**MOTIVATION**

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 TITLE :Android OS

 DATE :07-10-11

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**ANDROID OPERATING SYSTEM**

**Introduction**

 **Android** is an [operating system for mobile devices](http://en.wikipedia.org/wiki/Mobile_operating_system) such as [smartphones](http://en.wikipedia.org/wiki/Smartphone) and [tablet computers](http://en.wikipedia.org/wiki/Tablet_computer). It is developed by the [Open Handset Alliance](http://en.wikipedia.org/wiki/Open_Handset_Alliance) led by [Google](http://en.wikipedia.org/wiki/Google).[[7]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-google_code-6)[[8]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-philosophy-7)

Google purchased the initial developer of the software, Android Inc., in 2005.[[9]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-8) The unveiling of the Android distribution on November 5, 2007 was announced with the founding of the [Open Handset Alliance](http://en.wikipedia.org/wiki/Open_Handset_Alliance), a consortium of 84 [hardware](http://en.wikipedia.org/wiki/Computer_hardware), software, and [telecommunication](http://en.wikipedia.org/wiki/Telecommunication) companies devoted to advancing [open standards](http://en.wikipedia.org/wiki/Open_standard) for mobile devices.[[10]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-OHAhome-9)[[11]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-10)[[12]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-AndroidAnnouncement-11)[[13]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-12) Google released most of the Android code under the [Apache License](http://en.wikipedia.org/wiki/Apache_License), a [free software license](http://en.wikipedia.org/wiki/Free_software_license).[[14]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-AndroidOverview-13) The Android Open Source Project (AOSP) is tasked with the maintenance and further development of Android.[[15]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-source.android.com-14)

Android consists of a [kernel](http://en.wikipedia.org/wiki/Kernel_%28software%29) based on the [Linux kernel](http://en.wikipedia.org/wiki/Linux_kernel), with [middleware](http://en.wikipedia.org/wiki/Middleware), [libraries](http://en.wikipedia.org/wiki/Software_library) and [APIs](http://en.wikipedia.org/wiki/Application_programming_interface) written in [C](http://en.wikipedia.org/wiki/C_%28programming_language%29) and [application software](http://en.wikipedia.org/wiki/Application_software) running on an [application framework](http://en.wikipedia.org/wiki/Application_framework) which includes Java-compatible libraries based on [Apache Harmony](http://en.wikipedia.org/wiki/Apache_Harmony). Android uses the [Dalvik virtual machine](http://en.wikipedia.org/wiki/Dalvik_virtual_machine) with [just-in-time compilation](http://en.wikipedia.org/wiki/Just-in-time_compilation) to run compiled [Java](http://en.wikipedia.org/wiki/Java_%28programming_language%29) code.[[16]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-15) Android has a large community of developers writing applications ("apps") that extend the functionality of the devices. Developers write primarily in a customized version of Java.[[17]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-16) There are currently more than 520,000 apps available for Android.[[18]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-i.2Fo_2011_stats-17)[[19]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-18) Apps can be downloaded from third-party sites or through online stores such as [Android Market](http://en.wikipedia.org/wiki/Android_Market), the app store run by Google.

**Foundation**

Android, Inc. was founded in [Palo Alto, California](http://en.wikipedia.org/wiki/Palo_Alto%2C_California), United States in October, 2003 by [Andy Rubin](http://en.wikipedia.org/wiki/Andy_Rubin) (co-founder of [Danger](http://en.wikipedia.org/wiki/Danger_%28company%29)),[[22]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-AndyRubin-21) [Rich Miner](http://en.wikipedia.org/wiki/Rich_Miner) (co-founder of Wildfire Communications, Inc.),[[23]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-autogenerated1-22) Nick Sears (once VP at [T-Mobile](http://en.wikipedia.org/wiki/T-Mobile_USA)),[[24]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-Nick-23) and Chris White (headed design and interface development at [WebTV](http://en.wikipedia.org/wiki/WebTV))[[25]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-24) to develop, in Rubin's words "...smarter mobile devices that are more aware of its owner's location and preferences".[[26]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-AndroidInc-25) Despite the obvious past accomplishments of the founders and early employees, Android Inc. operated secretly, revealing only that it was working on software for mobile phones.[[26]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-AndroidInc-25)

**Post-acquisition development**

At Google, the team led by Rubin developed a mobile device platform powered by the [Linux kernel](http://en.wikipedia.org/wiki/Linux_kernel). Google marketed the platform to handset makers and [carriers](http://en.wikipedia.org/wiki/Mobile_network_operator) on the premise of providing a flexible, upgradable system. Google had lined up a series of hardware component and software partners and signaled to carriers that it was open to various degrees of cooperation on their part.[[28]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-EngadgetMobileOS-27)[[29]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-WSJ-28)[[30]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-DT-29).

In September 2007, [*InformationWeek*](http://en.wikipedia.org/wiki/InformationWeek) covered an [Evalueserve](http://en.wikipedia.org/wiki/Evalueserve) study reporting that Google had filed several [patent](http://en.wikipedia.org/wiki/Patent) applications in the area of mobile telephony.[[33]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-IWpatents-32)[[34]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-MNpatents-33)

**Licensing**

With the exception of brief update periods, Android has been available under a [free and open source software](http://en.wikipedia.org/wiki/Free_and_open_source_software) license since October 21, 2008 until March 2011.[[37]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-Honeycombclosed-36) Google published the entire [source code](http://en.wikipedia.org/wiki/Source_code) (including network and telephony stacks)[[38]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-37) under an [Apache License](http://en.wikipedia.org/wiki/Apache_License).[[39]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-38) Google also keeps the reviewed issues list publicly open for anyone to see and comment.[[40]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-39)

In September 2010, [Skyhook Wireless](http://en.wikipedia.org/wiki/Skyhook_Wireless) filed a lawsuit against Google in which they alleged that Google had used the compatibility document to block Skyhook's mobile positioning service (XPS) from Motorola's Android mobile devices.[[42]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-41) In December 2010 a judge denied Skyhook's motion for preliminary injunction, saying that Google had not closed off the possibility of accepting a revised version of Skyhook's XPS service, and that Motorola had terminated their contract with Skyhook because Skyhook wanted to disable Google's location data collection functions on Motorola's devices, which would have violated Motorola's obligations to Google and its carriers.[[43]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-42)

In early 2011, Google chose to withhold the Android source code to the tablet-only Honeycomb release, creating a controversy over Google's commitment to open source with Android.[[37]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-Honeycombclosed-36) The reason, according to [Andy Rubin](http://en.wikipedia.org/wiki/Andy_Rubin) in an official Android blog post, was because Honeycomb was rushed for production of the Motorola Xoom,[[44]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-43) and they did not want third parties creating a "really bad user experience" by attempting to put onto smartphones a version of Android intended for tablets.[[45]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-44) Google later confirmed that the Honeycomb source code would not be released until after it was merged with the Gingerbread release in Ice Cream Sandwich.[[46]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-honeycomb_wont_exist_on_own-45).

**Version history**

Main article: [Android version history](http://en.wikipedia.org/wiki/Android_version_history)

Android has seen a number of updates since its original release, each fixing [bugs](http://en.wikipedia.org/wiki/Software_bug) and adding new features. Each version is named, in alphabetical order, after a [dessert](http://en.wikipedia.org/wiki/Dessert).[[50]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-icecream-sandwich-49)

Future releases

* **Ice Cream Sandwich** is said to be a combination of Gingerbread and Honeycomb into a "cohesive whole".[[50]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-icecream-sandwich-49) In September 2011, [Eric Schmidt](http://en.wikipedia.org/wiki/Eric_Schmidt) stated that Ice Cream Sandwich "*is being released in October/November.*"[[59]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-58)

### Features





The Android Emulator default home screen (v1.5)

Handset layouts

The platform is adaptable to larger, [VGA](http://en.wikipedia.org/wiki/Video_Graphics_Array), [2D graphics](http://en.wikipedia.org/wiki/2D_computer_graphics) library, [3D graphics](http://en.wikipedia.org/wiki/3D_computer_graphics) library based on [OpenGL ES](http://en.wikipedia.org/wiki/OpenGL_ES) 2.0 specifications, and traditional smartphone layouts.

Storage

[SQLite](http://en.wikipedia.org/wiki/SQLite), a lightweight [relational database](http://en.wikipedia.org/wiki/Relational_database), is used for data storage purposes.

Connectivity

Android supports connectivity technologies including [GSM](http://en.wikipedia.org/wiki/GSM)/[EDGE](http://en.wikipedia.org/wiki/Enhanced_Data_Rates_for_GSM_Evolution), [IDEN](http://en.wikipedia.org/wiki/Integrated_Digital_Enhanced_Network), [CDMA](http://en.wikipedia.org/wiki/Code_division_multiple_access), [EV-DO](http://en.wikipedia.org/wiki/Evolution-Data_Optimized), [UMTS](http://en.wikipedia.org/wiki/Universal_Mobile_Telecommunications_System), [Bluetooth](http://en.wikipedia.org/wiki/Bluetooth), [Wi-Fi](http://en.wikipedia.org/wiki/Wi-Fi), [LTE](http://en.wikipedia.org/wiki/LTE_Advanced), [NFC](http://en.wikipedia.org/wiki/Near_Field_Communication) and [WiMAX](http://en.wikipedia.org/wiki/WiMAX).

Messaging

[SMS](http://en.wikipedia.org/wiki/SMS) and [MMS](http://en.wikipedia.org/wiki/Multimedia_Messaging_Service) are available forms of messaging, including threaded [text messaging](http://en.wikipedia.org/wiki/Text_messaging) and now Android Cloud To Device Messaging Framework ([C2DM](http://en.wikipedia.org/w/index.php?title=C2DM&action=edit&redlink=1)) is also a part of Android Push Messaging service.

Multiple language support

Android supports multiple human [languages](http://en.wikipedia.org/wiki/Language). The number of languages more than doubled for the platform 2.3 Gingerbread.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia%3ACitation_needed)]

Web browser

The web browser available in Android is based on the open-source [WebKit](http://en.wikipedia.org/wiki/WebKit) layout engine, coupled with [Chrome's](http://en.wikipedia.org/wiki/Google_Chrome) [V8 JavaScript engine](http://en.wikipedia.org/wiki/V8_JavaScript_engine). The browser scores a 95/100 on the [Acid3](http://en.wikipedia.org/wiki/Acid3) Test.

Java support

While most Android applications are written in [Java](http://en.wikipedia.org/wiki/Java_%28programming_language%29), there is no [Java Virtual Machine](http://en.wikipedia.org/wiki/Java_Virtual_Machine) in the platform and Java byte code is not executed. Java classes are compiled into Dalvik executables and run on [Dalvik](http://en.wikipedia.org/wiki/Dalvik_%28software%29), a specialized virtual machine designed specifically for Android and optimized for battery-powered mobile devices with limited memory and CPU. [J2ME](http://en.wikipedia.org/wiki/J2ME) support can be provided via third-party applications.

Media support

Android supports the following audio/video/still media formats: [WebM](http://en.wikipedia.org/wiki/WebM), [H.263](http://en.wikipedia.org/wiki/H.263), [H.264](http://en.wikipedia.org/wiki/H.264) (in [3GP](http://en.wikipedia.org/wiki/3GP) or [MP4](http://en.wikipedia.org/wiki/MP4) [container](http://en.wikipedia.org/wiki/Container_format_%28digital%29)), [MPEG-4 SP](http://en.wikipedia.org/wiki/MPEG-4_Part_2), [AMR](http://en.wikipedia.org/wiki/Adaptive_multi-rate_compression), [AMR-WB](http://en.wikipedia.org/wiki/AMR-WB) (in 3GP container), [AAC](http://en.wikipedia.org/wiki/Advanced_Audio_Coding), [HE-AAC](http://en.wikipedia.org/wiki/HE-AAC) (in MP4 or 3GP container), [MP3](http://en.wikipedia.org/wiki/MP3), [MIDI](http://en.wikipedia.org/wiki/Musical_Instrument_Digital_Interface), [Ogg Vorbis](http://en.wikipedia.org/wiki/Vorbis), [FLAC](http://en.wikipedia.org/wiki/Free_Lossless_Audio_Codec), [WAV](http://en.wikipedia.org/wiki/WAV), [JPEG](http://en.wikipedia.org/wiki/JPEG), [PNG](http://en.wikipedia.org/wiki/Portable_Network_Graphics), [GIF](http://en.wikipedia.org/wiki/Graphics_Interchange_Format), [BMP](http://en.wikipedia.org/wiki/BMP_file_format).[[71]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-mediaformats-70)

Streaming media support

RTP/RTSP streaming ([3GPP PSS](http://en.wikipedia.org/w/index.php?title=3GPP_PSS&action=edit&redlink=1), [ISMA](http://en.wikipedia.org/wiki/Internet_Streaming_Media_Alliance)), HTML progressive download (HTML5 <video> tag). Adobe Flash Streaming (RTMP) and HTTP Dynamic Streaming are supported by the Flash plugin.[[72]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-71) Apple HTTP Live Streaming is supported by RealPlayer for Mobile,[[73]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-72) and by the operating system in Android 3.0 (Honeycomb).[[55]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-honeycomb-highlights-54)

Additional hardware support

Android can use video/still cameras, [touchscreens](http://en.wikipedia.org/wiki/Touchscreen), [GPS](http://en.wikipedia.org/wiki/Global_Positioning_System), [accelerometers](http://en.wikipedia.org/wiki/Accelerometer), [gyroscopes](http://en.wikipedia.org/wiki/Gyroscope), [magnetometers](http://en.wikipedia.org/wiki/Magnetometer), dedicated gaming controls, [proximity](http://en.wikipedia.org/wiki/Proximity_sensor) and [pressure sensors](http://en.wikipedia.org/wiki/Pressure_sensor), [thermometers](http://en.wikipedia.org/wiki/Thermometer), accelerated 2D [bit blits](http://en.wikipedia.org/wiki/Bit_blit) (with hardware orientation, scaling, pixel format conversion) and accelerated 3D graphics.

Multi-touch

Android has native support for [multi-touch](http://en.wikipedia.org/wiki/Multi-touch) which was initially made available in handsets such as the [HTC Hero](http://en.wikipedia.org/wiki/HTC_Hero). The feature was originally disabled at the kernel level (possibly to avoid infringing Apple's patents on touch-screen technology at the time).[[74]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-73) Google has since released an update for the [Nexus One](http://en.wikipedia.org/wiki/Nexus_One) and the [Motorola Droid](http://en.wikipedia.org/wiki/Motorola_Droid) which enables multi-touch natively.[[75]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-74)

Bluetooth

Supports [A2DP](http://en.wikipedia.org/wiki/A2DP), [AVRCP](http://en.wikipedia.org/wiki/AVRCP), sending files ([OPP](http://en.wikipedia.org/wiki/Object_Push_Profile)), accessing the phone book ([PBAP](http://en.wikipedia.org/wiki/Bluetooth_profile#Phone_Book_Access_Profile_.28PBAP.2C_PBA.29)), voice dialing and sending contacts between phones. Keyboard, mouse and joystick ([HID](http://en.wikipedia.org/wiki/Bluetooth_profile#Human_Interface_Device_Profile_.28HID.29)) support is available in Android 3.1+, and in earlier versions through manufacturer customizations and third-party applications.[[76]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-75)

Video calling

Android does not support native video calling, but some handsets have a customized version of the operating system that supports it, either via the [UMTS](http://en.wikipedia.org/wiki/UMTS) network (like the [Samsung Galaxy S](http://en.wikipedia.org/wiki/Samsung_Galaxy_S)) or over IP. Video calling through Google Talk is available in Android 2.3.4 and later. Gingerbread allows Nexus S to place Internet calls with a SIP account. This allows for enhanced VoIP dialing to other SIP accounts and even phone numbers. Skype 2.1 offers video calling in Android 2.3, including front camera support.

Multitasking

Multitasking of applications is available.[[77]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-76)

Voice based features

Google search through voice has been available since initial release.[[78]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-77) Voice actions for calling, texting, navigation, etc. are supported on Android 2.2 onwards.[[79]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-78)

Tethering

Android supports [tethering](http://en.wikipedia.org/wiki/Tethering), which allows a phone to be used as a wireless/wired [Wi-Fi hotspot](http://en.wikipedia.org/wiki/Wi-Fi_hotspot). Before Android 2.2 this was supported by third-party applications or manufacturer customizations.[[80]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-79)

Screen capture

Android does not support [screenshot](http://en.wikipedia.org/wiki/Screenshot) capture as of 2011. This is supported by manufacturer and third-party customizations. Screen Capture is available through a PC connection using the DDMS developer's tool.[[81]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-80)

## Uses

Main article: [List of Android devices](http://en.wikipedia.org/wiki/List_of_Android_devices)

The Android operating system is used on [smartphones](http://en.wikipedia.org/wiki/Smartphone), [netbooks](http://en.wikipedia.org/wiki/Netbook), [tablet computers](http://en.wikipedia.org/wiki/Tablet_computer), [Google TV](http://en.wikipedia.org/wiki/Google_TV), and other devices.[[82]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-81)[[83]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-82)

The main hardware platform for Android is the [ARM architecture](http://en.wikipedia.org/wiki/ARM_architecture). There is support for [x86](http://en.wikipedia.org/wiki/X86) from the Android-x86 project,[[84]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-83) and Google TV uses a special x86 version of Android.

The first commercially available phone to run Android was the [HTC Dream](http://en.wikipedia.org/wiki/HTC_Dream), released on 22 October 2008.[[85]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-HTC-84) In early 2010 Google collaborated with [HTC](http://en.wikipedia.org/wiki/HTC) to launch its flagship[[86]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-85) Android device, the [Nexus One](http://en.wikipedia.org/wiki/Nexus_One). This was followed later in 2010 with the [Samsung](http://en.wikipedia.org/wiki/Samsung)-made [Nexus S](http://en.wikipedia.org/wiki/Nexus_S).

On September 2011, many companies which produce smartphones powered by [MeeGo](http://en.wikipedia.org/wiki/MeeGo), [Bada](http://en.wikipedia.org/wiki/Bada), [WebOS](http://en.wikipedia.org/wiki/WebOS) and [Windows](http://en.wikipedia.org/wiki/Windows) also produce smartphone powered by Android.[[*citation needed*](http://en.wikipedia.org/wiki/Wikipedia%3ACitation_needed)] There are also possibility that some [BlackBerry](http://en.wikipedia.org/wiki/BlackBerry) smartphones will use Android.[[87]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-86)[[*not in citation given*](http://en.wikipedia.org/wiki/Wikipedia%3AVerifiability)]

[iOS](http://en.wikipedia.org/wiki/IOS_%28Apple%29) and Android 2.3.3 'Gingerbread' may be set up to dual boot on a [jailbroken iPhone or iPod Touch](http://en.wikipedia.org/wiki/IOS_jailbreaking) with the help of OpeniBoot and iDroid.[[88]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-87)[[89]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-88)

##  Applications

See also: [Android software development](http://en.wikipedia.org/wiki/Android_software_development) and [List of open source Android applications](http://en.wikipedia.org/wiki/List_of_open_source_Android_applications)

Applications are usually developed in the Java language using the [Android Software Development Kit](http://en.wikipedia.org/wiki/Android_SDK), but other development tools are available, including a [Native Development Kit](http://en.wikipedia.org/wiki/Android_software_development#Native_Development_Kit) for applications or extensions in C or C++, and [Google App Inventor](http://en.wikipedia.org/wiki/Google_App_Inventor), a visual environment for novice programmers.

### Android Market

Android Market is the online software store developed by Google for Android devices. An application program ("app") called "Market" is preinstalled on most Android devices and allows users to browse and download apps published by third-party developers, hosted on Android Market. As of December 2010 there were about 200,000 games, applications and widgets available on the Android Market.[[90]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-200.2C000-89) In April 2011 Google said there had been more than 3 billion Android apps installed[[91]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-90) and at end of June 2011 there are 6 billion apps installs from the Android market. The operating system itself is installed on 130 million total devices.[[92]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-91)

Google has participated in the Android Market by offering several applications themselves, including [Google Voice](http://en.wikipedia.org/wiki/Google_Voice) (for the Google Voice service), Sky Map (for watching stars), Finance (for their finance service), Maps Editor (for their MyMaps service), Places Directory (for their Local Search), [Google Goggles](http://en.wikipedia.org/wiki/Google_Goggles) that searches by image, Gesture Search (for using finger-written letters and numbers to search the contents of the phone), Google Translate, Google Shopper, Listen for podcasts and My Tracks, a jogging application. In August 2010, Google launched "Voice Actions for Android",[[95]](http://en.wikipedia.org/wiki/Android_%28operating_system%29#cite_note-94) which allows users to search, write messages, and initiate calls by voice.

**Bibliography**

http://en.wikipedia.org/wiki/Android\_%28operating\_system%29