

# 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/woodser/monero-cpp-library>

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

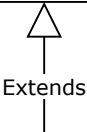
getHardForkInfo(): MoneroHardForkInfo

## 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[]

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

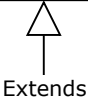
MoneroHardForkInfo
earliest_height: ulong
is_enabled: bool
state: uint
threshold: uint
version: string
num_votes: uint
window: uint
voting: uint
credits: ulong
top_block_hash: string

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.

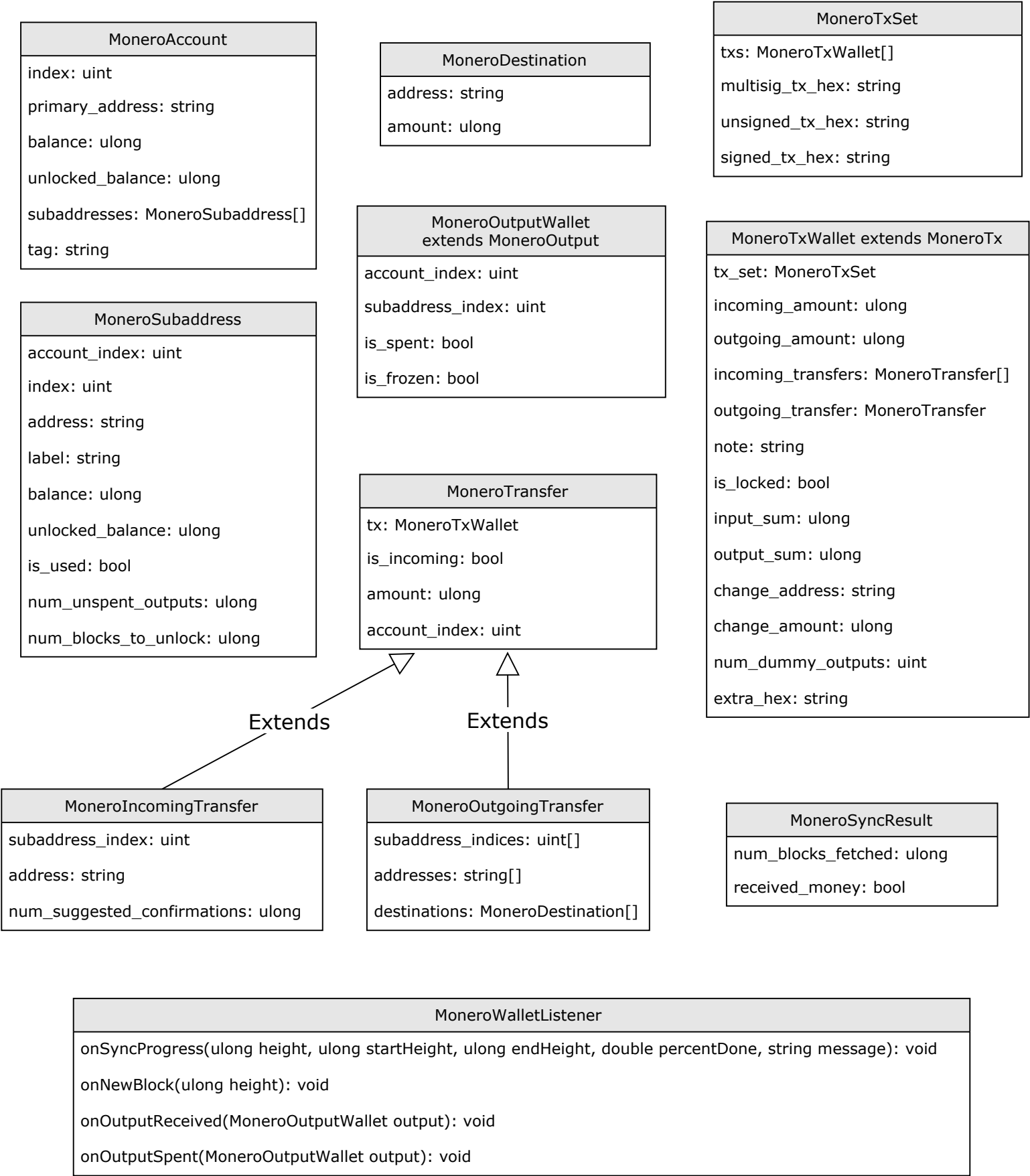
MoneroTxQuery extends MoneroTxWallet
is_outgoing: bool
is_incoming: bool
hashes: string[]
has_payment_id: bool
payment_ids: string[]
height: ulong
min_height: ulong
max_height: ulong
include_outputs: bool
transfer_request: MoneroTransferQuery
output_request: MoneroOutputQuery

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

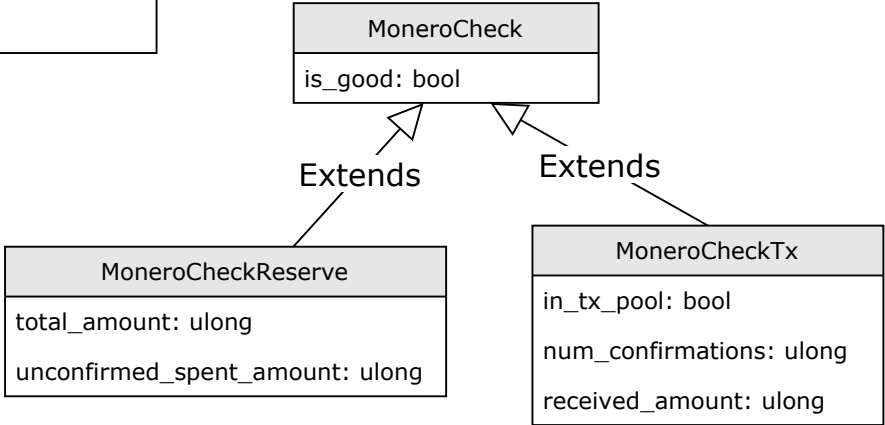
MoneroAddressBookEntry
index: uint
address: string
description: string
payment_id: string

MoneroMultisigInitResult
address: string
multisig_hex: string

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

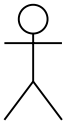
<<enumeration>> MoneroSendPriority
default: 0
unimportant: 1
normal: 2
elevated: 3

MoneroMultisigSignResult
signed_multisig_tx_hex: string
tx_hashes: string[]





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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.