corporate BlackBerry users can wirelessly synchronize their PDAs with the company's Microsoft Exchange Server, IBM Lotus Domino, or Novell GroupWise servers. Email, calendar entries, contacts, tasks, and memos kept on the company's server are automatically synchronized with the BlackBerry.

Automobile navigation

Some PDAs include Global Positioning System (GPS) receivers; this is particularly true of smartphones. Other PDAs are compatible with external GPS-receiver add-ons that use the PDA's processor and screen to display location information.

PDAs with GPS functionality can be used for automotive navigation. PDAs are increasingly being fitted as standard on new cars.

PDA-based GPS can also display traffic conditions, perform dynamic routing, and show known locations of roadside mobile radar guns. TomTom, Garmin, and iGO offer GPS navigation software for PDAs.

Newton Schlumberger

Newton120

Ruggedized PDAs

Some businesses and government organizations rely upon rugged PDAs, sometimes known as enterprise digital assistants (EDAs), for mobile data applications. EDAs often have extra features for data capture, such as barcode readers, radio-frequency identification (RFID) readers, magnetic stripe card readers, or smart card readers.

Typical applications include:

- Military: Notably Army
- supply chain management in warehouses
- package delivery
- route accounting
- medical treatment and recordkeeping in hospitals
- facilities maintenance and management
- parking enforcement
- access control and security
- capital asset maintenance
- meter reading by utilities
- "wireless waitress" applications in restaurants and hospitality venues

Medical and scientific uses

Many companies have developed PDA products aimed at the medical professions' unique needs, such as drug databases, treatment information, and medical news. Services such as AvantGo translate medical journals into PDA-readable formats. WardWatch organizes medical records, providing reminders of information such as the treatment regimens of patients and programs to doctors making ward rounds. Pendragon and Syware provide tools for conducting research with PDAs, allowing the user to enter data into a centralized database using their PDA. Microsoft Visual Studio and Sun Java also provide programming tools for developing survey instruments on the handheld. These development tools allow for integration with SQL databases that are stored on the handheld and can be synchronized with a desktop- or server-based database.

PDAs have been shown to aid diagnosis and drug selection and some studies have concluded that when patients use PDAs to record their symptoms, they communicate more effectively with hospitals during follow-up visits.

The development of Sensor Web technology may lead to wearable bodily sensors to monitor ongoing conditions, like diabetes or epilepsy, which would alert patients and doctors when treatment is required using wireless communication and PDAs.

Educational uses

As mobile technology becomes more common, it is increasingly being used as a learning tool. Some educational institutions have embraced **M-Learning**, integrating PDAs into their teaching practices.

PDAs and handheld devices are allowed in many classrooms for digital note-taking. Students can spell-check, modify, and amend their class notes on the PDA. Some educators distribute course material through the Internet or infrared file-sharing functions of the PDA. Textbook publishers have begun to release e-books, or electronic textbooks, which can be uploaded directly to a PDA, reducing the number of textbooks students must carry.

Software companies have developed PDA programs to meet the instructional needs of educational institutions, such as dictionaries, thesauri, word processing software, encyclopedias, and digital lesson planners.


SHARP PA-X1
PA-X1用保護カード
電子システム手帳使用表示例
電話
電話帳
住所録
スケジュール
カレンダー
4行表示
8行表示
時計
世界時計
計算
通貨換算/
日数計算
メモ
PA-X
MEMORY SAFE GUARD / AUTO POWER OFF
電子システム手帳

SHARP PA-X1

Stpaloma

TC-100

Recreational uses

PDAs may be used by music enthusiasts to play a variety of music file formats. Many PDAs include the functionality of an MP3 player.

Road rally enthusiasts can use PDAs to calculate distance, speed, and time. This information may be used for navigation, or the PDA's GPS functions can be used for navigation.

Underwater divers can use PDAs to plan breathing gas mixtures and decompression schedules using software such as "V-Planner."

PDAs for people with disabilities

PDAs offer varying degrees of accessibility for people with differing abilities, based on the particular device and service. People with vision, hearing, mobility, or speech impairments may be able to use PDAs on a limited basis. This use may be enhanced by accessibility software (e.g., speech recognition for verbal input instead of manual input). Universal design is relevant to PDAs as well as other technology, and a viable solution for many user-access issues, though it has yet to be consistently integrated into the design of popular consumer PDA devices.

PDAs are useful for people with traumatic brain injury or posttraumatic stress disorder, as seen in troops returning home from the Iraq War and Operation Enduring Freedom. PDAs help address memory problems, helping affected people with daily life organization and reminders. As of quite recently, the Department of Veterans' Affairs has issued thousands of PDAs to troops who need them. Occupational therapists have taken on a crucial role within this population helping these veterans return to the normality of life they once had.

OpenStreetMap on PDA

Zypad

Chapter-4

Smart TV

Smart TV, which is also sometimes also referred to as "***Connected TV***", (not to be confused with Internet TV, Web TV or LG Electronics's upcoming "SMART TV" branded NetCast Entertainment Access devices), is the phrase used to describe the current trend of integration of the internet into modern television sets and set-top boxes, as well as the technological convergence between computers and these television sets / set-top boxes. These new devices most often also have a much higher focus on online interactive media, Internet TV, over-the-top content, as well as on-demand streaming media, and less focus on traditional broadcast media like previous generations of television sets and set-top boxes always have had. Similar to how the internet, web widgets, and software applications are integrated in modern smartphones, hence also the name ("*Smart TV*" versus "*Smart Phone*").

The technology that enables Smart TVs is incorporated into devices such as television sets, set-top boxes, Blu-ray players, game consoles, and companion devices. These devices allow viewers to search and find videos, movies, photos and other content on the web, on a local cable TV channel, on a satellite TV channel, or stored on a local hard drive.

Definition

A *Smart TV* device is either a television set with integrated internet capabilities or a set-top box for television with a 10-foot user interface that offers more advanced computing ability and connectivity than a contemporary basic television set. Smart TVs may be thought of as a information appliance or the computer system from a handheld computer integrated within a television set unit, a such Smart TV often allows the user to install and run more advanced applications or plugins/addons based on a specific platform. Smart TVs run complete operating system or mobile operating system software providing a platform for application developers.

Technology

While the concept of Smart TVs is still in its incipient stages, with up and coming software frameworks such as the proprietary Google TV and the open source XBMC platforms getting a lot of public attention in the news media within the consumer electronics market area, and commercial offerings from companies such as Logitech, Sony, LG, Boxee, Samsung and Intel have indicated products in the area that will give television users search capabilities, ability to run apps (sometimes availabe via an 'app store' digital distribution platform), interactive on-demand media, personalized communications, and social networking features.

Operating system

There are a multiple array of mobile operating systems currently available, and while most are targeting smartphones, nettops or tablet computers, some also run on Smart TVs or were even designed specifically for Smart TV usage. Most often the operating system of Smart TVs are originally based Linux, Unix, Android, or another open-source software platform.

Social networking

A number of Smart TV platforms come prepackaged, or can be optionally extended, with social networking capabilities, with which users can both glean updates from, and post their own updates to, existing social networking services (i.e., Boxee's "social networking layer" - libboxee -, which interfaces with Facebook and Twitter, among other services), including posts related to the content currently being played. As social network and social news posts by users are already a growing means of web audience measurement, the addition of social networking synchronization to Smart TV and HTPC platforms may provide a similarly-greater affording of interaction with both on-screen content and other viewers than is currently available to most televisions, while simultaneously providing a much more cinematic experience of the content than is currently available with most computers.

List of platforms

Following list encompasses notable Smart TV platforms:

- MediaPortal (by Team MediaPortal and its open source community)
- Google TV (by Google, Intel, Sony and Logitech)
- Internet@TV (by Samsung)
- Mediaroom (by Microsoft)
- NetCast Entertainment Access (by LG Electronics)
- Viera Cast (by Panasonic)
- Vudu (by Wal-Mart)
- XBMC Media Center (by the XBMC Foundation and its open source community)
- Yahoo! Connected TV, formerly Yahoo! GoTV (by Yahoo!)

Television sets with Integrated Internet

The following is a list of television sets with integrated internet. There are more than 10 smart TV platforms currently available for the consumers offering access to applications like NetFlix, YouTube, CinemaNow, Pandora radio, Flickr, Vudu, Yahoo TV Widgets and more.

- LG Netcast
- Panasonic Vieracast
- Samsung Internet@TV
- Sharp AQUOS Net
- Sony Bravia Internet Video and Sony Internet TV
- Toshiba Internet TV
- Vizio VIA

Chapter-5

Smartphone

The HTC Desire Z, featuring common smartphone abilities such as a high-resolution touchable display, as well as a fairly common QWERTY slider keyboard.

IS02 Close

A **smartphone** is a mobile phone that offers more advanced computing ability and connectivity than a contemporary feature phone. Smartphones and feature phones may be thought of as handheld computers integrated with a mobile telephone, but while most feature phones are able to run applications based on platforms such as Java ME, a smartphone usually allows the user to install and run more advanced applications. Smartphones run complete operating system software providing a platform for application developers. Thus, they combine the functions of a camera phone and a personal digital assistant (PDA).

Some smartphones, sometimes called NirvanaPhones, have a docking station with an external display and keyboard to create a desktop or laptop environment.

According to an Olswang report in early 2011, Smartphones are experiencing accelerating rates of adoption: 22% of consumers already have a smartphone, with this percentage rising to 31% amongst 24-35 year olds.

Lanix KIP

Le Nokia 5800 XpressMusic sur le support

Growth in demand for advanced mobile devices boasting powerful processors, abundant memory, larger screens, and open operating systems has outpaced the rest of the mobile phone market for several years. According to a study by ComScore, over 45.5 million people in the United States owned smartphones in 2010 out of 234 million total subscribers. Despite the large increase in smartphone sales in the last few years, smartphone shipments only make up 20% of total handset shipments, as of the first half of 2010. In March 2011 Berg Insight reported data that showed global smartphone shipments increased 74% from 2009 to 2010.

History

Early years

The first smartphone was the IBM Simon; it was designed in 1992 and shown as a concept product that year at COMDEX, the computer industry trade show held in Las Vegas, Nevada. It was released to the public in 1993 and sold by BellSouth. Besides being a mobile phone, it also contained a calendar, address book, world clock, calculator, note pad, e-mail, send and receive fax, and games. It had no physical buttons to dial with. Instead customers used a touchscreen to select telephone numbers with a finger or create

facsimiles and memos with an optional stylus. Text was entered with a unique on-screen "predictive" keyboard. By today's standards, the Simon would be a fairly low-end product, lacking for example the camera now considered usual. However, its feature set at the time was highly advanced.

Fdl-3500

Helio ocean telephone keypad

The Nokia Communicator line was the first of Nokia's smartphones starting with the Nokia 9000, released in 1996. This distinctive palmtop computer style smartphone was the result of a collaborative effort of an early successful and costly personal digital assistant (PDA) by Hewlett-Packard combined with Nokia's bestselling phone around that time, and early prototype models had the two devices fixed via a hinge. The Nokia 9210 was the first color screen Communicator model which was the first true smartphone with an open operating system; the 9500 Communicator was also Nokia's first cameraphone Communicator and Nokia's first Wi-Fi phone. The 9300 Communicator was the third dimensional shift into a smaller form factor, and the latest E90 Communicator includes GPS. The Nokia Communicator model is remarkable for also having been the most costly phone model sold by a major brand for almost the full life of

the model series, costing easily 20% and sometimes 40% more than the next most expensive smartphone by any major producer.

In 1997 Ericsson released the concept phone GS88, the first device labelled as 'smartphone'.

Palm, Symbian, and BlackBerry

In 2000 Ericsson released the touchscreen smartphone R380, the first device to use the new Symbian OS. It was followed up by P800 in 2002, the first camera smartphone.

In early 2001, Palm, Inc. introduced the Kyocera 6035, the first smartphone to be deployed in widespread use in the United States. This device combined the features of a personal digital assistant (PDA) with a wireless phone that operated on the Verizon Wireless network. For example, a user could select a name from the PDA contact list, and the device would dial that contact's phone number. The device also supported limited web browsing. The device received a very positive reception from technology publications.

In 2001 Microsoft announced its Windows CE Pocket PC OS would be offered as "Microsoft Windows Powered Smartphone 2002." Microsoft originally defined its Windows Smartphone products as lacking a touchscreen and offering a lower screen resolution compared to its sibling Pocket PC devices.

In early 2002 Handspring released the Palm OS Treo smartphone, utilizing a full keyboard that combined wireless web browsing, email, calendar, and contact organizer with mobile third-party applications that could be downloaded or synced with a computer.

In 2002 RIM released the first BlackBerry which was the first smartphone optimized for wireless email use and had achieved a total customer base of 32 million subscribers by December 2009.

In 2007 Nokia launched the Nokia N95 which integrated a wide range of features into a consumer-oriented smartphone: GPS, a 5 megapixel camera with autofocus and LED flash, 3G and Wi-Fi connectivity and TV-out. In the next few years these features would become standard on high-end smartphones.

In 2010 Nokia released the Nokia N8 smartphone, the first device to use the new Symbian^3 OS. It featured a camera that Mobile Burn described as the best camera in a phone, and satellite navigation that Mobile Choice described as the best on any phone.

In February 2011 Nokia announced a plan to make Microsoft Windows Phone 7 its high end smartphone operating system, reducing MeeGo to a research platform while still keeping Symbian for mid range and low range products.

Android and iPhone

The original iPhone (2007)

LG MS25 Genius

LG Panther

Later in 2007, Apple Inc. introduced its first iPhone. It was initially costly, priced at $500 for the cheaper of two models on top of a two year contract. It was one of the first smartphones to be mainly controlled through its touchscreen, the others being the LG Prada and the HTC Touch (also released in 2007). It was the first mobile phone to use a multi-touch interface, and it featured a web browser that *Ars Technica* then described as "far superior" to anything offered by that of its competitors. At the time of the launch of the iPhone it was arguable whether it was actually a smartphone as the first generation lacked the ability to officially use third-party applications. A process called jailbreaking emerged quickly to provide unofficial third-party applications. Steve Jobs publicly stated that the iPhone lacked 3G support due to the immaturity, power use, and physical size requirements of 3G chipsets at the time. However, it has been rumored that the CDMA2000 Network Providers (Verizon, Sprint) refused to allow the iPhone on their network because Jobs wanted total control of the application store associated with the iPhone.

Android

Quantity Market Shares by Gartner (in one year)
(New Sales)

BRAND	Percent
Symbian 2009	46.9%
Symbian 2010	37.6%
Android 2009	3.9%
Android 2010	22.7%
RIM 2009	19.9%
RIM 2010	16.0%
iPhone 2009	14.4%
iPhone 2010	15.7%

Microsoft 2009	8.7%
Microsoft 2010	4.2%
Other OS 2009	6.1%
Other OS 2010	3.8%

Notes: The table is for a whole year. In one year RIM is still above iPhone. Other OS in the table includes Linux.

The Android operating system for smartphones was released in 2008. Android is an open source platform backed by Google, along with major hardware and software developers (such as Intel, HTC, ARM, Motorola and Samsung, to name a few), that form the Open Handset Alliance. The first phone to use Android was the HTC Dream, branded for distribution by T-Mobile as the G1. The software suite included on the phone consists of integration with Google's proprietary applications, such as Maps, Calendar, and Gmail, and a full HTML web browser. Third-party apps are available via the Android Market (released October 2008), including both free and paid apps.

Nokia ST

Nokia x6 16gb

In July 2008, Apple introduced its second generation iPhone which had a lower list price and 3G support. Released with it, Apple also created the App Store with both free and paid applications. The App Store can deliver smartphone applications developed by third parties directly to the iPhone or iPod Touch over Wi-Fi or cellular network without using a PC to download. The App Store has been a huge success for Apple and by April 2010 hosted more than 185,000 applications. The App Store hit three billion application downloads in early January 2010, and 10 billion by January 2011.

Orange San Francisco

P320

P320

In January 2010, Google launched the Nexus One smartphone using its Android OS. Although Android has multi-touch abilities, Google initially removed that feature from the Nexus One, but it was added through a firmware update on February 2, 2010.

According to Gartner in their report dated November 2010, total smartphone sales doubled in one year and now smartphones represent 19.3 percent of total mobile phone sales. Over late 2009 and 2010 Android's smartphone market share has increased very rapidly.

In Q4 2010, Android surpassed Symbian as the most common operating system in smartphones, with 32.9 million units sold versus 31.0 million. Android-equipped phones sold seven times more than in the prior year due to customers' increased preference for a device that can access websites while bypassing traditional computers.

In 2010 smartphone sales increased by 72.1 percent from the prior year, whereas sales for all mobile phones only increased by 31.8 percent. Smartphones make up 19 percent of all mobile phone.

March 2011: Concerning the Xperia Play smartphone, an analyst at CCS Insight said "Console wars are moving to the mobile platform".

March 2011: An Android high-end smartphone which can produce 3D effects with no need for special glasses (autostereoscopy) was announced by LG Electronics.

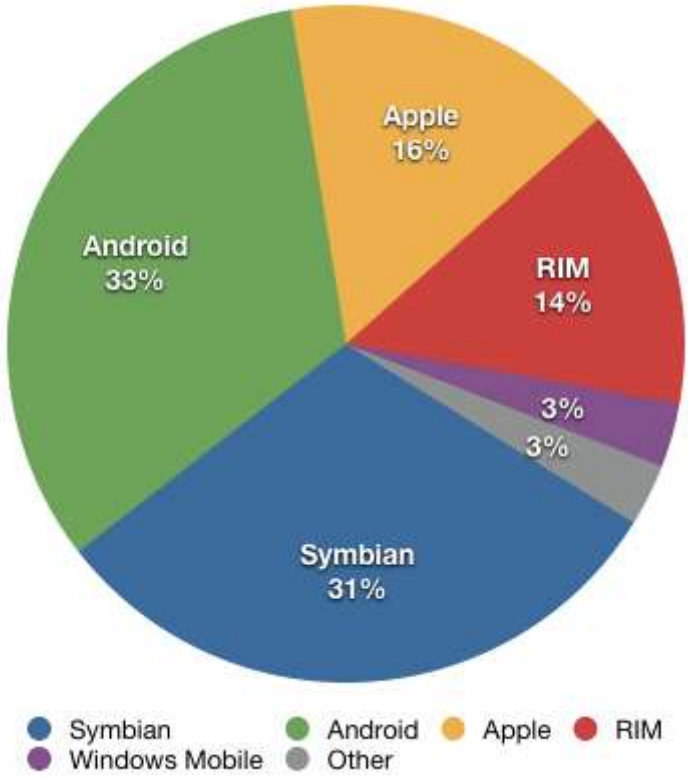
Windows Phone 7 mockuo

Zte

Other application stores

Platforms other than the iPhone are able to download apps from any website, rather than only from a single app store; however, other companies have more recently launched their own app stores. Google launched the Android Market in October 2008. RIM launched its app store, BlackBerry App World, in April 2009. Nokia launched its Ovi Store in May 2009. Palm launched its Palm App Catalog in June 2009. Microsoft launched its Windows Marketplace for Mobile in October 2009. Samsung launched Samsung Apps for its bada based phones.

Operating systems

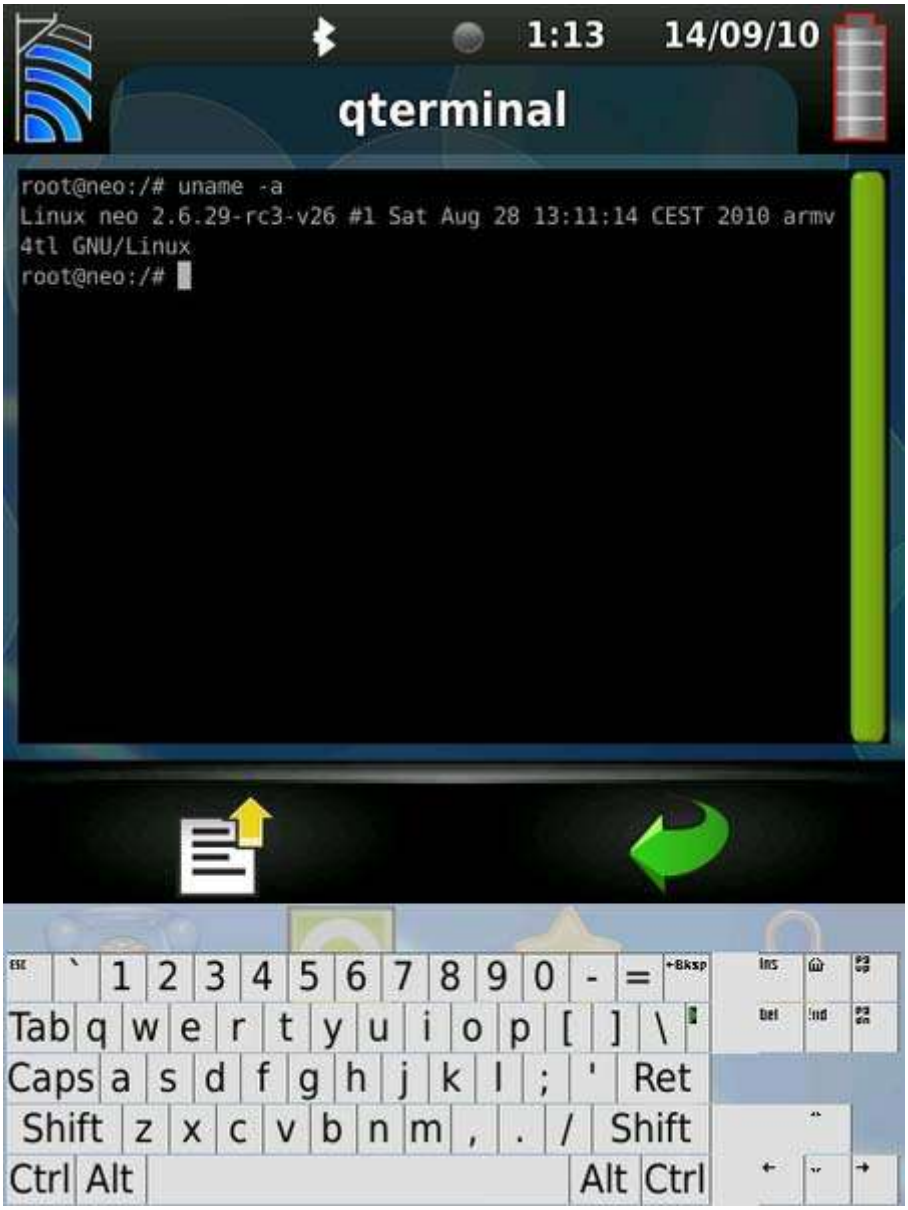


Share of worldwide 2010 Q4 smartphone sales to end users by operating system, according to Canalys. A different analysis of 2010 Q4 sales by Gartner puts total Symbian phone sales slightly ahead of Android.

2010 saw the rapid rise of the Google Android operating system from 4 percent of new deployments in 2009 to 33 percent at the beginning of 2011 making it share the top position with the since long dominating Symbian OS. The smaller rivals include US popular Blackberry OS, the trendsetting iOS, Samsung's recently introduced bada, HP's heir of Palm Pilot webOS and the Microsoft Windows Phone OS seeing a possible revival through an alliance with Nokia.

Open source development

The open source culture has penetrated the smartphone market in several ways. There have been attempts to open source both hardware and software of smartphones. One prominent project from open hardware development is the Neo FreeRunner smartphone developed by Openmoko.



Qtmoko v26 Terminal

Qtmoko v26 Themes

In February 2010 Nokia made Symbian open source. Thus, most commercial smartphones were based on open source operating systems. These include GNU/Linux based, such as Google's Android, Nokia's Maemo which was later merged with Intel's project Moblin to form MeeGo, Hewlett-Packard's WebOS, and Berkeley Software Distribution (BSD) based, such as the Darwin-based Apple iOS.

Screen

A US army soldier using an iPhone "app"

Screens on smartphones vary largely in both size and display resolution. Screen sizes range from 2 inches to 4.5 inches (measured diagonally), while resolutions vary from 240x320 to 640x960; a common resolution for smartphones is 480x800.

ROKR E6

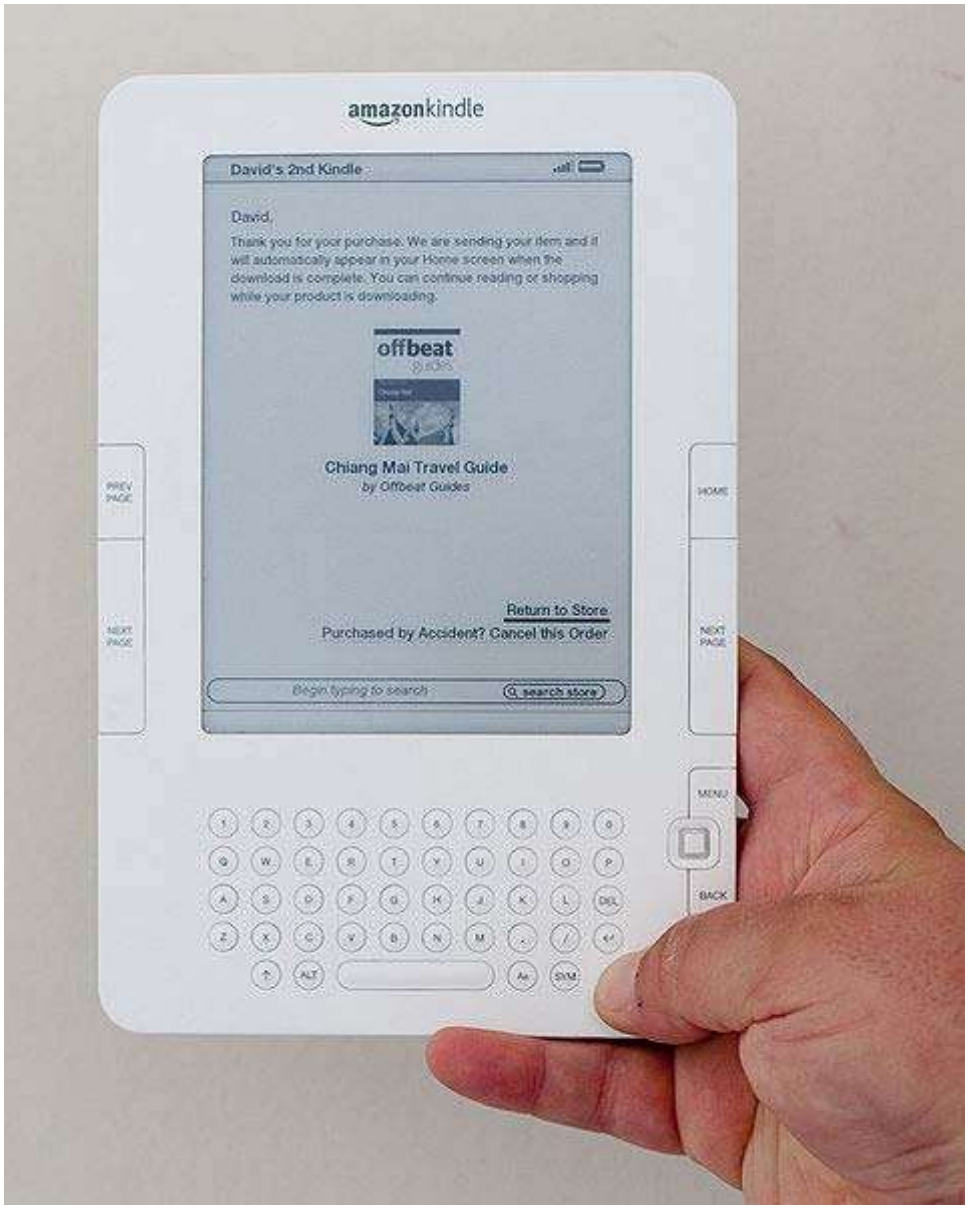
SHARP IS03

Toshiba tg01 spb polish

Chapter-6

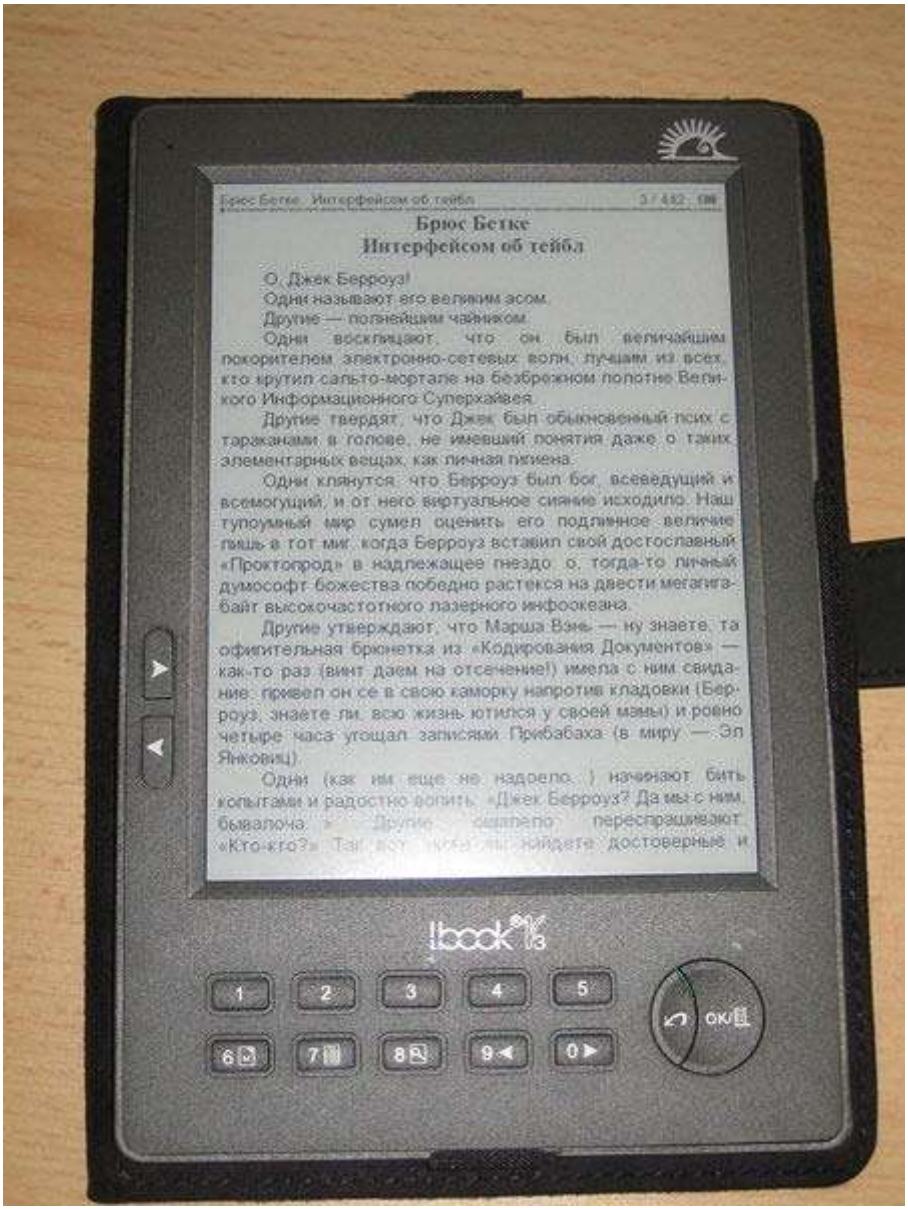
E-book

A user viewing an electronic page on a prototype OLPC



Amazon Kindle 2

An **electronic book** (also **e-book**, **ebook**, **digital book**) is a text and image-based publication in digital form produced on, published by, and readable on computers or other digital devices. Sometimes the equivalent of a conventional printed book, e-books can also be born digital. The *Oxford Dictionary of English* defines the e-book as "an electronic version of a printed book," but e-books can and do exist without any printed equivalent. E-books are usually read on dedicated hardware devices known as *e-Readers* or *e-book devices*. Personal computers and some cell phones can also be used to read e-books.



LBook V3

History

Among the earliest general e-books were those in *Project Gutenberg,* in 1971. One early e-book implementation was the desktop prototype for a proposed notebook computer, the *Dynabook,* in the 1970s at PARC: a general-purpose portable personal computer capable of displaying books for reading.

Early e-books were generally written for specialty areas and a limited audience, meant to be read only by small and devoted interest groups. The scope of the subject matter of these e-books included technical manuals for hardware, manufacturing techniques and

other subjects. In the 1990s, the general availability of the Internet made transferring electronic files much easier, including e-books.

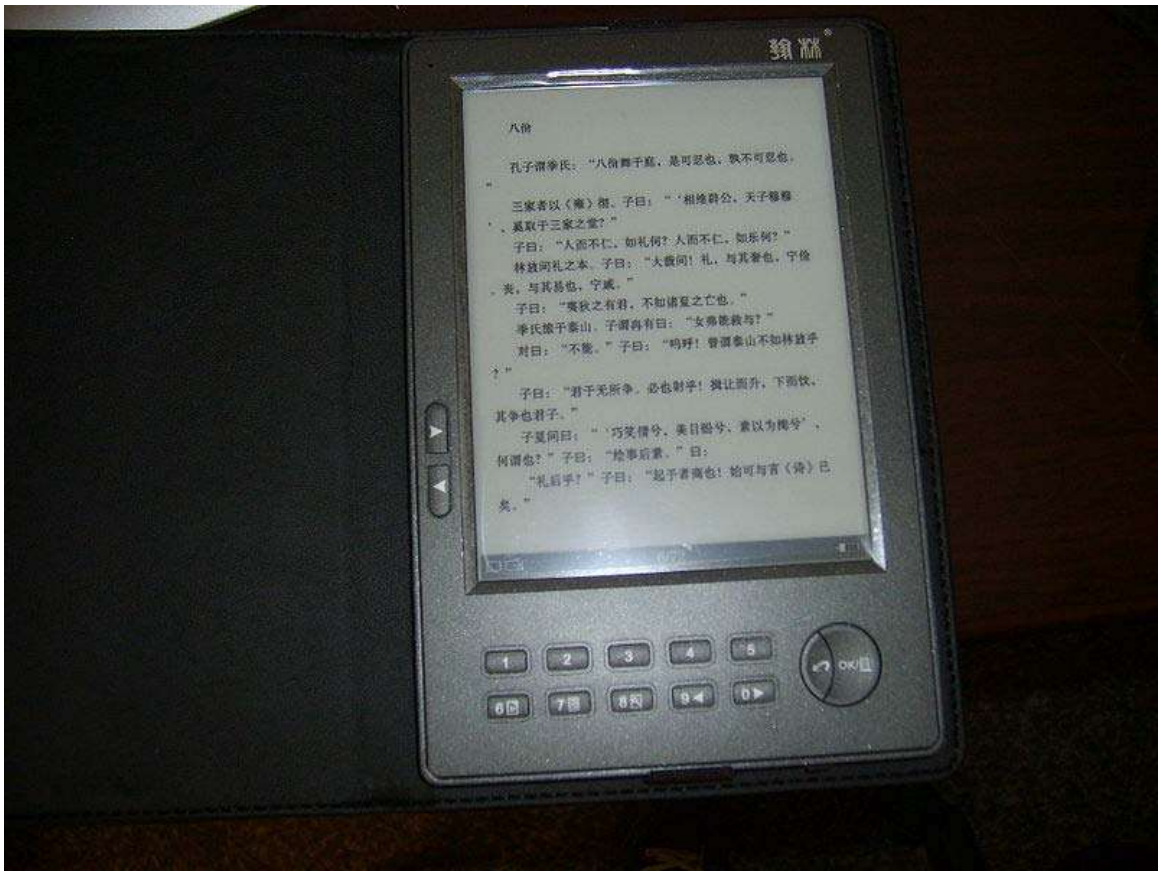
Numerous e-book formats, view comparison of e-book formats, emerged and proliferated, some supported by major software companies such as Adobe with its PDF format, and others supported by independent and open-source programmers. Multiple readers followed multiple formats, most of them specializing in only one format, and thereby fragmenting the e-book market even more. Due to exclusiveness and limited readerships of e-books, the fractured market of independents and specialty authors lacked consensus regarding a standard for packaging and selling e-books. In 2010 e-books continued to gain in their own underground markets. Many e-book publishers began distributing books that were in the public domain. At the same time, authors with books that were not accepted by publishers offered their works online so they could be seen by others. Unofficial (and occasionally unauthorized) catalogs of books became available over the web, and sites devoted to e-books began disseminating information about e-books to the public.

U.S. Libraries began providing free e-books to the public in 1998 through their web sites and associated services, although the e-books were primarily scholarly, technical or professional in nature, and could not be downloaded. In 2003, libraries began offering free downloadable popular fiction and non-fiction e-books to the public, launching an e-book lending model that worked much more successfully for public libraries. The number of library e-book distributors and lending models continued to increase over the next few years. In 2010, a Public Library Funding and Technology Access Study found that 66% of public libraries in the U.S. were offering e-books, and a large movement in the library industry began seriously examining the issues related to lending e-books, acknowledging a tipping point of broad e-book usage.

As of 2009, new marketing models for e-books were being developed and dedicated reading hardware was produced. E-books (as opposed to ebook readers) have yet to achieve global distribution. In the United States, as of September 2009, the Amazon Kindle model and Sony's PRS-500 were the dominant e-reading devices. By March 2010, some reported that the Barnes & Noble Nook may be selling more units than the Kindle. On January 27, 2010 Apple Inc. launched a multi-function device called the iPad and announced agreements with five of the six largest publishers that would allow Apple to distribute e-books. However, many publishers and authors have not endorsed the concept of electronic publishing, citing issues with demand, piracy and proprietary devices.

In July 2010, online bookseller Amazon.com reported sales of ebooks for its proprietary Kindle outnumbered sales of hardcover books for the first time ever during the second quarter of 2010, saying it sold 140 e-books for every 100 hardcover books, including hardcovers for which there was no digital edition. By January 2011, ebook sales at Amazon had surpassed its paperback sales. In the overall U.S. market, paperback book sales are still much larger than either hardcover or e-book; the American Publishing Association estimated e-books represented 8.5% of sales as of mid-2010. In Canada, the option of ebook publishing took a higher profile when the novel, *The Sentamentalists*,

won the prestigious national Giller Prize. Owing to the small scale of the novel's independent publisher, the book was initially not widely available in printed form, but the ebook edition had no such problems with it becoming the top-selling title for Kobo devices.



Hanlin V3

Timeline

1971

- Michael S. Hart launches *Project Gutenberg*.

1985–1992

- Robert Stein starts Voyager Company Expanded Books and books on CD-ROM.

1992

- Charles Stack's Book Stacks Unlimited begins selling new physical books online.

1993

- Zahur Klemath Zapata develops the first software to read digital books. Digital book version 1 and the first digital book is published *On Murder Considered as one of the Fine Arts* (Thomas de Quincey).
- Digital Book, Inc. offers the first 50 digital books in floppy disk with Digital Book Format (DBF).
- Hugo Award for Best Novel nominee texts published on CD-ROM by Brad Templeton.
- Bibliobytes, a project of free digital books online in Internet.

1995

- Amazon starts to sell physical books on the Internet.
- Online poet Alexis Kirke discusses the need for wireless internet electronic paper readers in his article "The Emuse".

1996

- Project Gutenberg reaches 1,000 titles. The target is 1,000,000.

1998

- Kim Blagg obtained the first ISBN issued to an ebook and began marketing multimedia-enhanced ebooks on CDs through retailers including amazon.com, bn.com and borders.com. Shortly thereafter through her company "Books OnScreen" she introduced the ebooks at the Book Expo America in Chicago, IL to an impressed, but unconvinced bookseller audience.
- First ebook Readers: Rocket ebook and SoftBook.
- Cybook / Cybook Gen1 Sold and manufactured at first by Cytale (1998–2003) then by Bookeen.

1999

- Baen Books opens up the Baen Free Library.
- Webscriptions starts selling unencrypted eBooks.

2000

- Microsoft Reader with ClearType technology.
- Stephen King offers his book "Riding the Bullet" in digital file; it can only be read on a computer.

2001
2002

- Random House and HarperCollins start to sell digital versions of their titles in English.

2004

- Sony Librie with e-ink.

2005

- Amazon buys Mobipocket.

2006

- Sony Reader with e-ink.
- LibreDigital launched BookBrowse as an online reader for publisher content.
- BooksOnBoard, one of the largest independent ebookstores, opens and sells ebooks and audiobooks in six different formats.

2007.

- Amazon launches Kindle in US.
- Bookeen launched Cybook Gen3 in Europe.

2008

- Adobe and Sony agreed to share their technologies (Reader and DRM).
- Sony sells the Sony Reader PRS-505 in UK and France.
- BooksOnBoard is first to sell ebooks for iPhones.

2009

- Bookeen releases the Cybook Opus in the US and in Europe.
- Sony releases the Reader Pocket Edition and Reader Touch Edition.
- Amazon releases the Kindle 2.
- Amazon releases the Kindle DX in the US.
- Barnes & Noble releases the Nook in the US.

2010

- Amazon releases the Kindle DX International Edition worldwide.
- Bookeen reveals the Cybook Orizon at CES.
- TurboSquid Magazine announces first magazine publication using Apple's iTunes LP format.
- Apple releases the iPad with an e-book app called iBooks. Between its release in April 2010, to October, Apple has sold 7 million iPads.
- Kobo Inc. releases its Kobo eReader to be sold at Indigo/Chapters in Canada and Borders in the United States.
- Amazon releases the third generation kindle, available in 3G+Wi-Fi and Wi-Fi versions.

- Kobo Inc. releases an updated Kobo eReader which now includes Wi-Fi.
- Barnes & Noble releases the new NOOKcolor.
- Sony releases its second generation Daily Edition PRS-950.
- PocketBook expands its successful line of e-readers in the ever-growing market.
- Google launches Google eBooks

FR Book e161

Formats

There are a variety of e-book formats used to create and publish e-books. A writer or publisher has many options when it comes to choosing a format for production. Every format has its proponents and champions, and debates over which format is best can become intense.

Comparison to printed books

Advantages

There are over 2 million free books available for download as of August 2009. Mobile availability of e-books may be provided for users with a mobile data connection, so that these e-books need not be stored on the device. An e-book can be offered indefinitely, without ever going "out of print". In the space that a comparably sized print book takes up, an e-reader can potentially contain thousands of e-books, limited only by its memory capacity. If space is at a premium, such as in a backpack or at home, it can be an advantage that an e-book collection takes up little room and weight.

E-book websites can include the ability to translate books into many different languages, making the works available to speakers of languages not covered by printed translations. Depending on the device, an e-book may be readable in low light or even total darkness. Many newer readers have the ability to display motion, enlarge or change fonts, use Text-to-speech software to read the text aloud for visually impaired, partially sighted, elderly or dyslectic people, search for key terms, find definitions, or allow highlighting bookmarking and annotation. Devices that utilize E Ink can imitate the look and ease of readability of a printed work while consuming very little power, allowing continuous reading for weeks at time.

While an e-book reader costs much more than one book, the electronic texts are at times cheaper. Moreover, a great share of e-books are available online for free, minus the minimal costs of the electronics required. For example, all fiction from before the year 1900 is in the public domain. Also, libraries lend more current e-book titles for limited times, free samples are available of many publications, and there are other lending models being piloted as well. E-books can be printed for less than the price of traditional new books using new on-demand book printers.

An e-book can be purchased/borrowed, downloaded, and used immediately, whereas when one buys or borrows a book, one must go to a bookshop, a home library, or public library during limited hours, or wait for a delivery. The production of e-books does not consume paper and ink. The necessary computer or e-reader uses less materials. Printed books use 3 times more raw materials and 78 times more water to produce albeit they do not require a machine for use (out of context) Depending on possible digital rights management, e-books can be backed up to recover them in the case of loss or damage and it may be possible to recover a new copy without cost from the distributor. Compared to printed publishing, it is cheaper and easier for authors to self-publish e-books. Also, the dispersal of a free e-book copy can stimulate the sales of the printed version.

Sony-ebook

Drawbacks

Ebook formats and file types continue to develop and change through time through advances and developments in technology or the introduction of new proprietary formats. While printed books remain readable for many years, e-books may need to be copied or converted to a new carrier or file type over time. PDF and epub are growing standards, but are not universal.

Not all books are available as e-books. Paper books can be bought and wrapped for a present and a library of books can provide visual appeal, while the digital nature of e-books makes them non-visible or tangible. E-books cannot provide the physical feel of the cover, paper, and binding of the original printed work. An author who publishes a book often puts more into the work than simply the words on the pages. E-books may cause people "to do the grazing and quick reading that screens enable, rather than be by themselves with the author's ideas". They may use the e-books simply for reference purposes rather than reading for pleasure and leisure. Books with large pictures (such as children's books) or diagrams are more inconvenient for viewing and reading.

A book will never turn off and would be unusable only if damaged or after many decades. The shelf life of a printed book exceeds that of an e-book reader, as over time the reader's battery will drain and require recharging. Additionally, "As in the case of microfilm, there is no guarantee that [electronic] copies will last. Bits become degraded over time. Documents may get lost in cyberspace...Hardware and software become

extinct at a distressing rate." E-book readers are more susceptible to damage from being dropped or hit than a print book. Due to faults in hardware or software, e-book readers may malfunction and data loss can occur. As with any piece of technology, the reader must be protected from the elements (such as extreme cold, heat, water, etc.), while print books are not susceptible to damage from electromagnetic pulses, surges, impacts, or extreme temperatures.

The cost of an e-book reader far exceeds that of a single book, and e-books often cost the same as their print versions. Due to the high cost of the initial investment in some form of e-reader, e-books are cost prohibitive to much of the world's population. Furthermore, there is no used e-book market, so consumers will neither be able to recoup some of their costs by selling an unwanted title they have finished, nor will they be able to buy used copies at significant discounts, as they can now easily do with printed books. Because of the high-tech appeal of the e-reader, they are a greater target for theft than an individual print book. Along with the theft of the physical device, any e-books it contains also become stolen. E-books purchased from vendors like Amazon or Barnes & Noble.com are stored "in the cloud" on servers and "digital lockers" and have the benefit of being easily retrieved if an e-reading device is lost. Not all e-booksellers are cloud based; if an e-book is stolen, accidentally lost, or deleted, in the absence of a backup it may have to be repurchased.

The display resolutions of reading devices are currently lower than printed materials. Because of proprietary formats or lack of file support, formatted e-books may be unusable on certain readers. Additionally, the reader's interaction with the reader may cause discomfort, for example glare on the screen or difficulty holding the device. Due to digital rights management, customers typically cannot resell or loan their e-books to other readers. However, some Barnes & Noble e-books are lendable for two weeks via their 'LendMe' technology. Additionally, the potential for piracy of e-books may make publishers and authors reluctant to distribute digitally. E-book readers require various toxic substances to produce, are non-biodegradable, and the disposal of their batteries in particular raises environmental concerns. As technologies rapidly change and old devices become obsolete, there will be larger amounts of toxic wastes that are not easily biodegradable like paper. Paper products are easily sustainable and reusable, unlike many rare earth minerals that are used up in electronic devices.

A rare or fine book can be an art object with a high monetary value. One can invest in first editions and out of print books. Some books will have a very high resale value. Real paper books can be used to decorate a home or office. Some finely bound, limited edition books can be considered very beautiful. Very old books often have great historical importance, and are one of a kind. Archives can easily store old paper books and documents, unlike e-books.

E-books and software can easily track data, times, usage, pages, and details about what one is reading and how often. Similar to this is the growing amount of data available through Google search engines, Facebook, and through data mining. For the first time in

history it is now far easier to track and record what specific people might be reading. The notions of privacy, private writing, solitude, and personal reading are changing.

Digital rights management

Anti-circumvention techniques may be used to restrict what the user may do with an e-book. For instance, it may not be possible to transfer ownership of an e-book to another person, though such a transaction is common with physical books. Some devices can phone home to track readers and reading habits, restrict printing, or arbitrarily modify reading material. This includes restricting the copying and distribution of works in the public domain through the use of "click-wrap" licensing, effectively limiting the rights of the public to distribute, sell or use texts in the public domain freely.

Most e-book publishers do not warn their customers about the possible implications of the digital rights management tied to their products. Generally they claim that digital rights management is meant to prevent copying of the e-book. However in many cases it is also possible that digital rights management will result in the complete denial of access by the purchaser to the e-book. With some formats of DRM, the e-book is tied to a specific computer or device. In these cases the DRM will usually let the purchaser move the book a limited number of times after which he cannot use it on any additional devices. If the purchaser upgrades or replaces their devices eventually they may lose access to their purchase. Some forms of digital rights management depend on the existence of online services to authenticate the purchasers. When the company that provides the service goes out of business or decides to stop providing the service, the purchaser will no longer be able to access the e-book.

As with digital rights management in other media, e-books are more like rental or leasing than purchase. The restricted book comes with a number of restrictions, and eventually access to the purchase can be removed by a number of different parties involved. These include the publisher of the book, the provider of the DRM scheme, and the publisher of the reader software. These are all things that are significantly different from the realm of experiences anyone has had with a physical copy of the book.

Production

Some e-books are produced simultaneously with the production of a printed format, as described in electronic publishing, though in many instances they may not be put on sale until later. Often, e-books are produced from pre-existing hard-copy books, generally by document scanning, sometimes with the use of robotic book scanners, having the technology to quickly scan books without damaging the original print edition. Scanning a book produces a set of image files, which may additionally be converted into text format by an OCR program. Occasionally, as in some e-text projects, a book may be produced by re-entering the text from a keyboard.

As a newer development, sometimes only the electronic version of a book is produced by the publisher. It is even possible to release an e-book chapter by chapter as each chapter

is written. This is useful in fields such as information technology where topics can change quickly in the months that it takes to write a typical book. It is also possible to convert an electronic book to a printed book by print on demand. However these are exceptions as tradition dictates that a book be launched in the print format and later if the author wishes an electronic version is produced.

As of 2010, there is no industry-wide e-book bestseller list, but various e-book vendors compile bestseller lists, such as those by Amazon Kindle Bestsellers and Fictionwise. There are two yearly awards for excellence in e-books—the EPIC eBook Award (formerly EPPIE) given by EPIC, and the Dream Realm Award for science fiction, fantasy and horror e-books. Both awards have been given since 2000.

e-Readers

e-Readers may be specifically designed for that purpose, or intended for other purposes as well. The term is restricted to hardware devices and used to describe a category type.

Specialized devices have the advantage of doing one thing well. Specifically, they tend to have the right screen size, battery lifespan, lighting and weight. A disadvantage of such devices is that they are often expensive when compared to multi-purpose devices such as laptops and PDAs.

In 2010, competition sent the price for the most popular electronic reading devices below USD 200.

Research released in March 2011 indicated that e-books and e-book readers are actually more popular with the older generation than the younger generation in the UK. The survey carried out by Silver Poll found that around 6% of over 55s owned an e-book reader compared with just 5% of 18-24 year olds.

The survey also revealed that the Amazon Kindle is the most popular e-book reader in the UK (47%) followed by the Apple iPad (31%) and the Sony Reader (14%).

It has been reported that there is a differing level of dissatisfaction amongst owners of different ebook readers due to poor availability of sought after ebook titles. A survey of the number of contemporary and popular titles available from ebook store, revealed that Amazon.com has the largest collection, over twice as large as Barnes and Noble, Sony Reader Store, Apple iBookstore and OverDrive, the public libraries lending system.

Chapter-7

Digital Audio Player

Acer P300

Archos 504 444

A **digital audio player**, shortened to **DAP**, is a consumer electronic device that stores, organizes and plays digital audio files. In contrast, analog audio players play music from cassette tapes, or records. Portable devices that also play video and text are referred to as portable media players. Often digital audio players are sold as **MP3 players**, even if they support other file formats.

History

Audio Highway's Listen Up player, winner of an Innovations Award at the Consumer Electronics Show in Jan. 1997.

The immediate predecessor in the market place of the digital audio player was the portable CD player, or "portable audio device."

Kane Kramer designed one of the earliest digital audio players, which he called the IXI. His 1979 prototype was capable of approximately 3.5 minutes of audio playback but it did not enter commercial production. His UK patent application was not filed until 1981, patent 2115996 issued in 1985, and U.S. Patent 4,667,088 in 1987. Apple Inc. hired Kramer as a consultant and presented his work as an example of prior art in the field of digital audio players during their litigation with Burst.com almost two decades later.

The world's first company to announce a portable MP3 player and the attendant system for uploading MP3 audio content to a personal computer and then downloading it onto a personal MP3 player was Audio Highway. Under the direction of founder and CEO, Nathan Schulhof, Audio Highway announced its Listen Up player on September 23, 1996, won an Innovations Award for its Listen Up player and its Listen Up Personal Audio System at the Consumer Electronics Show in January 1997, and began shipping the Listen Up player in the United States in September 1997. The Listen Up player also won a People's Choice Award at the 2nd annual Internet Showcase conference, held Jan. 30, 1998.

Commodore eVic 2.203

Cowon A2

As the lead inventor on three U.S. patents (5,557,541; 5,572,442 and 5,841,979), as well as co-inventor on another U.S. patent (6,549,942), Schulhof is sometimes referred to as "the father of the MP3 player industry."

One of the chips used to create portable MP3 players was the Micronas MAS3507D ASIC MP3 Decoder chip. Several electronics DIY projects used this circuit as a software based approach would have limited battery time severely. This chip allowed the microcontroller to read data from a flash memory and feed the decoder chip, creating a low power solution.

The next company on the MP3 player scene was South Korea-based Saehan Information Systems which began selling its “MPMan” player in the middle of 1998. The South Korean company then licensed the players to Eiger Labs which distributed them—now branded as Eiger Labs MPMan F10—to the North American market during the summer of 1998. The flash-based players were available in 32 MB (about 6 songs) storage capacity.

Cowon iAUDIO 7

Cowon iAUDIO T2

COWON iAUDO7 01

The Rio PMP300 from Diamond Multimedia was introduced in September 1998, a few months after the MPMan and also featured a 32 MB storage capacity. It was a success during the holiday season, with sales exceeding expectations. Interest and investment in digital music were subsequently spurred from it. Because of the player's notoriety as the target of a major lawsuit, the Rio is erroneously assumed to be the first DAP.

In 1998, Compaq developed the first hard drive based DAP using a 2.5" laptop drive. It was licensed to HanGo Electronics (now known as Remote Solution), which first sold the PJB-100 (Personal Jukebox) in 1999. The player had an initial capacity of 4.8 GB, with an advertised capacity of 1200 songs.

In 2000, Creative released the 6GB hard drive based Creative NOMAD Jukebox. The name borrowed the jukebox metaphor popularised by *Remote Solution* and also used by *Archos*. Later players in the Creative NOMAD range used microdrives rather than laptop drives.

In October 2001, Apple Computer (now known as Apple Inc.) unveiled the first generation iPod, a 5 GB hard drive based DAP with a 1.8" Toshiba hard drive. With the development of a spartan user interface and a smaller form factor, the iPod was initially popular within the Macintosh community. In July 2002, Apple introduced the second

generation update to the iPod. It was compatible with Windows computers through Musicmatch Jukebox. The iPod series, which grew to include flash memory-based players, has become the market leader in DAPs.

In 2002, Archos released the first "portable media player" (PMP), the Archos Jukebox Multimedia. Manufacturers have since implemented abilities to view images and play videos into their devices.

Dell DJ

Dellpda

In 2001 the first MP3 players were installed into mobile phones in South Korea and the first artist to sell songs as MP3 file downloads directly to mobile phones was Ricky Martin. The innovation spread rapidly and by 2005, more than half of all music sold in South Korea was sold directly to mobile phones. The idea spread across the globe and by 2005 all five major handset makers, Nokia, Motorola, Samsung, LG and SonyEricsson had released musicphones. By 2006, more MP3 players were sold in musicphones than all stand-alone MP3 players put together. The rapid rise of the musicphone was quoted by Apple as a primary reason for developing the iPhone. In 2007, the installed base of musicphones passed the 1 billion level, and today more than half of all mobile phones in the world have an MP3 player.

Although online music services such as RealNetworks' Rhapsody also offer legal downloads through a subscription plan, the launch of the iTunes Store in 2003 established the model of selling individual songs and albums for purchase.

Operation

Connecting a computer to a SanDisk Sansa Clip.

Digital sampling is used to convert an audio wave to a sequence of binary numbers that can be stored in a digital format, such as MP3. Common features of all MP3 players are a memory storage device, such as flash memory or a miniature hard disk drive, an embedded processor, and an audio codec microchip to convert the compressed file into an analogue sound signal.


Fully Adjustable
LCD DISPLAY
Audio Cable
MP3 FM MODULATOR
MP3-PLAYER
CHANNEL

GEDC0146

GEDC0164

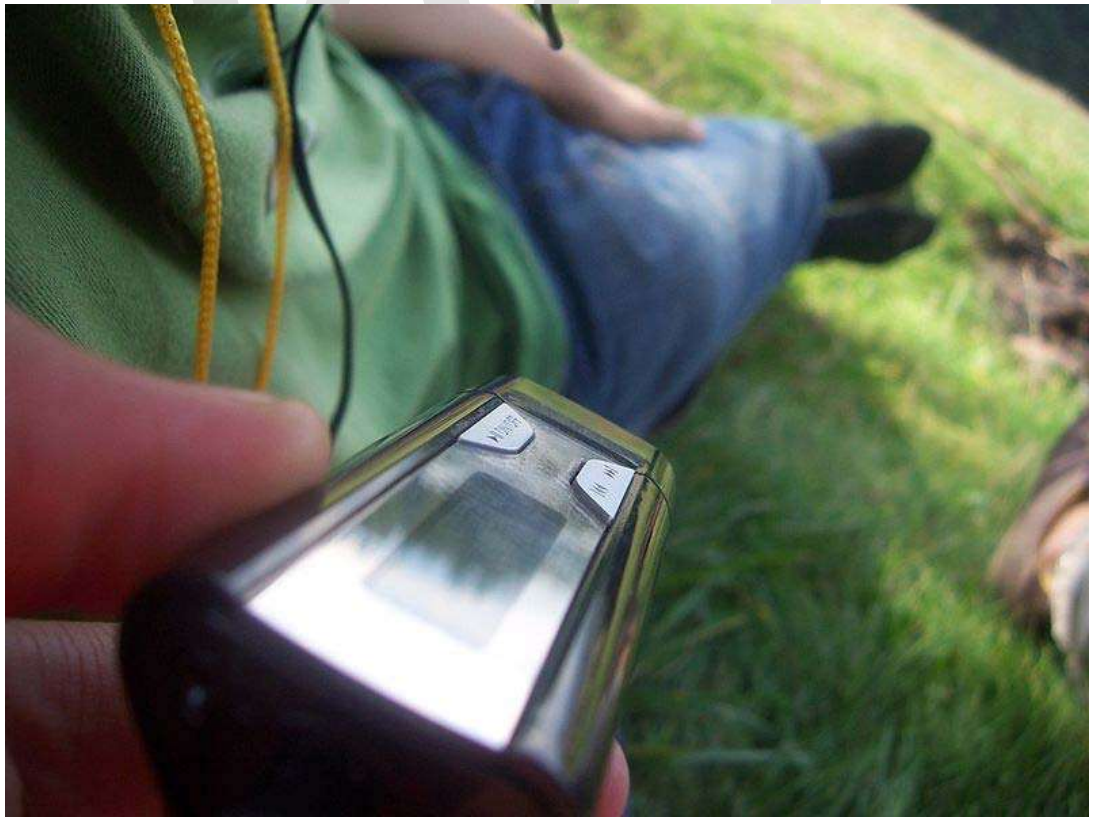
Most DAPs are powered by rechargeable batteries, some of which are not user-replaceable. They have a 3.5 mm stereo jack; music can be listened to with earbuds or headphones, or played via an external amplifier and speakers. Some devices also contain internal speakers, through which music can be listened to, although these built-in speakers are typically of very low quality.

Nearly all DAPs consists of some kind of display screen, although there are exceptions, such as the iPod Shuffle, and a set of controls with which the user can browse through the library of music contained in the device, select a track, and play it back. The display, if the unit even has one, can be anything from a simple one or two line monochrome LCD display, similar to what are found on typical pocket calculators, to large, high-resolution, full-color displays capable of displaying photographs or viewing video content on. The controls can range anywhere from the simple buttons as are found on most typical CD players, such as for skipping through tracks or stopping/starting playback to full touch-screen controls, such as that found on the iPod Touch or the Zune HD. One of the more common methods of control is some type of the scroll wheel with associated buttons. This method of control was first introduced with the Apple iPod and many other manufacturers have created variants of this control scheme for their respective devices.

Content is placed on DAPs typically through a process called "syncing", by connecting the device to a personal computer, typically via USB, and running any special software that is often provided with the DAP on a CD-ROM included with the device, or downloaded from the manufacturer's website. Some devices simply appear as an additional disk drive on the host computer, to which music files are simply copied like any other type of file. Other devices, most notably the Apple iPod or Microsoft Zune, requires the use of special management software, such as iTunes or Zune Software, respectively. The music, or other content such as TV episodes or movies, is added to the software to create a "library". The library is then "synced" to the DAP via the software. The software typically provides options for managing situations when the library is too large to fit on the device being synced to. Such options include allowing manual syncing, in that the user can manually "drag-n-drop" the desired tracks to the device, or allow for the creation of playlists. In addition to the USB connection, some of the more advanced units are now starting to allow syncing through a wireless connection, such as via WiFi or Bluetooth.

Content can also be obtained and placed on some DAPs, such as the iPod Touch or Zune HD by allowing access to a "store" or "marketplace", most notably the iTunes Store or Zune Marketplace, from which content, such as music and video, and even games, can be purchased and downloaded directly to the device.

Types



Close-up view of the Philips GoGear SA1110 flash-based player

An embedded hard drive-based player (Creative ZEN Vision:M)

An MP3 CD player (Philips Expanium)

Digital audio players are generally categorized by storage media:

- **Flash-based players**: These are non-mechanical solid state devices that hold digital audio files on internal flash memory or removable flash media called memory cards. Due to technological advancements in flash memory, these originally low-storage devices are now available commercially ranging up to 64 GB. Because they are solid state and do not have moving parts they require less battery power, are less likely to skip during playback, and may be more resilient to hazards such as dropping or fragmentation than hard disk-based players. There are USB flash drives available that include basic MP3 playback capabilities.
- **Hard drive-based players** or **digital jukeboxes**: Devices that read digital audio files from a hard disk drive (HDD). These players have higher capacities currently ranging up to 500 GB. At typical encoding rates, this means that tens of thousands of songs can be stored on one player. The disadvantage with these units is that a hard drive is inherently more fragile than solid-state storage, thus more care is required to not drop or otherwise mishandle these units.
- **MP3 CD/DVD players**: Portable CD players that can decode and play MP3 audio files stored on CDs. Such players are typically much less expensive than either the hard drive or flash-based players. Also, the blank CD-R media is very inexpensive, typically costing less than US$.15 per disk. In addition, these

devices have the added bonus of being able to play standard "Red book" audio CDs. A disadvantage is that due to the mechanical nature of these devices, they are even more fragile than the hard drive based players, and thus more susceptible to skipping or other misreads of the file during playback if mishandled. The better quality units attempt to mitigate this by providing a solid-state buffer in which the first several seconds of music is read into before playback begins. Also, a CD can typically hold only around 700 megabytes of data, thus a large library will require multiple disks to contain. However, some of the more expensive, higher-end units are also capable of reading and playing back files contained on larger capacity DVD disks as well, including the ability to playback and display video content, such as movies. More recently, portable Blu-ray players hit the market, and also portable DVD players with USB and memory card slots have come along.

- **Networked audio players**: Players that connect via (WiFi) network to receive and play audio. These types of units typically do not have any local storage of their own and must rely on a server, typically a personal computer also on the same network, to provide the audio files for playback.
- **USB host/memory card audio players**: Players that rely on USB flash drives or other memory cards to read data.

Recording

Many players have a built-in electret microphone which allows recording. Usually recording quality is poor, suitable for speech but not music.

There are also professional-quality recorders suitable for high-quality music recording with external microphones, at prices starting at a few hundred dollars.

Radio

Some DAPs have FM radio tuners built in. Many also have an option to change the band from the usual 87.5 - 108.0 MHz to the Japanese band of 76.0 - 90.0 MHz

HTC Touch Diamond

Iaudio u3

Ibox mp3

Common audio formats

Most audio formats use lossy compression, to produce as small as possible a file compatible with the desired sound quality. There is a trade-off between size and sound quality of lossily compressed files; most formats allow different combinations—e.g., MP3 files may use between 32 (worst) and 320 (best) kilobits per second. Different lossy formats may give files of different sizes for the same perceived quality.

The formats supported by a particular DAP depend upon its firmware; sometimes a firmware update adds more formats. To listen to a file on a player, it must be in a supported format; format conversion on a computer is usually possible, but with loss of quality.

MP3 is the dominant format, and is almost universally supported. It is a proprietary format; manufacturers must pay a small royalty to be allowed to support it.

The main proprietary alternative formats are AAC and WMA. Unlike MP3, these formats support DRM restrictions that are often enforced by files from paid download services.

Free formats, which do not require manufacturers or music distributors to pay a fee, are available, though less widely supported. Examples include Ogg Vorbis, FLAC, and Speex.

Most players can also play uncompressed PCM in a container such as WAV or AIFF.

Controversy

Although these issues are not usually controversial within digital audio players, they are matters of continuing controversy and litigation, including but not limited to content distribution and protection, and digital rights management (DRM).

Lawsuit with RIAA

The Recording Industry Association of America (RIAA) filed a lawsuit in late 1998 against Diamond Multimedia for its Rio players, alleging that the device encouraged copying music illegally. But Diamond won a legal victory on the shoulders of the Sony Corp. v. Universal City Studios case and DAPs were legally ruled as electronic devices.

Risk of hearing damage

According to SCENIHR, the risk of hearing damage from digital audio players depends on both sound level and listening time. The listening habits of most users are unlikely to cause hearing loss, but some people are putting their hearing at risk, because they set the volume control very high or listen to music at high levels for many hours per day. Such listening habits may result in temporary or permanent hearing loss, tinnitus, and difficulties understanding speech in noisy environments.

Alternative methods to reduce risk

Much of the risk of hearing loss is largely associated to the fact that many use headphones with the devices, and that they consider them personal devices instead of stereo system components. However, the headphone outputs technically output line-level stereo analog audio where a TRS-to-RCA connector (though the other end is sometimes TRS) can sometimes be used for bookshelf stereo or AV receiver use as an alternative method. Car audio system use has similar benefits as users often use stereo analog AUX inputs with TRS connectors, or cassette adapters on older car audio equipment, and FM transmitters on equipment without AUX inputs or cassette deck.

Motorola Rokr E6

ROKR E6

Chapter-8

Portable Media Player

A **portable media player** (PMP) is a consumer electronics device that is capable of storing and playing digital media such as audio, images, video, documents, etc. Digital audio players (DAP) that can also display images and play videos are usually called PMPs. Like DAPs, the data is typically stored on a hard drive, microdrive, or flash memory.

Other types of electronic devices like cellphones, internet tablets, and digital cameras are sometimes referred as PMPs because of their playback capabilities. Here we, however focuses on portable devices that have the main function of playing media.

History

In late 1998, one of the first portable media players was introduced, the Rio PMP300. The iPod is a portable media player designed and marketed by Apple and launched on October 23, 2001. In 2002, Archos first widely sold a portable media player, the Archos Jukebox Multimedia. Manufacturers have since implemented abilities to view images and play videos into their devices. In 2004, Microsoft attempted to take advantage of the growing PMP market by launching the Portable Media Center (PMC) platform. It was introduced at the 2004 Consumer Electronics Show with the announcement of the Zen Portable Media Center, which was co-developed by Creative. The Microsoft Zune series would later be based on the Gigabeat S, one of the PMC-implemented players.

Typical features

Creative ZEN

PMPs are capable of playing digital audio, images, and video. Usually, a colour liquid crystal display (LCD) or organic light-emitting diode (OLED) screen is used as a display. Various players include the ability to record video, usually with the aid of optional accessories or cables, and audio, with a built-in microphone or from a line-out cable or FM tuner. Some players include readers for memory cards, which are advertised to equip players with extra storage or transferring media. In some players, features of a personal organizer are emulated, or support for games, like the iriver clix (through compatibility of Adobe Flash Lite) or the PlayStation Portable, is included.

Audio playback

Nearly all players are compatible with the MP3 audio format, and many others support Windows Media Audio (WMA), Advanced Audio Coding (AAC) and WAV. Audio files purchased from online stores or ripped from CDs may include Digital Rights Management (DRM) copy protection, which most modern players support. Some players are compatible with open-source formats like Ogg Vorbis and the Free Lossless Audio Codec (FLAC). Every device has a bitrate limit on each compatible format.

Image viewing

The JPEG format is compatible on all players that are capable of displaying images. Some players, like the iPod series, provide compatibility to display additional file formats like GIF, PNG, and TIFF, while others are bundled with conversion software.

Video playback

Most newer players support the MPEG-4 video format, and many other players are compatible with Windows Media Video (WMV) and AVI, now mostly used as a container format. Recently, more and more players are enabling compatibility to the DivX video format and its open-source parallel, Xvid. Software included with the players may be able to convert video files into a compatible format.

Software

PMPs are usually packaged with an installation CD/DVD that inserts device drivers (and for some players, software that is capable of seamlessly transferring files between the player and the computer). For recent players, however, these are usually available online via the manufacturers' websites, or natively recognized by the operating system through Universal Mass Storage (UMS) or Media Transfer Protocol (MTP).

Hardware

- **Storage**

As with DAPs, PMPs come in either flash or hard disk storage. Storage capacities have reached up to 64 GB for flash memory based PMPs, first reached by the 3rd Generation iPod Touch, and up to 500 GB for Hard disk drive PMPs, first achieved by the Archos 5 Internet Tablet.

A number of players support memory card slots, including CompactFlash (CF), Secure Digital (SD), and Memory Sticks. They are used to directly transfer content from external devices, and expanding the storage capacity of PMPs.

- **Interface**

A standard PMP uses a 5-way D-pad to navigate, however there have been many alternatives used. Most notable are the wheel and touch mechanisms seen on players from the iPod and Sansa series. Another popular mechanism is the swipe-pad, or 'squircle,' first seen on the Zune. Additional buttons are commonly seen for features such as volume control.

- **Screen**

Sizes range all the way up to 7 inches. As well, resolutions also vary, going up to WVGA. Most screens come with a color depth of 16-bit, but higher quality video oriented devices may range all the way to 24-bit, otherwise known as Truecolor, with the

ability to display 16.7 million distinct colors. Screens commonly have a matte finish but may also come in glossy to increase color intensity and contrast. More and more devices are now also coming with touch screen as a form of primary or alternate input. This can be for convenience and/or aesthetic purposes. Certain devices, on the other hand, have no screen whatsoever, reducing costs at the expense of ease of browsing through the media library.

- **Radio**

Some portable media players include a radio receiver, most frequently receiving FM.

- **Other features**

Some portable media players have recently added features such as simple camera, built in game emulation (playing Famicon or other game formats from ROM images) and simple text readers and editors.

Chapter-9

Construction Field Computing

Construction field computing is the use of handheld devices that augment the construction superintendent's ability to manage the operations on a construction site. These information appliances (IA) must be portable devices which can be carried or worn by the user, and have computational and connectivity capacity to perform the tasks of communication management. Data entry and retrieval must be simple so that the user can manipulate the device while simultaneously moving, observing events, studying materials, checking quality, or performing other tasks required. Examples of these devices are the PDA, tablet PC and the smartphone.

Usage of information appliances in construction

Superintendents are often moving about the construction site or between various sites. Their responsibilities cover a wide variety of tasks such as:

- Comparing planned to constructed conditions.
- Coordinating and scheduling events and material delivery.
- Monitoring jobsite conditions and correcting safety deficiencies, improving efficiency, and ensuring quality.
- Recording and documenting work progress, labor, inspections, compliance to specifications, etc.
- Communicating direction to specialty contractors, laborers, suppliers, etc.
- Clarifying plans and specifications, resolving differing conditions, adapting methods and materials to site-specific requirements.

These tasks require that information is readily accessible and easily communicated to others and the company database. Since construction sites are unique, the device and system must be adaptable and flexible. Durability, predictability, and perceived value by the field management will determine the system's acceptance and thus proper use.

Construction personnel are not well known for adapting to new technologies, but they do embrace methods that are proven to lighten work load and increase income.

Construction industry field personnel were quick to adopt new technologies such as the FAX machine and mobile phone, they have been slower to embrace the PC, tablet PC, PDA, and other devices. Disruptive technology is usually difficult in construction field use for several reasons:

- Field managers have often risen 'through the ranks' and learned from their predecessors how to run a construction site.
- They commonly do not have exposure to higher education and the new methods and technologies being developed.
- Field work is demanding and varied such that suitable and durable technologies are difficult to build. Failure of the device or system means schedule slip and increase costs so that using the new technology can be untenable.
- Laborers generally are not highly educated and willing to invest time in change.
- Construction is very schedule driven and time for training or learning new methods is rare. The learning curve is perceived to be too steep to justify implementing new technologies or methods not mandated by governing authorities or required by the contract documents.

Overcoming these issues is imperative for most construction firms. The augmentation and automation of managerial practices is required to make the construction process more efficient. The information appliance makes it possible field supervisors to access needed information, communicate requirements to others, and document the process effectively.

An effective device will be able to process data into actionable information and transmit data and information to other devices or persons. The device may not actually perform computation of final communication, but it must appear as though it does. Extra steps to upload and download information will be perceived as a nuisance or waste of time to the user and cause the device to be underutilized. Some IAs are self-contained in that they have computing capacity and software to perform required tasks independent of a server or other devices. Others rely on connectivity with other devices and/or a server to perform required functions.

Communication with home office

Fat client

A fat client refers to a device that has sufficient speed and size to run programs and is loaded locally with software needed for operation. It can stand alone. Some advantages of this type of system are:

- No need for continuous Wi-Fi, Bluetooth, cell connection or other connectivity instrument for continuous operation. Data and operating functions are fully self-contained.

- User generally has more control over the interface so is able to adapt it to his/her own preferences and operational needs.
- User has perception of governance. The idea that another device or a central server controls the process is disturbing to many free-spirited construction personnel.
- Can be faster operationally than thin client since the device does not need to wait for transmitting data and server access time. With a good connection signal, however, this difference will most likely not be noticeable.

Thin client

A thin client refers to a device that acts as a terminal or interface with a server or other device. Sometimes called dumb terminal, these devices do not have sufficient computing capacity or data storage capacity of process information, but only allow the user to access the software and data needed by them. Some advantages of this type of system are:

- Real-time data. User both provides and has access to most current information. Information entered is immediately available to other users of the information through the central database. Updates from all contributors to the database are available immediately to the user.
- Automated and instantaneous action. Communication or directives are performed and recorded instantly rather than occurring when the information is uploaded by the user.
- More central control over information, operating systems, and the manner in which data is collected.
- Lower software and hardware costs since only minimal computing capacity is needed on the thin client device and separate software for each unit is not required.
- Thin client device is not useful as a stand-alone so that it is not attractive to fencers and thus a less likely target of theft. (Thieves generally know which items are worth stealing.) Stolen devices are unlikely to be usable to non-authorized personnel. Therefore, proprietary information is protected.
- Poka-yoke or error reduction strategies for data entry are more easily accomplished with a standardized system that cannot be easily altered by the user. A well-designed system will identify possible errors such as entering letters when numbers are required, identifying answers generally inconsistent with field, etc.
- More fully automates data transmission. Synchronization is not required as a separate activity which can be forgotten or take longer than the user wants to wait for.

Transparency and user friendliness

Computer transparency is important in construction because of the requirements listed in the 'usages' section here. Especially important here are the lack of training in computer sciences and need to remain focused on the job-site activities. Any suitable device and system should support the user without their understanding of the technical aspects of the

computer or system. Any data functions operations must require no knowledge of the database schema. Response to commands or input should be immediate and reversible so that the user can quickly experiment and learn by doing without causing damage to the system or data. The user will most often feel that access to information and control over the system is not unduly limited. These traits will reduce user anxiety and encourage usage and acceptance of new technologies and systems.

User friendliness is needed due to the varied level of knowledge of the user. The functional options should be easily labeled and structured such that the user can understand by viewing the screen and by intuition. Usability will in large part determine whether or not the device and/or system is utilized. An ineffective tool is not only useless, but can be deleterious in that it takes time from the user, but does not return value. Even if the user only perceives the operation of the device to be worthless, he/she will be 'demotivated' to use the device and do so improperly or insufficiently. This will render the activity useless, fulfilling the expectation of failure.

Portable devices available

Laptop and tablet PC

Laptop or notebook computers are small enough to be carried around the construction site, but too big to do so comfortably. Other disadvantages include:

- They must be set down on a suitable surface to be used.
- Require the use of both hands for proper operation.
- Most laptops are not durable enough to stand up to the dirt, moisture, and rough handling prevalent on most job sites. Those that are 'construction resistant' are too expensive and a target of theft.

The tablet PC is basically a scaled down laptop with a touch screen that accepts handwriting rather than keyboard entry. Some do have keyboards, but they must be set down to operate and thus suffer the same problem of not being usable and portable at the same time. They can be carried with one hand and used with the other, thus allowing for ambulatory use. They are generally the size of a clipboard or notepad carried by many superintendents and are a good replacement for those devices due to the automation advantages of the computer, but they are still too big to be worn so that the user can move throughout the jobsite easily (up and down ladders) and have hands available for other uses (measuring manipulating objects to demonstrate technique or effect).

PDAs

The PDA has been accepted by many construction firms to aid the management of punch lists, safety inspections, and maintenance work. They can be thin or thick devices, but are often a combination of the two, having connectivity, but containing programs to operate even when out of range of WiFi or coverage. PDAs are durable, inexpensive, and very

portable (being worn on a clip or carried in a pocket). The small screen size and limited ability to quickly enter data are the drawbacks of this device.

Smart phones

A smart phone is basically a mobile phone and PDA combined into one IA. Other functionalities such as digital camera and voice recorder are common. Data entry, like with the PDA, is by stylus or keypad and cumbersome. Many have web browsing capabilities but the small screen size diminishes the utility of this function to viewing email, weather reports, or some web content. Both PDA and smart phones have calendars, task lists, and phone lists, but they are useful to superintendents when coupled with the phone functions as is the case with the latter. opular devices include the Blackberry and Treo, the pocket pc, Iphone and Droid all are popular because of their web/email abilities and ease of use.

Cameras and peripherals

Digital cameras are often included in smart phones and PDAs, but their resolution is lower than the dedicated camera device. Most are not truly IA because they do not readily communicate with other devices or process information. Most brands share information by USB or flash memory card which is removed from the camera and inserted in complementary devices (most PDAs accept these cards). Other methods, such as Infrared Communications or Bluetooth are also available.

Software availability

A wide variety of software applications for each of the devices listed above are available. The user must determine system requirements and then ensure that software is available to perform the needed functions on a specific device.

Input/output features of IAs

Some IAs (such as the total station) are made specifically for construction use, but they are for very specific applications and will not be considered here as the purpose here concerns general construction site management. Traditional input and output methods of keyboard, mouse, and screen are not suitable for the portable IA due to size constraints. These features are very important and must be considered.

Input methods

Data, queries, commands, or responses must be entered into the computer through some sort of interface. Following are some of the methods useful in portable IAs.

Touch screen

The touch screen and stylus is effective for construction applications as it allows handwriting recognition for those who do not feel comfortable with keyboards or the small size of keyboards on portable IAs. They are also free hand entry so that the user can sketch and draw notes and measurements directly onto the screen. The digital image of the sketch can be transmitted to others or converted to another format after uploading to a printer or other computer.

Key pad

These devices are the standard entry method for phones and easy to understand but are a slow means for alphanumeric data entry. They may be suitable for numeric entry into data fields. The user enters numbers on the keypad in response to prompts on the IA screen so this method is only suitable for entry of quantifiable standard information.

Voice/speech recognition

Voice Recognition is the ability to respond to verbal commands. Speech recognition refers to the capacity of the IA to convert voice entry into data. Both have been difficult to use in many construction applications due to ambient noise, construction jargon which varies by region, trade, and company, and because of speech patterns of the individual user. This method is slower than keyboard entry for the experienced user.

Output methods

Screen

The touch screen is the standard display method for tablet PC and smaller IAs. Color may or may not be important to the user but can be an aid in directing the user. The screen size is perhaps the most important consideration. Organization of the screen is challenging on the small screen and the user should be considered when designing the interface.

Voice

Voice or tonal output from the IA can be effective as a reminder, warning, or indication of action performed, but tends to be irritating to the user if it is the principal method of interaction. Verbal output is slower than viewing the information and it is difficult for a person to pay attention to and understand information. Systems such as JAWS screen reader for the visually impaired do exist, but are not practical for construction site users and application.

Future possibilities

Eyetap is a technology being developed that may have construction applications in the future. It allows the user to receive input from the computer superimposed over the scene in view. A diptych screen may be utilized to increase overall screen size and input area.

Other 'Star Trek' devices and methods are being developed but the usable products have yet to be 'beamed down' to planet Earth.

Other considerations

Usability

The section on transparency here discusses some requirements for usability. Before implementing a system, a study on how it will add value to the user must be done. Having more data from the field is not directly beneficial to the site superintended. Reducing the time it takes to do 'paperwork' is valued. Sending an image taken from the IA camera directly to an architect for clarification does save time and effort and will be valued by the user.

Training

The system and device should be designed such that it encourages experimentation and usage. Immediate response to input and adaptability based on level of experience are better than sitting through a training seminar to get a few dry donuts. Training is best accomplished by showing and encouraging use. A 'guru' or user expert within the company may be best way to resolve questions and provide answers to questions and concerns.

Scalability and continual change

Technologies will evolve and the user will be facing new challenges with each change. It is usually wiser to adopt a small system that works and then later add features. This gradual adoption reduces anxiety and increases acceptance and use. This work by Linda V. Orr discusses methods to reduce anxiety for new computer users.

Integration of systems

Consideration should be given to ensure that IA devices and different software packages communicate with each other so that information is not lost or re-entry is not required by the user. Users do not always know or care what software is being used or which database is being accessed and do not understand why they must enter the same information again. For example, once the date has been entered, the user will be frustrated to be prompted to enter it again during the same session. Taking this further, the user may be frustrated to have to enter a date since there is a calendar function on the IA being used.

Chapter-10

Mobile Web

The **Mobile Web** refers to the use of Internet-connected applications, or browser-based access to the Internet from a mobile device - such as a smartphone or tablet PC - connected to a wireless network.

Traditionally, access to the Web has been via fixed-line services. However the Web is becoming more accessible by portable and wireless devices. In 2008 an important milestone in the transition from fixed to mobile Web use was reached when mobile access to the Internet exceeded desktop computer-based access for the first time (source: International Telecommunications Union, Oct 2009). In fact, the shift to mobile Web access has been accelerating since 2007 with the rise of larger form factor multitouch smartphones, and more recently since 2010 with the emergence of multitouch tablet computers. Both platforms are more conducive to Internet access and better browser- or application-based user Web experiences than have been afforded by previous generations of mobile devices.

The distinction between mobile Web applications and native applications is anticipated to become increasingly blurred, as mobile browsers gain direct access to the hardware of mobile devices (including accelerometers and GPS chips), and the performance of browser-based applications improve (speed- and capability-wise). Persistent storage and access to sophisticated user interface graphics functions may further reduce the need for the development of platform-specific native applications.

Once users are unable to differentiate between native and mobile web applications, the Mobile Web will refer generically to web access or use of Internet-connected apps from a mobile device.

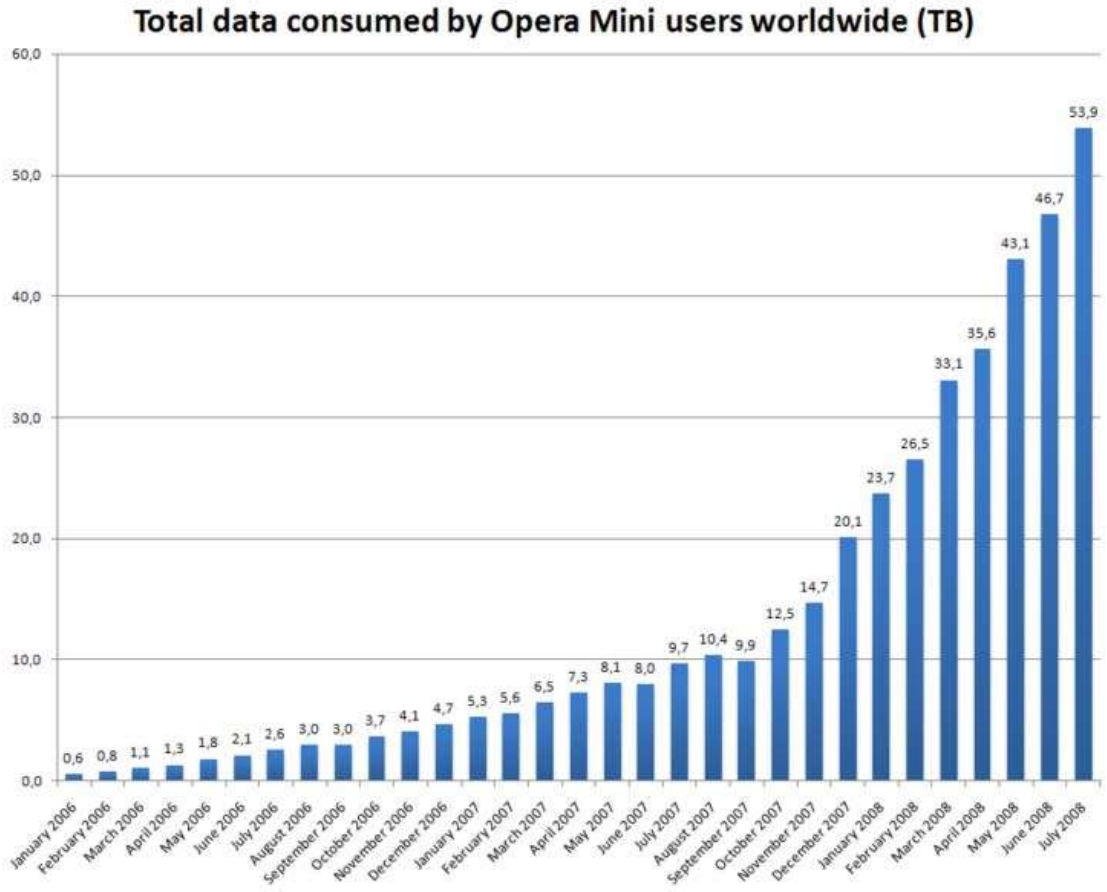
Mobile Web access today still suffers from interoperability and usability problems. Interoperability issues stem from the platform fragmentation of mobile devices, mobile operating systems, and browsers. Usability problems are centered around the small physical size of the mobile phone form factors (limited resolution screens and user input/operating limitations).

Mobile Internet

'Mobile Internet' refers to access to the Internet from a mobile device, such as a smartphone or laptop via integrated capabilities or via an independent device (such as a USB modem or PCMCIA card).

Today USB modems are HSPA (3.5G) modems. Many users "tether" their smartphones to their laptop or personal computer with the wireless device providing access to the Internet via 3G, GPRS or CSD.

Standards



Total data consumed by Opera Mini users worldwide from 2006 to mid-2008 in TB

The development of standards is one approach being implemented to improve the interoperability, usability, and accessibility issues surrounding mobile web usage.

The Mobile Web Initiative (MWI) is a new initiative set up by the W3C to develop best practices and technologies relevant to the Mobile Web. The goal of the initiative is to make browsing the Web from mobile devices more reliable and accessible. The main aim is to evolve standards of data formats from Internet providers that are tailored to the

specifications of particular mobile devices. The W3C has published guidelines for mobile content, and is actively addressing the problem of device diversity by establishing a technology to support a repository of device descriptions.

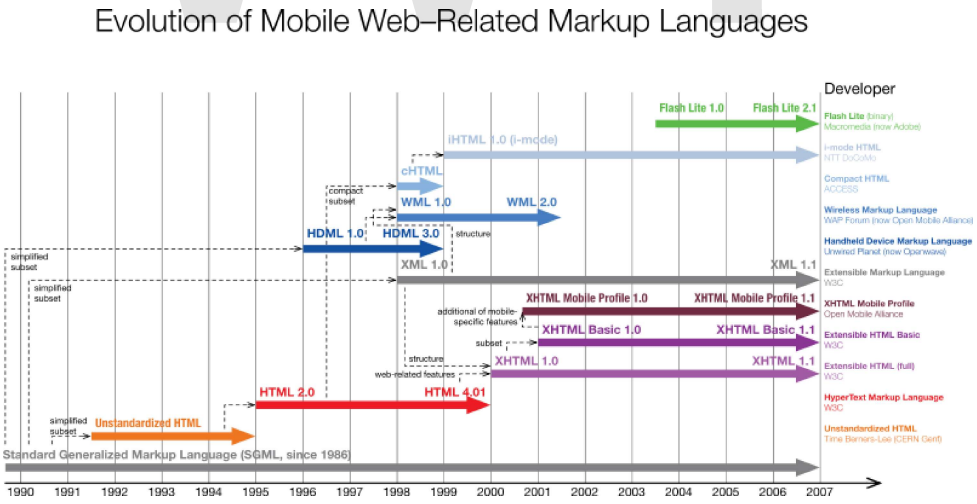
W3C is also developing a validating scheme to assess the readiness of content for the mobile web, through its *mobileOK Scheme*, which will help content developers to quickly determine if their content is web-ready. The W3C guidelines and mobile OK approach have not been immune from criticism. This puts the emphasis on Adaptation, which is now seen as the key process in achieving the ubiquitous web, when combined with a device description repository.

mTLD, the registry for .mobi, has released a free testing tool called the MobiReady Report to analyze the mobile readiness of website. It does a free page analysis and gives a Mobi Ready score. This report tests the mobile-readiness of the site using industry best practices and standards.

Other standards for the mobile web are being documented and explored for particular applications by interested industry groups, such as the use of the mobile web for the purpose of education and training.

Development

The first access to the mobile web was commercially offered in Finland in 1996 on the Nokia 9000 Communicator phone via the Sonera and Radiolinja networks. This was access to the real internet. The first commercial launch of a mobile-specific browser-based web service was in 1999 in Japan when i-mode was launched by NTT DoCoMo.



Evolution of mobile web standards

The Mobile Web primarily utilises lightweight pages written in Extensible Hypertext Markup Language (XHTML) or Wireless Markup Language (WML) to deliver content to mobile devices. Many new mobile browsers are moving beyond these limitations by

supporting a wider range of Web formats, including variants of HTML commonly found on the desktop Web.

Top-level domain

The .mobi sponsored top-level domain was launched specifically for the mobile Internet by a consortium of companies including Google, Microsoft, Nokia, Samsung, and Vodafone. By forcing sites to comply with mobile web standards, .mobi tries to ensure visitors a consistent and optimized experience on their mobile device. However, this domain has been criticized by several big names, including Tim Berners-Lee of the W3C, who claims that it breaks the device independence of the web: 1

It is fundamentally useful to be able to quote the URI for some information and then look up that URI in an entirely different context. For example, I may want to look up a restaurant on my laptop, bookmark it, and then, when I only have my phone, check the bookmark to have a look at the evening menu. Or, my travel agent may send me a pointer to my itinerary for a business trip. I may view the itinerary from my office on a large screen and want to see the map, or I may view it at the airport from my phone when all I want is the gate number. Dividing the Web into information destined for different devices, or different classes of user, or different classes of information, breaks the Web in a fundamental way. I urge ICANN not to create the ".mobi" top level domain.

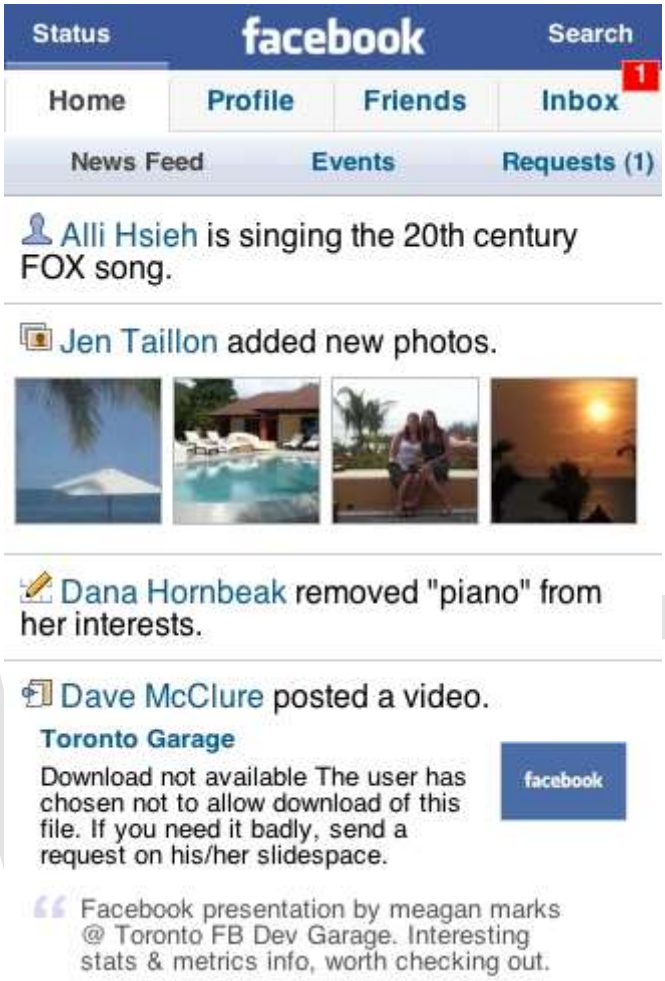
Seven mass media

Since the first ringing tone was sold on the mobile phone in Finland in 1998, the mobile has emerged as the seventh of the mass media. Today a wide range of paid media content is consumed on mobile phones ranging from 9.3 billion dollars of music and 5 billion dollars of videogaming to horoscopes, virtual gifts, jokes, news, adult entertainment, etc. Also like on all other media, advertising appeared onto mobile when a free news service launched in Finland sponsored by ads in 2000. In 2005, The Crazy Frog ringtone became the first mobile ringtone to cross over into the mainstream music charts, beating Coldplay for the Number 1 spot on the UK charts.

Advertising

Advertisers are increasingly using the mobile Web as platform to reach consumers. The total value of advertising on mobile was 2.2 billion dollars in 2007. A recent study by the Online Publishers Association reports that about one-in-ten mobile Web users said they have made a purchase based on a mobile Web ad, while 23% said they have visited a Web site, 13% said they have requested more information about a product or service and 11% said they have gone to a store to check out a product.

Limitations



Social network service mobile graphical user interface (Facebook)

Though Internet access "on the go" provides advantages to many, such as the ability to communicate by email with others and obtain information anywhere, the web, accessed from mobile devices, has a large number of limitations, which may vary, depending on the device. However, newer smartphones such as the iPhone and those using the Android operating system overcome some of these restrictions. Some problems which may be encountered include:

- **Small screen size** – This makes it difficult or impossible to see text and graphics dependent on the standard size of a desktop computer screen.
- **Lack of windows** – On a desktop computer, the ability to open more than one window at a time allows for multi-tasking and for easy revert to a previous page. Historically on mobile web, only one page can be displayed at a time, and pages can only be viewed in the sequence they were originally accessed. However, there are apps for the iPhone (e.g. Oceanus), as well as browsers such as Opera Mini

for Java ME, allowing multiple windows, but sometimes a limited number, and not multiple windows in the same screen.

- **Navigation –** Most mobile devices do not use a mouselike pointer, but rather simply an up and down function for scrolling, thereby limiting the flexibility in navigation.
- **Lack of Javascript and cookies –** Most devices do not support client-side scripting and storage of cookies (smartphones excluded), which are now widely used in most Web sites for enhancing user experience, facilitating the validation of data entered by the page visitor, etc. This also results in web analytics tools not being suitable for uniquely identifying visitors using mobile devices.
- **Types of pages accessible –** Many sites that can be accessed on a desktop cannot on a mobile device. Many devices cannot access pages with a secured connection, Flash or other similar software, PDFs, or video sites, although recently this has been changing.
- **Speed –** On most mobile devices, the speed of service is very slow, often slower than dial-up Internet access.
- **Broken pages –** On many devices, a single page as viewed on a desktop is broken into segments, which are each treated as a separate page. Paired with the slow speed, navigation between these pages is slow.
- **Compressed pages –** Many pages, in their conversion to mobile format, are squeezed into an order different from how they would customarily be viewed on a desktop computer.
- **Size of messages –** Many devices have limits on the number of characters that can be sent in an email message.
- **Cost –** the access and bandwidth charges levied by cellphone networks can be high if there is no flat fee per month.
- **Location of mobile user**:
    - if advertisements reach phone users in private locations, users find them more distressful (Banerjee & Dholakia, 2008)
    - if the user is abroad the flat fee per month usually does not apply
- **Situation in which ad reaches user –** When advertisements reach users in work-related situations, they may be considered more intrusive than in leisure situations (Banerjee & Dholakia, 2008)

The inability of mobile web applications to access the local capabilities on the mobile device can limit their ability to provide the same features as native applications. The OMTP BONDI activity is acting as a catalyst to enable a set of JavaScript APIs which can access local capabilities in a secure way on the mobile device. Specifications and a reference implementation have been produced. Security is a key aspect in this provision in order to protect users from malicious web applications and widgets.

In addition to the limitations of the device itself there are limitations that should be made known to users concerning the interference these devices cause in other electromagnetic technology.

The convergence of the Internet and phone, in particular has caused hospitals to increase their mobile phone exclusion zones. A study by Erik van Lieshout and colleagues (Academic Medical Centre, University of Amsterdam) has found that the General Packet Radio Service (GPRS) used in modern phones can affect machines from up to 3 meters away. The Universal Mobile Telecommunications System (UMTS) signals, used in 3G networks, have a smaller exclusion zone of just a few centimeters. Not surprisingly, the worst offenders in hospitals are the doctors.