

A Monero Data Model and API Specification

*with implementations in Java, JavaScript, and C++
using monero v0.16.0.0 'Nitrogen Nebula'*

Last revised June 04, 2020



Java implementation: <https://github.com/monero-ecosystem/monero-java>

JavaScript implementation: <https://github.com/monero-ecosystem/monero-javascript>

C++ implementation: <https://github.com/monero-ecosystem/monero-cpp>

This document's source: <https://github.com/monero-ecosystem/monero-java/blob/master/monero-spec.xml>

This document created and revisable using: <https://www.draw.io/>

Monero Daemon Interface 1/2

isConnected(): bool

getVersion(): MoneroVersion

isTrusted(): bool

getHeight(): ulong

getBlockHash(ulong height): string

getBlockTemplate(string walletAddress, uint reserveSize=null): MoneroBlockTemplate

getLastBlockHeader(): MoneroBlockHeader

getBlockHeaderByHash(string blockHash): MoneroBlockHeader

getBlockHeaderByHeight(ulong height): MoneroBlockHeader

getBlockHeadersByRange(ulong startHeight=0, ulong endHeight=chainHeight): MoneroBlockHeader[]

getBlockByHash(string blockHash): MoneroBlock

getBlocksByHash(string[] blockHashes, ulong startHeight, bool prune=false): MoneroBlock[]

getBlockByHeight(ulong height): MoneroBlock

getBlocksByHeight(ulong[] heights): MoneroBlock[]

getBlocksByRange(ulong startHeight=0, ulong endHeight=chainHeight): MoneroBlock[]

getBlocksByRangeChunked(ulong startHeight=0, ulong endHeight=chainHeight, ulong maxChunkSize=3000000): MoneroBlock[]

getBlockHashes(string[] blockHashes, ulong startHeight): string[]

getTx(string txHash, bool prune=false): MoneroTx

getTxs(string[] txHashes, bool prune=false): MoneroTx[]

getTxHex(string txHash, bool prune=false): string

getTxHexes(string[] txHashes, bool prune=false): string[]

getMinerTxSum(ulong height, ulong numBlocks=chainHeight): MoneroMinerTxSum

getFeeEstimate(ulong graceBlocks=?): ulong

submitTxHex(string txHex, bool doNotRelay=false): MoneroSubmitTxResult

relayTxByHash(string txHash): void

relayTxByHash(string[] txHashes): void

getTxPool(): MoneroTx[]

getTxPoolHashes(): string[]

getTxPoolBacklog(): MoneroTxBacklogEntry[]

getTxPoolStats(): MoneroTxPoolStats

flushTxPool(string[] txHashes=null): void

getKeyImageSpentStatus(string keyImage): MoneroKeyImageSpentStatus

getKeyImageSpentStatuses(string[] keyImages): MoneroKeyImageSpentStatus[]

getOutputs(MoneroOutput[] outputs): MoneroOutput[]

getInfo(): MoneroDaemonInfo

getSyncInfo(): MoneroDaemonSyncInfo

getHardForkInfo(): MoneroHardForkInfo

Monero Daemon Intereface 2/2

getAltChains(): MoneroAltChain[]
getAltBlockHashes(): string[]
getDownloadLimit(): uint
setDowloadLimit(uint limit): uint
resetDownloadLimit(): uint
getUploadLimit(): uint
setUploadLimit(uint): uint
resetUploadLimit(): uint
getKnownPeers(): MoneroDaemonPeer[]
getConnections(): MoneroDaemonConnection[]
setOutgoingPeerLimit(uint limit): void
setIncomingPeerLimit(uint limit): void
getPeerBans(): MoneroBan[]
setPeerBan(MoneroBan ban): void
setPeerBans(MoneroBan[] bans): void
getOutputDistribution(ulong[] amounts, bool isCumulative, ulong startHeight=0, ulong endHeight=chainHeight):
 MoneroOutputDistributionEntry[]
getOutputHistogram(ulong[] amounts, ulong minCount, ulong maxCount, bool isUnlocked, ulong recentCutoff):
 MoneroOutputHistogramEntry[]
startMining(string address, ulong numThreads=null, bool isBackground=false, bool ignoreBattery=false): void
stopMining(): void
getMiningStatus(): MoneroMiningStatus
submitBlock(string blockBlob): void
submitBlocks(string[] blockBlobs): void
checkForUpdate(): MoneroDaemonUpdateCheckResult
downloadUpdate(string path): MoneroDaemonUpdateDownloadResult
getNextBlockHeader(): MoneroBlockHeader
addListener(MoneroDaemonListener listener): void
removeListener(MoneroDaemonListener listener): void
stop(): void

Monero Daemon Types 1/3

| MoneroBlockHeader |
|------------------------------|
| hash: string |
| height: ulong |
| timestamp: ulong |
| size: ulong |
| weight: ulong |
| long_term_weight: ulong |
| depth: ulong |
| difficulty: ulong |
| cumulative_difficulty: ulong |
| major_version: uint |
| minor_version: uint |
| nonce: uint |
| miner_tx_hash: string |
| num_txs: uint |
| orphan_status: bool |
| prev_hash: string |
| reward: ulong |
| pow_hash: string |



| MoneroBlock |
|---------------------|
| hex: string |
| miner_tx: MoneroTx |
| txs: MoneroTx[] |
| tx_hashes: string[] |

| MoneroOutput |
|-----------------------------|
| tx: MoneroTx |
| key_image: MoneroKeyImage |
| amount: ulong |
| index: uint |
| ring_output_indices: uint[] |
| stealth_public_key: string |

| MoneroDaemonInfo |
|----------------------------------|
| version: string |
| num_alt_blocks: ulong |
| block_size_limit: ulong |
| block_size_median: ulong |
| block_weight_limit: ulong |
| block_weight_median: ulong |
| bootstrap_daemon_address: string |
| difficulty: ulong |
| cumulative_difficulty: ulong |
| free_space: ulong |
| num_offline_peers: uint |
| num_online_peers: uint |
| height: ulong |
| height_without_bootstrap: ulong |
| network_type: MoneroNetworkType |
| is_offline: bool |
| num_incoming_connections: uint |
| num_outgoing_connections: uint |
| num_rpc_connections: uint |
| start_timestamp: ulong |
| target: ulong |
| target_height: ulong |
| top_block_hash: string |
| num_txs: uint |
| num_txs_pool: uint |
| was_bootstrap_ever_used: bool |
| database_size: uint |
| update_available: bool |
| credits: ulong |

| <enumeration> MoneroNetworkType |
|------------------------------------|
| mainnet: 0 |
| testnet: 1 |
| stagenet: 2 |

| MoneroTx |
|-------------------------------|
| block: MoneroBlock |
| height: ulong |
| hash: string |
| version: uint |
| is_coinbase: bool |
| payment_id: string |
| fee: ulong |
| ring_size: uint |
| do_not_relay: bool |
| is_relayed: bool |
| is_confirmed: bool |
| in_tx_pool: bool |
| num_confirmations: ulong |
| unlock_time: ulong |
| last_relayed_timestamp: ulong |
| received_timestamp: ulong |
| is_double_spend: bool |
| key: string |
| full_hex: string |
| pruned_hex: string |
| prunable_hex: string |
| prunable_hash: string |
| size: ulong |
| weight: ulong |
| inputs: MoneroOutput[] |
| outputs: MoneroOutput[] |
| output_indices: uint[] |
| metadata: string |
| extra: uint[] |
| rct_signatures: string[] |
| rct_sig_prunable: ? |
| is_kept_by_block: bool |
| is_failed: bool |
| last_failed_height: ulong |
| last_failed_hash: string |
| max_used_block_height: ulong |

Monero Daemon Types 2/3

| |
|-----------------------------|
| max_used_block_hash: string |
| signatures: string[] |

| MoneroDaemonSyncInfo |
|---------------------------------------|
| height: ulong |
| connections: MoneroDaemonConnection[] |
| spans: MoneroDaemonConnectionSpan[] |
| target_height: ulong |
| next_needed_pruning_seed: uint |
| overview: ? |

| MoneroDaemonConnection |
|--------------------------|
| peer: MoneroDaemonPeer |
| id: string |
| avg_download: ulong |
| avg_upload: ulong |
| current_download: ulong |
| current_upload: ulong |
| height: ulong |
| is_incoming: bool |
| live_time: ulong |
| is_local_ip: bool |
| is_local_host: bool |
| num_receives: uint |
| num_sends: uint |
| receive_idle_time: ulong |
| send_idle_time: ulong |
| state: string |
| num_support_flags: uint |
| type: ConnectionType |

| MoneroDaemonConnectionSpan |
|----------------------------|
| connection_id: string |
| num_blocks: ulong |
| remote_address: string |
| rate: ulong |
| speed: ulong |
| size: ulong |
| start_block_height: ulong |

| MoneroDaemonListener |
|---|
| onBlockHeader(MoneroBlockHeader header): void |

| MoneroKeyImage |
|-------------------|
| hex: string |
| signature: string |

| <enumeration> MoneroKeyImageSpentStatus |
|--|
| not_spent: 0 |
| confirmed: 1 |
| tx_pool: 2 |

| MoneroSubmitTxResult |
|----------------------------|
| is_good: bool |
| is_relayed: bool |
| is_double_spend_seen: bool |
| is_fee_too_low: bool |
| is_mixin_too_low: bool |
| has_invalid_input: bool |
| has_invalid_output: bool |
| has_too_few_outputs: bool |
| is_rct: bool |
| is_overspend: bool |
| is_too_big: bool |
| sanity_check_failed: bool |
| reason: string |
| credits: ulong |
| top_block_hash: string |

| MoneroDaemonPeer |
|-----------------------------|
| id: string |
| address: string |
| host: string |
| port: uint |
| is_online: boolean |
| last_seen_timestamp: ulong |
| pruning_seed: uint |
| rpc_port: uint |
| rpc_credits_per_hash: ulong |

| MoneroBan |
|-----------------|
| host: string |
| ip: string |
| is_banned: bool |
| seconds: ulong |

| MoneroBlockTemplate |
|-----------------------------|
| block_template_blob: string |
| block_hashing_blob: string |
| difficulty: ulong |
| expected_reward: ulong |
| height: ulong |
| prev_hash: string |
| reserved_offset: ulong |
| seed_height: ulong |
| seed_hash: string |
| next_seed_hash: string |

Monero Daemon Types 3/3

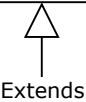
| MoneroHardForkInfo |
|------------------------|
| earliest_height: ulong |
| is_enabled: bool |
| state: uint |
| threshold: uint |
| version: string |
| num_votes: uint |
| window: uint |
| voting: uint |
| credits: ulong |
| top_block_hash: string |

| MoneroVersion |
|------------------|
| number: uint |
| is_release: bool |

| <enumeration> ConnectionType |
|---------------------------------|
| invalid: 0 |
| ipv4: 1 |
| ipv6: 2 |
| tor: 3 |
| i2p: 4 |

| MoneroDaemonUpdateCheckResult |
|-------------------------------|
| is_update_available: bool |
| version: string |
| hash: string |
| auto_uri: string |
| user_uri: string |

| MoneroDaemonUpdateDownloadResult |
|----------------------------------|
| download_path: string |



| MoneroMinerTxSum |
|---------------------|
| emission_sum: ulong |
| fee_sum: ulong |

| MoneroMiningStatus |
|---------------------|
| is_active: bool |
| is_background: bool |
| address: string |
| speed: ulong |
| num_threads: uint |

| MoneroOutputHistogramEntry |
|-------------------------------|
| amount: ulong |
| num_instances: ulong |
| num_unlocked_instances: ulong |
| num_recent_instances: ulong |

| MoneroTxPoolStats |
|-------------------------|
| num_txs: uint |
| num_not_relayed: uint |
| num_failing: uint |
| num_double_spends: uint |
| num_10m: uint |
| fee_total: ulong |
| bytes_max: ulong |
| bytes_med: ulong |
| bytes_min: ulong |
| bytes_total: ulong |
| histo: ? |
| histo_98pc: ulong |
| oldest_timestamp: ulong |

| MoneroAltChain |
|--------------------------------------|
| block_hashes: string[] |
| difficulty: ulong |
| height: ulong |
| length: ulong |
| main_chain_parent_block_hash: string |

Monero Wallet Interface 1/3

```
isViewOnly(): bool
setDaemonConnection(MoneroDaemonConnection connection): void
getDaemonConnection(): MoneroDaemonConnection
isConnected(): bool
getVersion(): MoneroVersion
getNetworkType(): MoneroNetworkType
getPath(): string
getMnemonic(): string
getMnemonicLanguage(): string
getMnemonicLanguages(): string[]
getPrivateSpendKey(): string
getPrivateViewKey(): string
getPublicSpendKey(): string
getPublicViewKey(): string
getPrimaryAddress(): string
getAddress(uint accountId, uint subaddressIdx): string
getAddressIndex(string address): MoneroSubaddress
getDaemonConnection(): MoneroRpcConnection
getHeight(): ulong
getDaemonHeight(): ulong
getDaemonMaxPeerHeight(): ulong
getApproximateChainHeight(): ulong
sync(ulong startHeight=null, MoneroSyncListener listener=null): MoneroSyncResult
startSyncing(): void
stopSyncing(): void
rescanSpent(): void
rescanBlockchain(): void
getBalance(uint accountId=null, uint subaddressIdx=null): ulong
getUnlockedBalance(uint accountId=null, uint subaddressIdx=null): ulong
getAccounts(bool includeSubaddresses=false, string tag=null): MoneroAccount[]
getAccount(uint accountId, bool includeSubaddresses=false): MoneroAccount
createAccount(string label=null): void
getSubaddresses(uint accountId, uint[] subaddressIndices): void
getSubaddress(uint accountId, uint subaddressIdx): MoneroSubaddress
createSubaddress(uint accountId, string label=null): MoneroSubaddress
getTx(string txId): MoneroTxWallet
getTxs(MoneroTxQuery query=null): MoneroTxWallet[]
getTransfers(uint accountId=null, uint subaddressIdx=null): MoneroTransfer[]
```

Monero Wallet Interface 2/3

```
getOutputs(MoneroOutputQuery query=null): MoneroOutputWallet[]
getOutgoingTransfers(MoneroTransferQuery query=null): MoneroOutgoingTransfer[]
getIncomingTransfers(MoneroTransferQuery query=null): MoneroIncomingTransfer[]
getTransfers(MoneroTransferQuery query=null): void
getKeyImages(): MoneroKeyImage[]
importOutputsHex(string outputsHex): uint
getOutputsHex(): string
importKeyImages(MoneroKeyImage[] keyImages): MoneroKeyImageImportResult
getNewKeyImagesFromLastImport(): MoneroKeyImage[]
createTx(MoneroTxConfig config): MoneroTxWallet
createTxs(MoneroTxConfig config): MoneroTxWallet[]
sweepOutput(MoneroTxConfig config): MoneroTxWallet
sweepUnlocked(MoneroTxConfig config): MoneroTxWallet[]
sweepDust(bool relay=false): MoneroTxWallet[]
relayTx(string txMetadata): string
relayTx(MoneroTxWallet tx): string
relayTxs(string[] txMetadatas): string[]
relayTxs(MoneroTxWallet[] txs): string[]
parseTxSet(MoneroTxSet txSet): MoneroTxSet
signTxs(string unsignedTxHex): string
submitTxs(string signedTxHex): string[]
signMessage(string message): string
verifyMessage(string message, string address, string signature): bool
getTxKey(string txId): string
checkTxKey(string txId, string txKey, string address): MoneroCheckTx
getTxProof(String txId, string address, string message=null): string
checkTxProof(string txId, string address, string message, string signature): MoneroCheckTx
getSpendProof(string txId, string message=null): string
checkSpendProof(string txId, string message, string signature): bool
```


Monero Wallet Interface 3/3

getReserveProofWallet(string message): string

getReserveProofAccount(uint accountId, ulong amount, string message): string

checkReserveProof(string address, string message, string signature): MoneroCheckReserve

setTxNotes(string[] txHashes, string[] notes): void

setTxNote(string txHash, string note): void

getTxNotes(string[] txHashes): string[]

getTxNote(string txHash): string

getAddressBookEntries(uint[] entryIndices=null): MoneroAddressBookEntry[]

addAddressBookEntry(string address, string description): uint

editAddressBookEntry(uint entryIdx, bool setAddress, string address, bool setDescription, string description): void

deleteAddressBookEntry(uint entryIdx): void

tagAccounts(string tag, uint[] accountIndices): void

untagAccounts(uint[] accountIndices): void

getAccountTags(): MoneroAccountTag[]

setAccountTagLabel(string tag, string label): void

createPaymentUri(MoneroSendRequest request): string

parsePaymentUri(string uri): MoneroSendRequest

getAttribute(string key): string

setAttribute(string key, string val): void

startMining(uint numThreads=null, bool backgroundMining=false, bool ignoreBattery=true): void

stopMining(): void

isMultisigImportNeeded(): bool

isMultisig(): bool

getMultisigInfo(): MoneroMultisigInfo

prepareMultisig(): string

makeMultisig(string[] multisigHexes, uint threshold, string password): MoneroMultisigInitResult

exchangeMultisigKeys(string[] multisigHexes, string password): MoneroMultisigInitResult

getMultisigHex(): string

importMultisigHex(string[] multisigHexes): uint

signMultisigTxHex(string multisigTxHex): MoneroMultisigSignResult

submitMultisig(string signedMultisigHex): string[]

moveTo(string path, string password): void

save(): void

close(bool save=false): void

isClosed(): bool

getIntegratedAddress(string paymentId=null): MoneroIntegratedAddress (deprecated)

decodeIntegratedAddress(string integratedAddress): MoneroIntegratedAddress (deprecated)

Monero Wallet Types 1/3 - Send Request and Queries for Transactions, Transfers, and Outputs

| MoneroTxConfig |
|-----------------------------------|
| address: string |
| amount: ulong |
| destinations: MoneroDestination[] |
| payment_id: string |
| priority: MoneroTxPriority |
| fee: ulong |
| account_index: uint |
| subaddress_index: uint |
| subaddress_indices: uint[] |
| unlock_time: ulong |
| can_split: bool |
| relay: bool |
| note: string |
| recipient_name: string |
| below_amount: ulong |
| sweep_each_subaddress: bool |
| key_image: string |

Configures creating transactions to send funds.

| MoneroOutputQuery extends MoneroOutputWallet |
|--|
| subaddress_indices: uint[] |
| tx_query: MoneroTxQuery |
| min_amount: ulong |
| max_amount: ulong |

Configures a query to get wallet outputs.

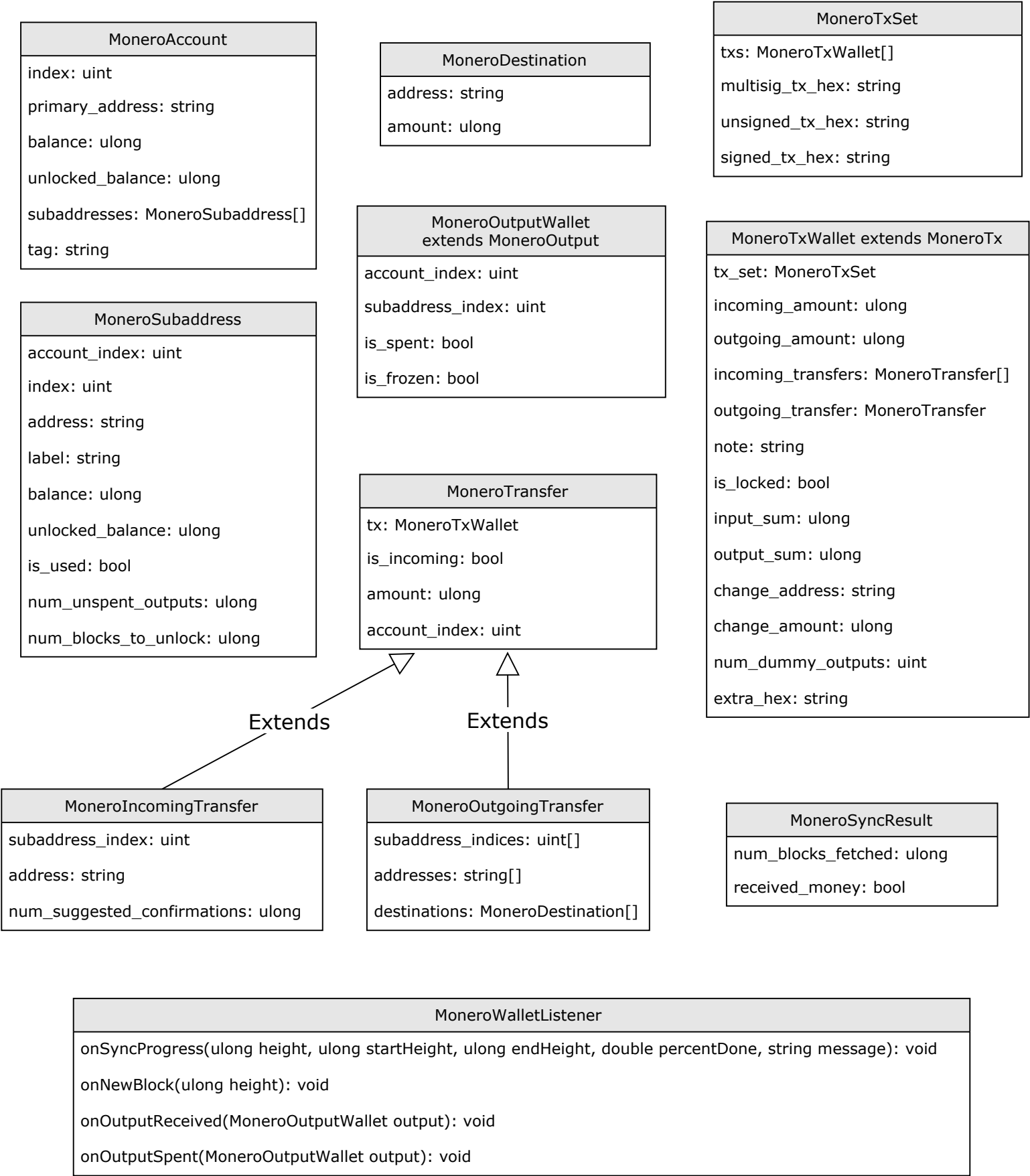
| MoneroTxQuery extends MoneroTxWallet |
|---------------------------------------|
| is_outgoing: bool |
| is_incoming: bool |
| hashes: string[] |
| has_payment_id: bool |
| payment_ids: string[] |
| height: ulong |
| min_height: ulong |
| max_height: ulong |
| include_outputs: bool |
| transfer_request: MoneroTransferQuery |
| output_request: MoneroOutputQuery |

Configures a query to get wallet transactions.

| MoneroTransferQuery extends MoneroTransfer |
|--|
| is_incoming: bool |
| address: string |
| addresses: string[] |
| subaddress_index: uint |
| subaddress_indices: uint[] |
| destinations: MoneroDestination[] |
| has_destinations: bool |
| tx_query: MoneroTxQuery |

Configures a query to get wallet transfers.

Monero Wallet Types 2/3



Monero Wallet Types 3/3

| MoneroAccountTag |
|-------------------------|
| tag: string |
| label: string |
| account_indices: uint[] |

| MoneroMultisigInfo |
|------------------------|
| is_multisig: bool |
| is_ready: bool |
| threshold: uint |
| num_participants: uint |

| MoneroKeyImageImportResult |
|----------------------------|
| height: ulong |
| spent_amount: ulong |
| unspent_amount: ulong |

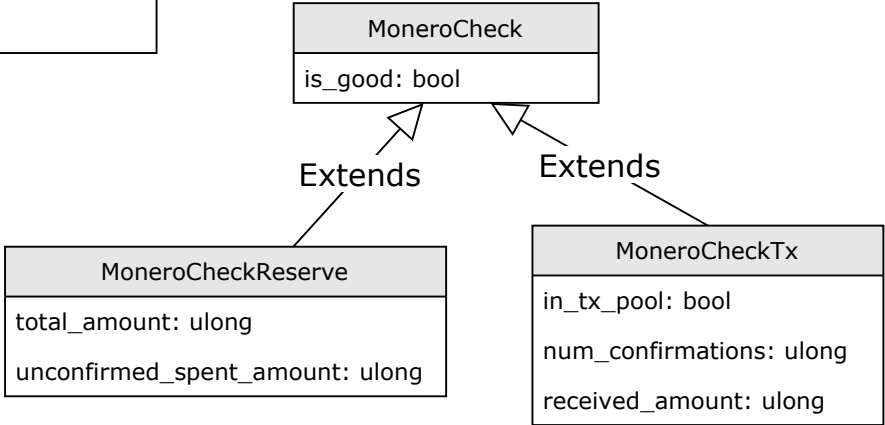
| MoneroAddressBookEntry |
|------------------------|
| index: uint |
| address: string |
| description: string |
| payment_id: string |

| MoneroMultisigInitResult |
|--------------------------|
| address: string |
| multisig_hex: string |

| MoneroIntegratedAddress (deprecated) |
|--------------------------------------|
| standard_address: string |
| payment_id: string |
| integrated_address: string |

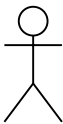
| <<enumeration>> MoneroSendPriority |
|---------------------------------------|
| default: 0 |
| unimportant: 1 |
| normal: 2 |
| elevated: 3 |

| MoneroMultisigSignResult |
|--------------------------------|
| signed_multisig_tx_hex: string |
| tx_hashes: string[] |





46FR1GKVqFNQnDiFkH7AuzbUBrGQwz2VdaXTDD4jcjRE8YkkoTYTmZ2Vohsz9gLsqkj5EM6ai9Q7sBoX4FPPYJdGKQQXPVz



woodser

donation_address: const string
irc: "woodser"
reddit: "XmrApiDev"
time_committed_to_xmr: ulong
competing_interests: list<?>

Motivation tends to increase with support shown to donation address.