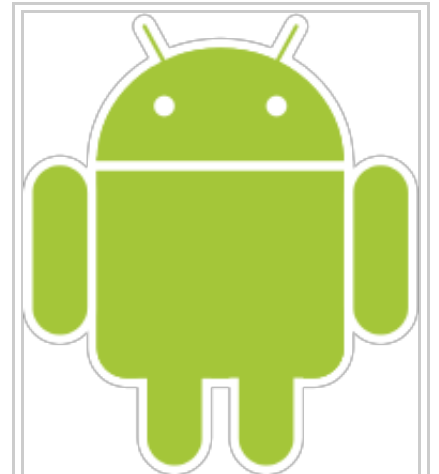# Android version history

From Wikipedia, the free encyclopedia

The version history of the Android operating system began with the release of the Android beta in November 2007. The first commercial version, Android 1.0, was released in September 2008. Android is a mobile operating system developed by Google and the Open Handset Alliance, and has seen a number of updates to its base operating system since its original release. These updates typically fix bugs and add new features. Since April 2009, Android versions have been developed under a codename and released in alphabetical order: Cupcake, Donut, Éclair, Froyo, Gingerbread, Honeycomb, Ice Cream Sandwich, and Jelly Bean. The most recent major update was Jelly Bean v4.1, which was announced in June 2012, and released into the Android Open Source Project a month later.

The Android logo, featuring a stylized green robot.

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Version history

Android beta

The Android beta was released on November 5, 2007,[1][2] while the software developer's kit (SDK) was released on November 12, 2007.[3]

Android 1.0

Android 1.0, the first commercial version of the software, was released on September 23, 2008.[4] The first

Android device, the HTC Dream,[5] incorporated the following Android 1.0 features:

The HTC Dream introduced Android 1.0.

Version	Release date	Features
1.0	September 23, 2008	- Android Market application download and updates through the Market app - Web browser to show, zoom and pan full HTML and XHTML web pages – multiple pages show as windows ("cards")[6][7] - Camera support – however this version lacked the option to change the camera's resolution, white balance, quality, etc.[8] - Folders allowing the grouping of a number of app icons into a single folder icon on the Home screen.[9] - Access to web email servers, supporting POP3, IMAP4, and SMTP.[7] - Gmail synchronization with the Gmail app - Google Contacts synchronization with the People app - Google Calendar synchronization with the Calendar app - Google Maps with Latitude and Street View to view maps and satellite imagery, as well as find local business and obtain driving directions using GPS[8] - Google Sync, allowing management of over-the-air synchronization of Gmail, People, and Calendar - Google Search, allowing users to search the Internet and phone apps, contacts, calendar, etc. - Google Talk instant messaging - Instant messaging, text messaging, and MMS - Media Player, enabling management, importing, and playback of media files – however, this version lacked video and stereo Bluetooth support[7][8] - Notifications appear in the Status bar, with options to set ringtone, LED or vibration alerts[6][7][10]

- Voice Dialer allows dialing and placing of phone calls without typing a name or number[7]
- Wallpaper allows the user to set the background image or photo behind the Home screen icons and widgets
- YouTube video player[11]
- Other apps include: Alarm Clock, Calculator, Dialer (Phone), Home screen (launcher), Pictures (Gallery), and Settings.
- Wi-Fi and Bluetooth support

Android 1.1

On February 9, 2009, the Android 1.1 update was released, initially for the HTC Dream only. Android 1.1 was known as "Petit Four" internally, though this name was not used officially.[12] The update resolved bugs, changed the API and added a number of features:[13]

Version	Release date	Features
1.1	February 9, 2009	- Details and reviews available when a user searches for businesses on Maps - Longer in-call screen timeout default when using the speakerphone, plus ability to show/hide dialpad - Ability to save attachments in messages - Support added for marquee in system layouts

Android 1.5 Cupcake

On April 30, 2009, the Android 1.5 update was released, based on Linux kernel 2.6.27.[14][15] This was the first release to officially use a name based on a dessert ("Cupcake"), a theme which would be used for all releases henceforth. The update included several new features and UI amendments:[16]

The Android Emulator default home screen (v1.5).

Version	Release date	Features
1.5	April 30, 2009	- Support for third-party virtual keyboards with text prediction and user dictionary for custom words - Support for Widgets - miniature application views that can be embedded in other applications (such as the Home screen) and receive periodic updates[17] - Video recording and playback in MPEG-4 and 3GP formats - Auto-pairing and stereo support for Bluetooth added (A2DP and AVRCP profiles) - Copy and paste features added to web browser - User pictures shown for Favorites in Contacts - Specific date/time stamp shown for events in call log, and one-touch access to a contact card from call log event - Animated screen transitions - Added auto-rotation option - Added the current stock boot animation - Ability to upload videos to YouTube - Ability to upload photos to Picasa

Android 1.6 Donut

On September 15, 2009, the Android 1.6 SDK – dubbed Donut – was released, based on Linux kernel 2.6.29.[18][19][20] Included in the update were numerous new features:[18]

The Android 1.6 home screen.

Version	Release date	Features
1.6	September 15, 2009	- Voice and text entry search enhanced to include bookmark history, contacts, and the web - Ability for developers to include their content in search results - Multi-lingual speech synthesis engine to allow any Android application to "speak" a string of text - Easier searching and ability to view app screenshots in Android Market - Gallery, camera and camcorder more fully integrated, with faster camera access - Ability for users to select multiple photos for deletion - Updated technology support for CDMA/EVDO, 802.1x, VPNs, and a text-to-speech engine - Support for WVGA screen resolutions - Speed improvements in searching and camera applications - Expanded Gesture framework and new GestureBuilder development tool

Android 2.0/2.1 Eclair

On October 26, 2009, the Android 2.0 SDK – codenamed Eclair – was released, based on Linux kernel 2.6.29.[21] Changes included:[22]

The Motorola Droid, running Android 2.0.

Version	Release date	Features
2.0	October 26, 2009	- Expanded Account sync, allowing users to add multiple accounts to a device for email- and contact-synchronization - Exchange email support, with combined inbox to browse email from multiple accounts in one page - Bluetooth 2.1 support - Ability to tap a Contacts photo and select to call, SMS, or email the person - Ability to search all saved SMS and MMS messages, with delete oldest messages in a conversation automatically deleted when a defined limit is reached - Numerous new camera features, including flash support, digital zoom, scene mode, white balance, color effect and macro focus - Improved typing speed on virtual keyboard, with smarter dictionary that learns from word usage and includes contact names as suggestions - Refreshed browser UI with bookmark thumbnails, double-tap zoom and support for HTML5 - Calendar agenda view enhanced, showing attending status for each invitee, and ability to invite new guests to events - Optimized hardware speed and revamped UI - Support for more screen sizes and resolutions, with better contrast ratio - Improved Google Maps 3.1.2 - MotionEvent class enhanced to track multi-touch events[23] - Addition of live wallpapers, allowing the animation of home-screen background images to show movement
2.0.1	December 3, 2009[24]	Minor API changes, bug fixes and framework behavioral changes
2.1	January 12, 2010[25]	Minor amendments to the API and bug fixes

Android 2.2.x Froyo

On May 20, 2010, the Android 2.2 (Froyo, short for Frozen Yogurt) SDK was released, based on Linux kernel 2.6.32.[26]

Google's Nexus One was
the first smartphone to
receive Android 2.2 Froyo.

Version	Release date	Features
2.2	May 20, 2010	- Speed, memory, and performance optimizations[27] - Additional application speed improvements, implemented through JIT compilation[28] - Integration of Chrome's V8 JavaScript engine into the Browser application - Support for the Android Cloud to Device Messaging (C2DM) service, enabling push notifications - Improved Microsoft Exchange support, including security policies, auto-discovery, GAL look-up, calendar synchronization and remote wipe - Improved application launcher with shortcuts to Phone and Browser applications - USB tethering and Wi-Fi hotspot functionality - Added an option to disable data access over mobile network - Updated Market application with batch and automatic update features[27] - Quick switching between multiple keyboard languages and their dictionaries - Voice dialing and contact sharing over Bluetooth - Support for Bluetooth-enabled car and desk docks - Support for numeric and alphanumeric passwords - Support for file upload fields in the Browser application[29] - Support for installing applications to the expandable memory - Adobe Flash support[30] - Support for extra-high-PPI screens (320 ppi), such as 4" 720p[31] - Gallery allows users to view picture stacks using a zoom gesture
2.2.1	January 18, 2011	- Bug fixes, security updates and performance improvements
2.2.2	January 22, 2011	- Minor bug fixes, including SMS routing issues that affected the Nexus One.[32]
2.2.3	November 21, 2011	- Two security patches

Android 2.3.x Gingerbread

On December 6, 2010, the Android 2.3 (Gingerbread) SDK was released, based on Linux kernel 2.6.35.[33][34] Changes included:[33]

Google's Nexus S introduced Android 2.3 Gingerbread.

Version	Release date	Features
2.3	December 6, 2010	- Updated user interface design with increased simplicity and speed - Support for extra-large screen sizes and resolutions (WXGA and higher)[31] - Native support for SIP VoIP internet telephony - Faster, more intuitive text input in virtual keyboard, with improved accuracy, better suggested text and voice input mode - Enhanced copy/paste functionality, allowing users to select a word by press-hold, copy, and paste - Support for Near Field Communication (NFC), allowing the user to read an NFC tag embedded in a poster, sticker, or advertisement - New audio effects such as reverb, equalization, headphone virtualization, and bass boost - New Download Manager, giving users easy access to any file downloaded from the browser, email, or another application - Support for multiple cameras on the device, including a front-facing camera, if available - Support for WebM/VP8 video playback, and AAC audio encoding

		- Improved power management with a more active role in managing apps that are keeping the device awake for too long - Enhanced support for native code development - Switched from YAFFS to ext4 on newer devices[35][36] - Audio, graphical, and input enhancements for game developers - Concurrent garbage collection for increased performance - Native support for more sensors (such as gyroscopes and barometers)
2.3.3	February 9, 2011	Several improvements and API fixes.[37]
2.3.4	April 28, 2011	- Support for voice or video chat using Google Talk.[38] - Open Accessory Library support. Open Accessory was introduced in 3.1 (Honeycomb) but the Open Accessory Library grants 2.3.4 added support when connecting to a USB peripheral with compatible software and a compatible application on the device.[39]
2.3.5	July 25, 2011	- System enhancements:[40] - Improved network performance for the Nexus S 4G, among other fixes and improvements - Fixed Bluetooth bug on Samsung Galaxy S - Improved Gmail application - Shadow animations for list scrolling - Camera software enhancements - Improved battery efficiency
2.3.6	September 2, 2011	Fixed a voice search bug (The 2.3.6 update had the side-effect of impairing the Wi-Fi hotspot functionality of many Canadian Nexus S phones. Google acknowledged this problem and fixed it in late September).[41][42]
2.3.7	September 21, 2011	Google Wallet support for the Nexus S 4G.

Android 3.x Honeycomb

On February 22, 2011, the Android 3.0 (Honeycomb) SDK – the first tablet-only Android update – was released, based on Linux kernel 2.6.36.[43][44][45][46] The first device featuring this version, the Motorola Xoom tablet, was released on February 24, 2011.[47] The update's features included:[43]

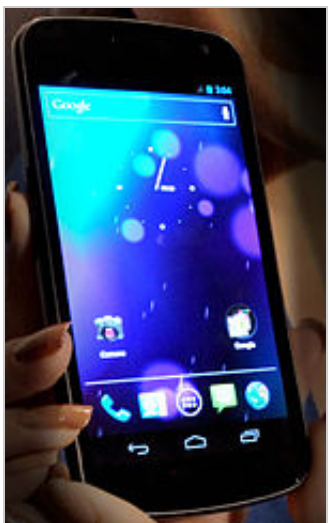
The Motorola Xoom tablet introduced Android 3.0 Honeycomb.

Version	Release date	Features
3.0	February 22, 2011	- Optimized tablet support with a new virtual and "holographic" user interface - Added System Bar, featuring quick access to notifications, status, and soft navigation buttons, available at the bottom of the screen - Added Action Bar, giving access to contextual options, navigation, widgets, or other types of content at the top of the screen - Simplified multitasking – tapping Recent Apps in the System Bar allows users to see snapshots of the tasks underway and quickly jump from one app to another - Redesigned keyboard, making typing fast, efficient and accurate on larger screen sizes - Simplified, more intuitive copy/paste interface - Multiple browser tabs replacing browser windows, plus form auto-fill and a new "incognito" mode allowing anonymous browsing - Quick access to camera exposure, focus, flash, zoom, front-facing camera, time-lapse, and other camera features - Ability to view albums and other collections in full-screen mode in Gallery, with easy access to thumbnails for other photos - New two-pane Contacts UI and Fast Scroll to let users easily organize and locate contacts - New two-pane Email UI to make viewing and organizing messages more efficient, allowing users to select one or more messages - Support for video chat using Google Talk

		- Hardware acceleration - Support for multi-core processors - Ability to encrypt all user data - HTTPS stack improved with Server Name Indication (SNI) - Filesystem in Userspace (FUSE; kernel module)
3.1	May 10, 2011[48]	- UI refinements - Connectivity for USB accessories - Expanded Recent Apps list - Resizable Home screen widgets - Support for external keyboards and pointing devices - Support for joysticks and gamepads - Support for FLAC audio playback[49][50] - High-performance Wi-Fi lock, maintaining high-performance Wi-Fi connections when device screen is off - Support for HTTP proxy for each connected Wi-Fi access point
3.2	July 15, 2011[51]	- Improved hardware support, including optimizations for a wider range of tablets - Increased ability of apps to access files on the SD card, e.g. for synchronization - Compatibility display mode for apps that have not been optimized for tablet screen resolutions - New display support functions, giving developers more control over display appearance on different Android devices [52]
3.2.1	September 20, 2011	- Bug fixes and minor security, stability and Wi-Fi improvements - Update to Android Market with automatic updates and easier-to-read Terms and Condition text - Update to Google Books - Improved Adobe Flash support in browser - Improved Chinese handwriting prediction
3.2.2	August 30, 2011	Bug fixes and other minor improvements for the Motorola Xoom 4G
3.2.4	December 2011	"Pay as You Go" support for 3G and 4G

		tablets
3.2.6	February 2012	▪ Fixed data connectivity issues when coming out of airplane mode on the US 4G Motorola Xoom

Android 4.0.x Ice Cream Sandwich

The SDK for Android 4.0.1 (Ice Cream Sandwich), based on Linux kernel 3.0.1,[53] was publicly released on October 19, 2011.[54] Google's Gabe Cohen stated that Android 4.0 was "theoretically compatible" with any Android 2.3.x device in production at that time.[55] The source code for Android 4.0 became available on November 14, 2011.[56] The update introduced numerous new features, including:[57][58][59]

The Samsung Galaxy Nexus introduced Android 4.0 Ice Cream Sandwich.

Version	Release date	Features
4.0.1	October 19, 2011	▪ Soft buttons from Android 3.x are now available for use on phones ▪ Separation of widgets in a new tab, listed in a similar manner to apps ▪ Easier-to-create folders, with a drag-and-drop style ▪ A customizable launcher ▪ Improved visual voicemail with the ability to speed up or slow down voicemail messages ▪ Pinch-to-zoom functionality in the calendar ▪ Integrated screenshot capture (accomplished by holding down the Power and Volume-Down buttons) ▪ Improved error correction on the keyboard ▪ Ability to access apps directly from lock screen ▪ Improved copy and paste functionality ▪ Better voice integration and continuous, real-time speech to text dictation ▪ Face Unlock, a feature that allows users

- to unlock handsets using facial recognition software
- New tabbed web browser under Google's Chrome brand, allowing up to 16 tabs
- Automatic syncing of browser with users' Chrome bookmarks
- A new typeface family for the UI, Roboto
- Data Usage section in settings that lets users set warnings when they approach a certain usage limit, and disable data use when the limit is exceeded
- Ability to shut down apps that are using data in the background
- Improved camera app with zero shutter lag, time lapse settings, panorama mode, and the ability to zoom while recording
- Built-in photo editor
- New gallery layout, organized by location and person
- Refreshed "People" app with social network integration, status updates and hi-res images
- Android Beam, a near-field communication feature allowing the rapid short-range exchange of web bookmarks, contact info, directions, YouTube videos and other data
- Support for the WebP image format[49]
- Hardware acceleration of the UI[60]
- Wi-Fi Direct[61]
- 1080p video recording for stock Android devices
- Android VPN Framework (AVF), and TUN (but not TAP) kernel module. Prior to 4.0, VPN software required rooted Android.

4.0.2	November 28, 2011	- Fixed minor bugs on the Verizon Galaxy Nexus, the US launch of which was later delayed until December 2011 (For Canadian consumers, 4.0.2 reportedly created a bug on the Galaxy Nexus that crashed the application market when users attempted to view details of any Android application. It also inadvertently reduced the NFC capabilities of the Nexus phone).[62][63]
		- Numerous bug fixes and optimizations - Improvements to graphics, databases, spell-checking and Bluetooth functionality - New APIs for developers, including a

4.0.3	December 16, 2011[64]	social stream API in the Contacts provider • Calendar provider enhancements • New camera apps enhancing video stabilization and QVGA resolution • Accessibility refinements such as improved content access for screen readers[65]
4.0.4	March 29, 2012[66]	• Stability improvements • Better camera performance • Smoother screen rotation • Improved phone number recognition[67]

Android 4.1.x Jelly Bean

Google announced Android 4.1 (Jelly Bean) at the Google I/O conference on June 27, 2012. Based on Linux kernel 3.0.31, Jelly Bean was an incremental update with the primary aim of improving the functionality and performance of the user interface. The performance improvement involved "Project Butter", which uses touch anticipation, triple buffering, extended vsync timing and a fixed frame rate of 60 fps to create a fluid and "buttery"-smooth UI.[68] Android 4.1 Jelly Bean was released to AOSP on July 9, 2012,[69] and the Nexus 7, the first device to run Jelly Bean, was released on July 13, 2012.[70]
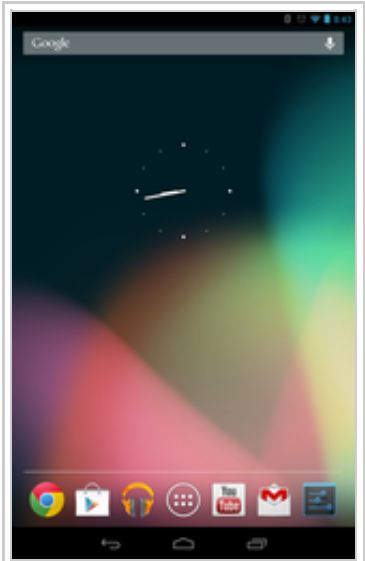
Android 4.1 Jelly Bean on the Asus Nexus 7 tablet.

Version	Release date	Features
4.1.1	July 9, 2012	- Smoother user interface: - Vsync timing across all drawing and animation done by the Android framework, including application rendering, touch events, screen composition and display refresh - Triple buffering in the graphics pipeline - Enhanced accessibility - Bi-directional text and other language support - User-installable keyboard maps - Expandable notifications - Ability to turn off notifications on an app specific basis - Shortcuts and widgets can automatically be re-arranged or re-sized to allow new items to fit on home screens - Bluetooth data transfer for Android Beam - Offline voice dictation - New interface layout for tablets with smaller screens or phablets (whose screens more closely resemble that of a phone)[71] - Improved voice search - Improved camera app - Google Wallet (for the Nexus 7) - High-resolution Google+ contact photos[72] - Google Now search application - Multichannel audio[73] - USB audio (for external sound DACs)[73] - Audio chaining (also known as gapless playback)[73][74][75] - Stock Android browser is replaced with the Android mobile version of Google Chrome in devices with Android 4.1 preinstalled[76] - Abillity for other launchers to add widgets from the app drawer without requiring root access
4.1.2	October 9, 2012[77]	- Home screen rotation support[78] - Bug fixes and performance enhancements

See also

- Blackberry OS version history
- iOS version history
- Windows Phone version history

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