

Bitcoin Core version 0.13.0 is now available from:

<https://bitcoin.org/bin/bitcoin-core-0.13.0/>

This is a new major version release, including new features, various bugfixes and performance improvements, as well as updated translations.

Please report bugs using the issue tracker at github:

<https://github.com/bitcoin/bitcoin/issues>

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## Compatibility

Microsoft ended support for Windows XP on April 8th, 2014, an OS initially released in 2001. This means that not even critical security updates will be released anymore. Without security updates, using a bitcoin wallet on a XP machine is irresponsible at least.

In addition to that, with 0.12.x there have been varied reports of Bitcoin Core randomly crashing on Windows XP. It is not clear what the source of these crashes is, but it is likely that upstream libraries such as Qt are no longer being tested on XP.

We do not have time nor resources to provide support for an OS that is end-of-life. From 0.13.0 on, Windows XP is no longer supported. Users are suggested to upgrade to a newer version of Windows, or install an alternative OS that is supported.

No attempt is made to prevent installing or running the software on Windows XP, you can still do so at your own risk, but do not expect it to work: do not report issues about Windows XP to the issue tracker.

## Notable changes

### Database cache memory increased

As a result of growth of the UTXO set, performance with the prior default database cache of 100 MiB has suffered. For this reason the default was changed to 300 MiB in this release.

For nodes on low-memory systems, the database cache can be changed back to 100 MiB (or to another value) by either:

- Adding `dbcache=100` in `bitcoin.conf`
- Changing it in the GUI under **Options** → **Size of database cache**

Note that the database cache setting has the most performance impact during initial sync of a node, and when catching up after downtime.

### bitcoin-cli: arguments privacy

The RPC command line client gained a new argument, `-stdin` to read extra arguments from standard input, one per line until EOF/Ctrl-D. For example:

```
$ src/bitcoin-cli -stdin walletpassphrase
mysecretcode
120
..... press Ctrl-D here to end input
$
```

It is recommended to use this for sensitive information such as wallet passphrases, as command-line arguments can usually be read from the process table by any user on the system.

### C++11 and Python 3

Various code modernizations have been done. The Bitcoin Core code base has started using C++11. This means that a C++11-capable compiler is now needed for building. Effectively this means GCC 4.7 or higher, or Clang 3.3 or higher.

When cross-compiling for a target that doesn't have C++11 libraries, configure with `./configure --enable-glibc-back-compat ... LDFLAGS=-static-libstdc++`.

For running the functional tests in `qa/rpc-tests`, Python3.4 or higher is now required.

### Linux ARM builds

Due to popular request, Linux ARM builds have been added to the uploaded executables.

The following extra files can be found in the download directory or torrent:

- `bitcoin-${VERSION}-arm-linux-gnueabi.tar.gz`: Linux binaries targeting the 32-bit ARMv7-A architecture.
- `bitcoin-${VERSION}-aarch64-linux-gnu.tar.gz`: Linux binaries targeting the 64-bit ARMv8-A architecture.

ARM builds are still experimental. If you have problems on a certain device or Linux distribution combination please report them on the bug tracker, it may be possible to resolve them. Note that the device you use must be (backward) compatible with the architecture targeted by the binary that you use. For example, a Raspberry Pi 2 Model B or Raspberry Pi 3 Model B (in its 32-bit execution state) device, can run the 32-bit ARMv7-A targeted binary. However, no model of Raspberry Pi 1 device can run either binary because they are

all ARMv6 architecture devices that are not compatible with ARMv7-A or ARMv8-A.

Note that Android is not considered ARM Linux in this context. The executables are not expected to work out of the box on Android.

## Compact Block support (BIP 152)

Support for block relay using the Compact Blocks protocol has been implemented in PR 8068.

The primary goal is reducing the bandwidth spikes at relay time, though in many cases it also reduces propagation delay. It is automatically enabled between compatible peers. BIP 152

As a side-effect, ordinary non-mining nodes will download and upload blocks faster if those blocks were produced by miners using similar transaction filtering policies. This means that a miner who produces a block with many transactions discouraged by your node will be relayed slower than one with only transactions already in your memory pool. The overall effect of such relay differences on the network may result in blocks which include widely- discouraged transactions losing a stale block race, and therefore miners may wish to configure their node to take common relay policies into consideration.

## Hierarchical Deterministic Key Generation

Newly created wallets will use hierarchical deterministic key generation according to BIP32 (keypath  $m/0'/0'/k'$ ). Existing wallets will still use traditional key generation.

Backups of HD wallets, regardless of when they have been created, can therefore be used to re-generate all possible private keys, even the ones which haven't already been generated during the time of the backup. **Attention:** Encrypting the wallet will create a new seed which requires a new backup!

Wallet dumps (created using the `dumpwallet` RPC) will contain the deterministic seed. This is expected to allow future versions to import the seed and all associated funds, but this is not yet implemented.

HD key generation for new wallets can be disabled by `-usehd=0`. Keep in mind that this flag only has affect on newly created wallets. You can't disable HD key generation once you have created a HD wallet.

There is no distinction between internal (change) and external keys.

HD wallets are incompatible with older versions of Bitcoin Core.

Pull request, BIP 32

## Segregated Witness

The code preparations for Segregated Witness (“segwit”), as described in BIP 141, BIP 143, BIP 144, and BIP 145 are finished and included in this release. However, BIP 141 does not yet specify activation parameters on mainnet, and so this release does not support segwit use on mainnet. Testnet use is supported, and after BIP 141 is updated with proposed parameters, a future release of Bitcoin Core is expected that implements those parameters for mainnet.

Furthermore, because segwit activation is not yet specified for mainnet, version 0.13.0 will behave similarly as other pre-segwit releases even after a future activation of BIP 141 on the network. Upgrading from 0.13.0 will be required in order to utilize segwit-related features on mainnet (such as signal BIP 141 activation, mine segwit blocks, fully validate segwit blocks, relay segwit blocks to other segwit nodes, and use segwit transactions in the wallet, etc).

## Mining transaction selection (“Child Pays For Parent”)

The mining transaction selection algorithm has been replaced with an algorithm that selects transactions based on their feerate inclusive of unconfirmed ancestor transactions. This means that a low-fee transaction can become more likely to be selected if a high-fee transaction that spends its outputs is relayed.

With this change, the `-blockminsize` command line option has been removed.

The command line option `-blockmaxsize` remains an option to specify the maximum number of serialized bytes in a generated block. In addition, the new command line option `-blockmaxweight` has been added, which specifies the maximum “block weight” of a generated block, as defined by [BIP 141 (Segregated Witness)] (<https://github.com/bitcoin/bips/blob/master/bip-0141.mediawiki>).

In preparation for Segregated Witness, the mining algorithm has been modified to optimize transaction selection for a given block weight, rather than a given number of serialized bytes in a block. In this release, transaction selection is unaffected by this distinction (as BIP 141 activation is not supported on mainnet in this release, see above), but in future releases and after BIP 141 activation, these calculations would be expected to differ.

For optimal runtime performance, miners using this release should specify `-blockmaxweight` on the command line, and not specify `-blockmaxsize`. Additionally (or only) specifying `-blockmaxsize`, or relying on default settings for both, may result in performance degradation, as the logic to support `-blockmaxsize` performs additional computation to ensure that constraint is met. (Note that for mainnet, in this release, the equivalent parameter for `-blockmaxweight` would be four times the desired `-blockmaxsize`. See [BIP 141] (<https://github.com/bitcoin/bips/blob/master/bip-0141.mediawiki>) for additional details.)

In the future, the `-blockmaxsize` option may be removed, as block creation

is no longer optimized for this metric. Feedback is requested on whether to deprecate or keep this command line option in future releases.

## Reindexing changes

In earlier versions, reindexing did validation while reading through the block files on disk. These two have now been split up, so that all blocks are known before validation starts. This was necessary to make certain optimizations that are available during normal synchronizations also available during reindexing.

The two phases are distinct in the Bitcoin-Qt GUI. During the first one, “Reindexing blocks on disk” is shown. During the second (slower) one, “Processing blocks on disk” is shown.

It is possible to only redo validation now, without rebuilding the block index, using the command line option `-reindex-chainstate` (in addition to `-reindex` which does both). This new option is useful when the blocks on disk are assumed to be fine, but the chainstate is still corrupted. It is also useful for benchmarks.

## Removal of internal miner

As CPU mining has been useless for a long time, the internal miner has been removed in this release, and replaced with a simpler implementation for the test framework.

The overall result of this is that `setgenerate` RPC call has been removed, as well as the `-gen` and `-genproclimit` command-line options.

For testing, the `generate` call can still be used to mine a block, and a new RPC call `generatetoaddress` has been added to mine to a specific address. This works with wallet disabled.

## New bytespersigop implementation

The former implementation of the bytespersigop filter accidentally broke bare multisig (which is meant to be controlled by the `permitbaremultisig` option), since the consensus protocol always counts these older transaction forms as 20 sigops for backwards compatibility. Simply fixing this bug by counting more accurately would have reintroduced a vulnerability. It has therefore been replaced with a new implementation that rather than filter such transactions, instead treats them (for fee purposes only) as if they were in fact the size of a transaction actually using all 20 sigops.

## Low-level P2P changes

- The optional new p2p message “feefilter” is implemented and the protocol version is bumped to 70013. Upon receiving a feefilter message from a

peer, a node will not send invs for any transactions which do not meet the filter feerate. BIP 133

- The P2P alert system has been removed in PR #7692 and the `alert` P2P message is no longer supported.
- The transaction relay mechanism used to relay one quarter of all transactions instantly, while queueing up the rest and sending them out in batch. As this resulted in chains of dependent transactions being reordered, it systematically hurt transaction relay. The relay code was redesigned in PRs #7840 and #8082, and now always batches transactions announcements while also sorting them according to dependency order. This significantly reduces orphan transactions. To compensate for the removal of instant relay, the frequency of batch sending was doubled for outgoing peers.
- Since PR #7840 the BIP35 `mempool` command is also subject to batch processing. Also the `mempool` message is no longer handled for non-whitelisted peers when `NODE_BLOOM` is disabled through `-peerbloomfilters=0`.
- The maximum size of orphan transactions that are kept in memory until their ancestors arrive has been raised in PR #8179 from 5000 to 99999 bytes. They are now also removed from memory when they are included in a block, conflict with a block, and time out after 20 minutes.
- We respond at most once to a `getaddr` request during the lifetime of a connection since PR #7856.
- Connections to peers who have recently been the first one to give us a valid new block or transaction are protected from disconnections since PR #8084.

## Low-level RPC changes

- RPC calls have been added to output detailed statistics for individual mempool entries, as well as to calculate the in-mempool ancestors or descendants of a transaction: see `getmempoolentry`, `getmempoolancestors`, `getmempooldescendants`.
- `gettxoutsetinfo` UTXO hash (`hash_serialized`) has changed. There was a divergence between 32-bit and 64-bit platforms, and the txids were missing in the hashed data. This has been fixed, but this means that the output will be different than from previous versions.
- Full UTF-8 support in the RPC API. Non-ASCII characters in, for example, wallet labels have always been malformed because they weren't taken into account properly in JSON RPC processing. This is no longer the case. This also affects the GUI debug console.
- Asm script outputs replacements for `OP_NOP2` and `OP_NOP3`

- OP\_NOP2 has been renamed to OP\_CHECKLOCKTIMEVERIFY by BIP 65
- OP\_NOP3 has been renamed to OP\_CHECKSEQUENCEVERIFY by BIP 112
- The following outputs are affected by this change:
  - \* RPC `getrawtransaction` (in verbose mode)
  - \* RPC `decoderawtransaction`
  - \* RPC `decodescript`
  - \* REST `/rest/tx/` (JSON format)
  - \* REST `/rest/block/` (JSON format when including extended tx details)
  - \* `bitcoin-tx -json`
- The sorting of the output of the `getrawmempool` output has changed.
- New RPC commands: `generatetoaddress`, `importprunedfunds`, `removeprunedfunds`, `signmessagewithprivkey`, `getmempoolancestors`, `getmempooldescendants`, `getmempoolentry`, `createwitnessaddress`, `addwitnessaddress`.
- Removed RPC commands: `setgenerate`, `getgenerate`.
- New options were added to `fundrawtransaction`: `includeWatching`, `changeAddress`, `changePosition` and `feeRate`.

## Low-level ZMQ changes

- Each ZMQ notification now contains an up-counting sequence number that allows listeners to detect lost notifications. The sequence number is always the last element in a multi-part ZMQ notification and therefore backward compatible. Each message type has its own counter. PR #7762.

## 0.13.0 Change log

Detailed release notes follow. This overview includes changes that affect behavior, not code moves, refactors and string updates. For convenience in locating the code changes and accompanying discussion, both the pull request and git merge commit are mentioned.

### RPC and other APIs

- #7156 9ee02cf Remove `cs_main` lock from `createrawtransaction` (laanwj)
- #7326 2cd004b Fix typo, wrong information in `gettxout` help text (pavel-janik)

- #7222 82429d0 Indicate which transactions are signaling opt-in RBF (sdaftuar)
- #7480 b49a623 Changed getnetworkhps value to double to avoid overflow (instagibbs)
- #7550 8b958ab Input-from-stdin mode for bitcoin-cli (laanwj)
- #7670 c9a1265 Use cached block hash in blockToJSON() (rat4)
- #7726 9af69fa Correct importaddress help reference to importpubkey (CypherGrue)
- #7766 16555b6 Register calls where they are defined (laanwj)
- #7797 e662a76 Fix generatetoaddress failing to parse address (mrduddy)
- #7774 916b15a Add versionHex in getblock and getblockheader JSON results (mrduddy)
- #7863 72c54e3 Getblockchaininfo: make bip9\_softforks an object, not an array (rustyrussell)
- #7842 d97101e Do not print minping time in getpeerinfo when no ping received yet (paveljanik)
- #7518 be14ca5 Add multiple options to fundrawtransaction (promag)
- #7756 9e47fce Add cursor to iterate over utxo set, use this in gettxoutsetinfo (laanwj)
- #7848 88616d2 Divergence between 32- and 64-bit when hashing >4GB affects gettxoutsetinfo (laanwj)
- #7827 4205ad7 Speed up getchaintips (mrbandrews)
- #7762 a1eb344 Append a message sequence number to every ZMQ notification (jonasschnelli)
- #7688 46880ed List solvability in listunspent output and improve help (sipa)
- #7926 5725807 Push back getaddednodeinfo dead value (instagibbs)
- #7953 0630353 Create signmessagewithprivkey rpc (achow101)
- #8049 c028c7b Expose information on whether transaction relay is enabled in getnetworkinfo (laanwj)
- #7967 8c1e49b Add feerate option to fundrawtransaction (jonasschnelli)
- #8118 9b6a48c Reduce unnecessary hashing in signrawtransaction (jonasnick)
- #7957 79004d4 Add support for transaction sequence number (jonasschnelli)
- #8153 75ec320 fundrawtransaction feeRate: Use BTC/kB (MarcoFalke)
- #7292 7ce9ac5 Expose ancestor/descendant information over RPC (sdaftuar)
- #8171 62fcf27 Fix createrawtx sequence number unsigned int parsing (jonasschnelli)
- #7892 9c3d0fa Add full UTF-8 support to RPC (laanwj)
- #8317 304eff3 Don't use floating point in rpcwallet (MarcoFalke)
- #8258 5a06ebb Hide softfork in getblockchaininfo if timeout is 0 (jl2012)
- #8244 1922e5a Remove unnecessary LOCK(cs\_main) in getrawmempool (dcousens)



## Block and transaction handling

- #7056 6a07208 Save last db read (morcos)
- #6842 0192806 Limitfreerelay edge case bugfix (ptschip)
- #7084 11d74f6 Replace maxFeeRate of 10000\*minRelayTxFee with max-TxFee in mempool (MarcoFalke)
- #7539 9f33dba Add tags to mempool's mapTx indices (sdaftuar)
- #7592 26a2a72 Re-remove ERROR logging for mempool rejects (laanwj)
- #7187 14d6324 Keep reorgs fast for SequenceLocks checks (morcos)
- #7594 01f4267 Mempool: Add tracking of ancestor packages (sdaftuar)
- #7904 fc9e334 Txdb: Fix assert crash in new UTXO set cursor (laanwj)
- #7927 f9c2ac7 Minor changes to dbwrapper to simplify support for other databases (laanwj)
- #7933 e26b620 Fix OOM when deserializing UTXO entries with invalid length (sipa)
- #8020 5e374f7 Use SipHash-2-4 for various non-cryptographic hashes (sipa)
- #8076 d720980 VerifyDB: don't check blocks that have been pruned (sdaftuar)
- #8080 862fd24 Do not use mempool for GETDATA for tx accepted after the last mempool req (gmaxwell)
- #7997 a82f033 Replace mapNextTx with slimmer setSpends (kazcw)
- #8220 1f86d64 Stop trimming when mapTx is empty (sipa)
- #8273 396f9d6 Bump -dbcache default to 300MiB (laanwj)
- #7225 eb33179 Eliminate unnecessary call to CheckBlock (sdaftuar)
- #7907 006cdf6 Optimize and Cleanup CScript::FindAndDelete (pstratem)
- #7917 239d419 Optimize reindex (sipa)
- #7763 3081fb9 Put hex-encoded version in UpdateTip (sipa)
- #8149 d612837 Testnet-only segregated witness (sipa)
- #8305 3730393 Improve handling of unconnecting headers (sdaftuar)
- #8363 fca1a41 Rename "block cost" to "block weight" (sdaftuar)
- #8381 f84ee3d Make witness v0 outputs non-standard (jl2012)
- #8364 3f65ba2 Treat high-sigop transactions as larger rather than rejecting them (sipa)

## P2P protocol and network code

- #6589 dc0305d Log bytes recv/sent per command (jonasschnelli)
- #7164 3b43cad Do not download transactions during initial blockchain sync (ptschip)
- #7458 898fedf peers.dat, banlist.dat recreated when missing (kirkalex)
- #7637 3da5d1b Fix memleak in TorController (laanwj, jonasschnelli)
- #7553 9f14e5a Remove vfReachable and modify IsReachable to only use vfLimited (pstratem)
- #7708 9426632 De-neuter NODE\_BLOOM (pstratem)
- #7692 29b2be6 Remove P2P alert system (btcdarak)

- #7542 c946a15 Implement “feefilter” P2P message (morcos)
- #7573 352fd57 Add `-maxtimeadjustment` command line option (mruddy)
- #7570 232592a Add IPv6 Link-Local Address Support (mruddy)
- #7874 e6a4d48 Improve AlreadyHave (morcos)
- #7856 64e71b3 Only send one GetAddr response per connection (gmaxwell)
- #7868 7daa3ad Split DNS resolving functionality out of net structures (theuni)
- #7919 7617682 Fix headers announcements edge case (sdaftuar)
- #7514 d9594bf Fix IsInitialBlockDownload for testnet (jmacwhyte)
- #7959 03cf6e8 fix race that could fail to persist a ban (kazcw)
- #7840 3b9a0bf Several performance and privacy improvements to inv/mempool handling (sipa)
- #8011 65aecda Don't run ThreadMessageHandler at lowered priority (kazcw)
- #7696 5c3f8dd Fix de-serialization bug where AddrMan is left corrupted (EthanHeilman)
- #7932 ed749bd CAddrMan::Deserialize handle corrupt serializations better (pstratem)
- #7906 83121cc Prerequisites for p2p encapsulation changes (theuni)
- #8033 18436d8 Fix Socks5() connect failures to be less noisy and less unnecessarily scary (wtogami)
- #8082 01d8359 Defer inserting into maprelay until just before relaying (gmaxwell)
- #7960 6a22373 Only use AddInventoryKnown for transactions (sdaftuar)
- #8078 2156fa2 Disable the mempool P2P command when bloom filters disabled (petertodd)
- #8065 67c91f8 Addrman offline attempts (gmaxwell)
- #7703 761cddb Tor: Change auth order to only use password auth if -torpassword (laanwj)
- #8083 cd0c513 Add support for dnsseeds with option to filter by servicebits (jonasschnelli)
- #8173 4286f43 Use SipHash for node eviction (sipa)
- #8154 1445835 Drop vAddrToSend after sending big addr message (kazcw)
- #7749 be9711e Enforce expected outbound services (sipa)
- #8208 0a64777 Do not set extra flags for unfiltered DNS seed results (sipa)
- #8084 e4bb4a8 Add recently accepted blocks and txn to AttemptToEvict-Connection (gmaxwell)
- #8113 3f89a53 Rework addnode behaviour (sipa)
- #8179 94ab58b Evict orphans which are included or precluded by accepted blocks (gmaxwell)
- #8068 e9d76a1 Compact Blocks (TheBlueMatt)
- #8204 0833894 Update petertodd's testnet seed (petertodd)
- #8247 5cd35d3 Mark my dnsseed as supporting filtering (sipa)
- #8275 042c323 Remove bad chain alert partition check (btcdtrak)
- #8271 1bc9c80 Do not send witnesses in cmpctblock (sipa)

- #8312 [ca40ef6](#) Fix mempool DoS vulnerability from malleated transactions (sdaftuar)
- #7180 [16ccb74](#) Account for `sendheaders verack` messages (laanwj)
- #8102 [425278d](#) Bugfix: use global `::fRelayTxes` instead of `CNode` in version send (sipa)
- #8408 [b7e2011](#) Prevent fingerprinting, disk-DoS with compact blocks (sdaftuar)

## Build system

- #7302 [41f1a3e](#) C++11 build/runtime fixes (theuni)
- #7322 [fd9356b](#) c++11: add scoped enum fallbacks to CPPFLAGS rather than defining them locally (theuni)
- #7441 [a6771fc](#) Use Debian 8.3 in gitian build guide (fanquake)
- #7349 [152a821](#) Build against system UniValue when available (luke-jr)
- #7520 [621940e](#) LibreSSL doesn't define OPENSSL\_VERSION, use LIBRESSL\_VERSION\_TEXT instead (paveljanik)
- #7528 [9b9bfce](#) autogen.sh: warn about needing autoconf if autoreconf is not found (knocte)
- #7504 [19324cf](#) Crystal clean make clean (paveljanik)
- #7619 [18b3f1b](#) Add missing sudo entry in gitian VM setup (btcdraK)
- #7616 [639ec58](#) [depends] Delete unused patches (MarcoFalke)
- #7658 [c15eb28](#) Add curl to Gitian setup instructions (btcdraK)
- #7710 [909b72b](#) [Depends] Bump miniupnpc and config.guess+sub (fanquake)
- #7723 [5131005](#) build: python 3 compatibility (laanwj)
- #7477 [28ad4d9](#) Fix quoting of copyright holders in configure.ac (domob1812)
- #7711 [a67bc5e](#) [build-aux] Update Boost & check macros to latest serials (fanquake)
- #7788 [4dc1b3a](#) Use relative paths instead of absolute paths in protoc calls (paveljanik)
- #7809 [bbd210d](#) depends: some base fixes/changes (theuni)
- #7603 [73fc922](#) Build System: Use PACKAGE\_TARNAME in NSIS script (JeremyRand)
- #7905 [187186b](#) test: move accounting\_tests and rpc\_wallet\_tests to wallet/test (laanwj)
- #7911 [351abf9](#) leveldb: integrate leveldb into our buildsystem (theuni)
- #7944 [a407807](#) Re-instate TARGET\_OS=linux in configure.ac. Removed by [351abf9e035](#) (randy-waterhouse)
- #7920 [c3e3cfb](#) Switch Travis to Trusty (theuni)
- #7954 [08b37c5](#) build: quiet annoying warnings without adding new ones (theuni)
- #7165 [06162f1](#) build: Enable C++11 in build, require C++11 compiler (laanwj)
- #7982 [559fbae](#) build: No need to check for leveldb atomics (theuni)

- #8002 f9b4582 [depends] Add -stdlib=libc++ to darwin CXX flags (fanquake)
- #7993 6a034ed [depends] Bump Freetype, ccache, ZeroMQ, miniupnpc, expat (fanquake)
- #8167 19ea173 Ship debug tarballs/zips with debug symbols (theuni)
- #8175 f0299d8 Add --disable-bench to config flags for windows (laanwj)
- #7283 fd9881a [gitian] Default reference\_datetime to commit author date (MarcoFalke)
- #8181 9201ce8 Get rid of CLIENT\_DATE (laanwj)
- #8133 fde0ac4 Finish up out-of-tree changes (theuni)
- #8188 65a9d7d Add armhf/aarch64 gitian builds (theuni)
- #8194 cca1c8c [gitian] set correct PATH for wrappers (MarcoFalke)
- #8198 5201614 Sync ax\_pthread with upstream draft4 (fanquake)
- #8210 12a541e [Qt] Bump to Qt5.6.1 (jonasschnelli)
- #8285 da50997 windows: Add testnet link to installer (laanwj)
- #8304 0cca2fe [travis] Update SDK\_URL (MarcoFalke)
- #8310 6ae20df Require boost for bench (theuni)
- #8315 2e51590 Don't require sudo for Linux (theuni)
- #8314 67caef6 Fix pkg-config issues for 0.13 (theuni)
- #8373 1fe7f40 Fix OSX non-deterministic dmg (theuni)
- #8358 cfd1280 Gbuild: Set memory explicitly (default is too low) (MarcoFalke)

## GUI

- #7154 00b4b8d Add InMemPool() info to transaction details (jonasschnelli)
- #7068 5f3c670 [RPC-Tests] add simple way to run rpc test over QT clients (jonasschnelli)
- #7218 a1c185b Fix misleading translation (MarcoFalke)
- #7214 be9a9a3 qt5: Use the fixed font the system recommends (MarcoFalke)
- #7256 08ab906 Add note to coin control dialog QT5 workaround (fanquake)
- #7255 e289807 Replace some instances of formatWithUnit with formatHtmlWithUnit (fanquake)
- #7317 3b57e9c Fix RPCTimerInterface ordering issue (jonasschnelli)
- #7327 c079d79 Transaction View: LastMonth calculation fixed (crowning-)
- #7334 e1060c5 coincontrol workaround is still needed in qt5.4 (fixed in qt5.5) (MarcoFalke)
- #7383 ae2db67 Rename “amount” to “requested amount” in receive coins table (jonasschnelli)
- #7396 cdcbc59 Add option to increase/decrease font size in the console window (jonasschnelli)
- #7437 9645218 Disable tab navigation for peers tables (Kefkious)
- #7604 354b03d build: Remove spurious dollar sign. Fixes #7189 (dooglus)
- #7605 7f001bd Remove openssl info from init/log and from Qt debug

- window (jonasschnelli)
- #7628 87d6562 Add ‘copy full transaction details’ option (ericshawlinux)
- #7613 3798e5d Add autocomplete to bitcoin-qt’s console window (GamerSg)
- #7668 b24266c Fix history deletion bug after font size change (achow101)
- #7680 41d2dfa Remove reflection from **about** icon (laanwj)
- #7686 f034bce Remove 0-fee from send dialog (MarcoFalke)
- #7506 b88e0b0 Use CCoinControl selection in CWallet::FundTransaction (promag)
- #7732 0b98dd7 Debug window: replace “Build date” with “Datadir” (jonasschnelli)
- #7761 60db51d remove trailing output-index from transaction-id (jonasschnelli)
- #7772 6383268 Clear the input line after activating autocomplete (pavel-janik)
- #7925 f604bf6 Fix out-of-tree GUI builds (laanwj)
- #7939 574ddc6 Make it possible to show details for multiple transactions (laanwj)
- #8012 b33824b Delay user confirmation of send (Tyler-Hardin)
- #8006 7c8558d Add option to disable the system tray icon (Tyler-Hardin)
- #8046 169d379 Fix Cmd-Q / Menu Quit shutdown on OSX (jonasschnelli)
- #8042 6929711 Don’t allow to open the debug window during splashscreen & verification state (jonasschnelli)
- #8014 77b49ac Sort transactions by date (Tyler-Hardin)
- #8073 eb2f6f7 askpassphrasedialog: Clear pass fields on accept (rat4)
- #8129 ee1533e Fix RPC console auto completer (UdjinM6)
- #7636 fb0ac48 Add bitcoin address label to request payment QR code (makevoid)
- #8231 760a6c7 Fix a bug where the SplashScreen will not be hidden during startup (jonasschnelli)
- #8256 af2421c BUG: bitcoin-qt crash (fsb4000)
- #8257 ff03c50 Do not ask a UI question from bitcoind (sipa)
- #8288 91abb77 Network-specific example address (laanwj)
- #7707 a914968 UI support for abandoned transactions (jonasschnelli)
- #8207 f7a403b Add a link to the Bitcoin-Core repository and website to the About Dialog (MarcoFalke)
- #8281 6a87eb0 Remove client name from debug window (laanwj)
- #8407 45eba4b Add dbcache migration path (jonasschnelli)

## Wallet

- #7262 fc08994 Reduce inefficiency of GetAccountAddress() (dooglus)
- #7537 78e81b0 Warn on unexpected EOF while salvaging wallet (laanwj)
- #7521 3368895 Don’t resend wallet txs that aren’t in our own mempool (morcos)
- #7576 86a1ec5 Move wallet help string creation to CWallet (jonasschnelli)

- #7577 5b3b5a7 Move “load wallet phase” to CWallet (jonasschnelli)
- #7608 0735c0c Move hardcoded file name out of log messages (MarcoFalke)
- #7649 4900641 Prevent multiple calls to CWallet::AvailableCoins (promag)
- #7646 e5c3511 Fix lockunspent help message (promag)
- #7558 b35a591 Add import/removeprunedfunds rpc call (instagibbs)
- #6215 48c5adf add bip32 pub key serialization (jonasschnelli)
- #7913 bafd075 Fix for incorrect locking in GetPubKey() (keystore.cpp) (yurizhykin)
- #8036 41138f9 init: Move BerkeleyDB version reporting to wallet (laanwj)
- #8028 373b50d Fix insanity of CWalletDB::WriteTx and CWalletTx::WriteToDisk (pstratem)
- #8061 f6b7df3 Improve Wallet encapsulation (pstratem)
- #7891 950be19 Always require OS randomness when generating secret keys (sipa)
- #7689 b89ef13 Replace OpenSSL AES with ctaes-based version (sipa)
- #7825 f972b04 Prevent multiple calls to ExtractDestination (pedrobranco)
- #8137 243ac0c Improve CWallet API with new AccountMove function (pstratem)
- #8142 52c3f34 Improve CWallet API with new GetAccountPubkey function (pstratem)
- #8035 b67a472 Add simplest BIP32/deterministic key generation implementation (jonasschnelli)
- #7687 a6ddb19 Stop treating importaddress’ed scripts as change (sipa)
- #8298 aef3811 wallet: Revert input selection post-pruning (laanwj)
- #8324 bc94b87 Keep HD seed during salvagewallet (jonasschnelli)
- #8323 238300b Add HD keypath to CKeyMetadata, report metadata in validateaddress (jonasschnelli)
- #8367 3b38a6a Ensure <0.13 clients can’t open HD wallets (jonasschnelli)
- #8378 ebea651 Move SetMinVersion for FEATURE\_HD to SetHDMasterKey (pstratem)
- #8390 73adfe3 Correct hdmasterkeyid/masterkeyid name confusion (jonasschnelli)
- #8206 18b8ee1 Add HD xpriv to dumpwallet (jonasschnelli)
- #8389 c3c82c4 Create a new HD seed after encrypting the wallet (jonasschnelli)

## Tests and QA

- #7320 d3dfc6d Test walletpassphrase timeout (MarcoFalke)
- #7208 47c5ed1 Make max tip age an option instead of chainparam (laanwj)
- #7372 21376af Trivial: [qa] wallet: Print maintenance (MarcoFalke)
- #7280 668906f [travis] Fail when documentation is outdated (MarcoFalke)
- #7177 93b0576 [qa] Change default block priority size to 0 (MarcoFalke)
- #7236 02676c5 Use createrawtx locktime parm in txn\_clone (dgenr8)
- #7212 326ffed Adds unittests for CAddrMan and CAddrinfo, removes source of non-determinism (EthanHeilman)

- #7490 d007511 tests: Remove May15 test (laanwj)
- #7531 18cb2d5 Add bip68-sequence.py to extended rpc tests (btcdarak)
- #7536 ce5fc02 test: test leading spaces for ParseHex (laanwj)
- #7620 1b68de3 [travis] Only run check-doc.py once (MarcoFalke)
- #7455 7f96671 [travis] Exit early when check-doc.py fails (MarcoFalke)
- #7667 56d2c4e Move GetTempPath() to testutil (musalbas)
- #7517 f1ca891 test: script\_error checking in script\_invalid tests (laanwj)
- #7684 3d0dfdb Extend tests (MarcoFalke)
- #7697 622fe6c Tests: make prioritise\_transaction.py more robust (sdaftuar)
- #7709 efde86b Tests: fix missing import in mempool\_packages (sdaftuar)
- #7702 29e1131 Add tests verifychain, lockunspent, getbalance, listsinceblock (MarcoFalke)
- #7720 3b4324b rpc-test: Normalize assert() (MarcoFalke)
- #7757 26794d4 wallet: Wait for reindex to catch up (MarcoFalke)
- #7764 a65b36c Don't run pruning.py twice (MarcoFalke)
- #7773 7c80e72 Fix comments in tests (btcdarak)
- #7489 e9723cb tests: Make proxy\_test work on travis servers without IPv6 (laanwj)
- #7801 70ac71b Remove misleading "errorString syntax" (MarcoFalke)
- #7803 401c65c maxblocksinfliht: Actually enable test (MarcoFalke)
- #7802 3bc71e1 httpbasics: Actually test second connection (MarcoFalke)
- #7849 ab8586e tests: add varints\_bitpatterns test (laanwj)
- #7846 491171f Clean up lockorder data of destroyed mutexes (sipa)
- #7853 6ef5e00 py2: Unfiddle strings into bytes explicitly (MarcoFalke)
- #7878 53adc83 [test] bctest.py: Revert faa41ee (MarcoFalke)
- #7798 cabba24 [travis] Print the commit which was evaluated (MarcoFalke)
- #7833 b1bf511 tests: Check Content-Type header returned from RPC server (laanwj)
- #7851 fa9d86f pull-tester: Don't mute zmq ImportError (MarcoFalke)
- #7822 0e6fd5e Add listunspent() test for spendable/unspendable UTXO (jpdfonseca)
- #7912 59ad568 Tests: Fix deserialization of reject messages (sdaftuar)
- #7941 0ea3941 Fixing comment in script\_test.json test case (Christewart)
- #7807 0ad1041 Fixed miner test values, gave constants for less error-prone values (instagibbs)
- #7980 88b77c7 Smartfees: Properly use ordered dict (MarcoFalke)
- #7814 77b637f Switch to py3 (MarcoFalke)
- #8030 409a8a1 Revert fatal-ness of missing python-zmq (laanwj)
- #8018 3e90fe6 Autofind rpc tests -srcdir (jonasschnelli)
- #8016 5767e80 Fix multithread CScheduler and reenale test (paveljanik)
- #7972 423ca30 pull-tester: Run rpc test in parallel (MarcoFalke)
- #8039 69b3a6d Bench: Add crypto hash benchmarks (laanwj)
- #8041 5b736dd Fix bip9-softforks blockstore issue (MarcoFalke)
- #7994 1f01443 Add op csv tests to script\_tests.json (Christewart)
- #8038 e2bf830 Various minor fixes (MarcoFalke)

- #8072 1b87e5b Travis: ‘make check’ in parallel and verbose (theuni)
- #8056 8844ef1 Remove hardcoded “4 nodes” from test\_framework (MarcoFalke)
- #8047 37f9a1f Test\_framework: Set wait-timeout for bitcoind proc (MarcoFalke)
- #8095 6700cc9 Test framework: only cleanup on successful test runs (sdaftuar)
- #8098 06bd4f6 Test\_framework: Append portseed to tmpdir (MarcoFalke)
- #8104 6ff2c8d Add timeout to sync\_blocks() and sync\_mempools() (sdaftuar)
- #8111 61b8684 Benchmark SipHash (sipa)
- #8107 52b803e Bench: Added base58 encoding/decoding benchmarks (yurizhykin)
- #8115 0026e0e Avoid integer division in the benchmark inner-most loop (gmaxwell)
- #8090 a2df115 Adding P2SH(p2pkh) script test case (Christewart)
- #7992 ec45cc5 Extend #7956 with one more test (TheBlueMatt)
- #8139 ae5575b Fix interrupted HTTP RPC connection workaround for Python 3.5+ (sipa)
- #8164 0f24eaf [Bitcoin-Tx] fix missing test fixtures, fix 32bit atoi issue (jonasschnelli)
- #8166 0b5279f Src/test: Do not shadow local variables (paveljanik)
- #8141 44c1b1c Continuing port of java comparison tool (mrbandrews)
- #8201 36b7400 fundrawtransaction: Fix race, assert amounts (MarcoFalke)
- #8214 ed2cd59 Mininode: fail on send\_message instead of silent return (MarcoFalke)
- #8215 a072d1a Don’t use floating point in wallet tests (MarcoFalke)
- #8066 65c2058 Test\_framework: Use different rpc\_auth\_pair for each node (MarcoFalke)
- #8216 0d41d70 Assert ‘changePosition out of bounds’ (MarcoFalke)
- #8222 961893f Enable mempool consistency checks in unit tests (sipa)
- #7751 84370d5 test\_framework: python3.4 authproxy compat (laanwj)
- #7744 d8e862a test\_framework: detect failure of bitcoind startup (laanwj)
- #8280 115735d Increase sync\_blocks() timeouts in pruning.py (MarcoFalke)
- #8340 af9b7a9 Solve trivial merge conflict in p2p-segwit.py (MarcoFalke)
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- #7951 5c7df70 Test\_framework: Properly print exception (MarcoFalke)
- #8070 7771aa5 Remove non-determinism which is breaking net\_tests #8069 (EthanHeilman)
- #8309 bb2646a Add wallet-hd test (MarcoFalke)
- #8444 cd0910b Fix p2p-feefilter.py for changed tx relay behavior (sdaftuar)



## Mining

- #7507 11c7699 Remove internal miner (Leviathn)
- #7663 c87f51e Make the generate RPC call function for non-regtest (sipa)
- #7671 e2ebd25 Add generatetoaddress RPC to mine to an address (achow101)
- #7935 66ed450 Versionbits: GBT support (luke-jr)
- #7600 66db2d6 Select transactions using feerate-with-ancestors (sdaftuar)
- #8295 f5660d3 Mining-related fixups for 0.13.0 (sdaftuar)
- #7796 536b75e Add support for negative fee rates, fixes `prioritizetransaction` (MarcoFalke)
- #8362 86edc20 Scale legacy sigop count in CreateNewBlock (sdaftuar)
- #8489 8b0eee6 Bugfix: Use pre-BIP141 sigops until segwit activates (GBT) (luke-jr)

## Documentation and miscellaneous

- #7423 69e2a40 Add example for building with constrained resources (jarret)
- #8254 c2c69ed Add OSX ZMQ requirement to QA readme (fanquake)
- #8203 377d131 Clarify documentation for running a tor node (nathaniel-mahieu)
- #7428 4b12266 Add example for listing ./configure flags (nathaniel-mahieu)
- #7847 3eae681 Add arch linux build example (mruddy)
- #7968 ff69aaf Fedora build requirements (wtogami)
- #8013 fbcd09 Fedora build requirements, add gcc-c++ and fix typo (wtogami)
- #8009 fbd8478 Fixed invalid example paths in gitian-building.md (JeremyRand)
- #8240 63fbdbc Mention Windows XP end of support in release notes (laanwj)
- #8303 5077d2c Update bips.md for CSV softfork (fanquake)
- #7789 e0b3e19 Add note about using the Qt official binary installer (paveljanik)
- #7791 e30a5b0 Change Precise to Trusty in gitian-building.md (JeremyRand)
- #7838 8bb5d3d Update gitian build guide to debian 8.4.0 (fanquake)
- #7855 b778e59 Replace precise with trusty (MarcoFalke)
- #7975 fc23fee Update bitcoin-core GitHub links (MarcoFalke)
- #8034 e3a8207 Add basic git squash workflow (fanquake)
- #7813 214ec0b Update port in tor.md (MarcoFalke)
- #8193 37c9830 Use Debian 8.5 in the gitian-build guide (fanquake)
- #8261 3685e0c Clarify help for `getblockchaininfo` (paveljanik)
- #7185 ea0f5a2 Note that reviewers should mention the id of the commits they reviewed (pstratem)

- #7290 c851d8d [init] Add missing help for args (MarcoFalke)
- #7281 f9fd4c2 Improve CheckInputs() comment about sig verification (petertodd)
- #7417 1e06bab Minor improvements to the release process (PRabahy)
- #7444 4cbbd42 Improve block validity/ConnectBlock() comments (peter-todd)
- #7527 db2e1c0 Fix and cleanup listreceivedbyX documentation (instagibbs)
- #7541 b6e00af Clarify description of blockindex (pinheadmz)
- #7590 f06af57 Improving wording related to Boost library requirements [updated] (jonathancross)
- #7635 0fa88ef Add dependency info to test docs (elliottolds)
- #7609 3ba07bd RPM spec file project (AliceWonderMiscreations)
- #7850 229a17c Removed call to TryCreateDirectory from GetDefaultDataDir in src/util.cpp (alexreg)
- #7888 ec870e1 Prevector: fix 2 bugs in currently unreachable code paths (kazcw)
- #7922 90653bc CBase58Data::SetString: cleanse the full vector (kazcw)
- #7881 c4e8390 Update release process (laanwj)
- #7952 a9c8b74 Log invalid block hash to make debugging easier (pavel-janik)
- #7974 8206835 More comments on the design of AttemptToEvictConnection (gmaxwell)
- #7795 47a7cfb UpdateTip: log only one line at most per block (laanwj)
- #8110 e7e25ea Add benchmarking notes (fanquake)
- #8121 58f0c92 Update implemented BIPs list (fanquake)
- #8029 58725ba Simplify OS X build notes (fanquake)
- #8143 d46b8b5 comment nit: miners don't vote (instagibbs)
- #8136 22e0b35 Log/report in 10% steps during VerifyDB (jonasschnelli)
- #8168 d366185 util: Add ParseUInt32 and ParseUInt64 (laanwj)
- #8178 f7b1bfc Add git and github tips and tricks to developer notes (sipa)
- #8177 67db011 developer notes: updates for C++11 (kazcw)
- #8229 8ccdac1 [Doc] Update OS X build notes for 10.11 SDK (fanquake)
- #8233 9f1807a Mention Linux ARM executables in release process and notes (laanwj)
- #7540 ff46dd4 Rename OP\_NOP3 to OP\_CHECKSEQUENCEVERIFY (btcdrak)
- #8289 26316ff bash-completion: Adapt for 0.12 and 0.13 (roques)
- #7453 3dc3149 Missing patches from 0.12 (MarcoFalke)
- #7113 54a550b Switch to a more efficient rolling Bloom filter (sipa)
- #7257 de9e5ea Combine common error strings for different options so translations can be shared and reused (luke-jr)
- #7304 b8f485c [contrib] Add clang-format-diff.py (MarcoFalke)
- #7378 e6f97ef devtools: replace github-merge with python version (laanwj)

- #7395 0893705 devtools: show pull and commit information in github-merge (laanwj)
- #7402 6a5932b devtools: github-merge get toplevel dir without extra whitespace (achow101)
- #7425 20a408c devtools: Fix utf-8 support in messages for github-merge (laanwj)
- #7632 409f843 Delete outdated test-patches reference (Lewuathe)
- #7662 386f438 remove unused NOBLKS\_VERSION\_{START,END} constants (rat4)
- #7737 aa0d2b2 devtools: make github-merge.py use py3 (laanwj)
- #7781 55db5f0 devtools: Auto-set branch to merge to in github-merge (laanwj)
- #7934 f17032f Improve rolling bloom filter performance and benchmark (sipa)
- #8004 2efe38b signal handling: fReopenDebugLog and fRequestShutdown should be type sig\_atomic\_t (catilac)
- #7713 f6598df Fixes for verify-commits script (petertodd)
- #8412 8360d5b libconsensus: Expose a flag for BIP112 (jtimon)

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