A Monero data model and API specification

with implementations in Java, TypeScript, and C++ using monero v0.18.4.1 'Flourine Fermi'

Last updated July 22, 2025



Java implementation: https://github.com/woodser/monero-java

TypeScript implementation: https://github.com/woodser/monero-ts

C++ implementation: https://github.com/woodser/monero-cpp

Document source: https://github.com/woodser/monero-java/blob/master/docs/monero-spec.drawio

Document created and revisable using: https://www.draw.io/

Monero Daemon Interface 1/2 setProxyUri(string proxyUri): void 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=?): MoneroFeeEstimate $submitTxHex(string\ txHex,\ bool\ doNotRelay=false):\ MoneroSubmitTxResult$ relayTxByHash(string txHash): void relayTxsByHash(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 Interface 2/2
getAltChains(): MoneroAltChain[]
getAltBlockHashes(): string[]
getDownloadLimit(): uint
setDowloadLimit(uint limit): uint
resetDownloadLimit(): uint
getUploadLimit(): uint
setUploadLimit(uint): uint
resetUploadLimit(): uint
getPeers(): MoneroPeer[]
getKnownPeers(): MoneroPeer[]
setOutgoingPeerLimit(uint limit): void
setIncomingPeerLimit(uint limit): void
getPeerBans(): MoneroBan[]
setPeerBan(MoneroBan ban): void
setPeerBans(MoneroBan[] bans): void
qetOutputDistribution(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
addListener(MoneroDaemonListener listener): void
removeListener(MoneroDaemonListener listener): void
```

waitForNextBlockHeader(): MoneroBlockHeader

pruneBlockchain(bool check): MoneroPruneResult

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: ulong

miner_tx_hash: string

num_txs: uint

orphan_status: bool

prev_hash: string

pow_hash: string

reward: ulong



MoneroBlock

hex: string

miner_tx: MoneroTx

txs: MoneroTx[]

tx_hashes: string[]

MoneroOutput

tx: MoneroTx

key_image: MoneroKeyImage

amount: ulong index: ulong

ring_output_indices: ulong[]
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

adjusted_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

is_busy_syncing: bool

is_synchronized: bool

is_restricted: bool

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: ulong[]

metadata: string

extra: byte[]

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

MoneroDaemonSyncInfo

height: ulong

connections: MoneroDaemonConnection[]

spans: MoneroDaemonConnectionSpan[]

target_height: ulong

next_needed_pruning_seed: uint

overview: ?

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

 ${\tt MoneroDaemonConnectionSpan}$

connection_id: string

num blocks: ulong

remote_address: string

rate: ulong

speed: ulong

size: ulong

start_block_height: ulong

MoneroDaemonListener

onBlockHeader(MoneroBlockHeader header): void

<enumeration>
MoneroNetworkType

mainnet: 0 testnet: 1

stagenet: 2

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

is_tx_result_too_big: bool

nonzero_unlock_time: bool

MoneroPeer

max used block hash: string

signatures: string[]

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

type: ConnectionType

num_support_flags: uint

state: string

send_idle_time: ulong

receive_idle_time: ulong

num_sends: uint

num_receives: uint

is_local_host: bool

is_local_ip: bool

live_time: ulong

is incoming: bool

height: ulong

current_upload: ulong

current_download: ulong

avg_upload: ulong

avg_download: ulong

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

MoneroFeeEstimate

fee: ulong

fees: ulong[]

quantizationMask: ulong

MoneroDaemonUpdateCheckResult

is_update_available: bool

version: string
hash: string
auto_uri: string

user_uri: string

Extends

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

MoneroPruneResult

is_pruned: bool

pruning_seed: 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: unlong

oldest_timestamp: ulong

MoneroAltChain

block_hashes: string[]

difficulty: ulong

height: ulong

length: ulong

main_chain_parent_block_hash: string

Monero Wallet Interface 1/3

```
addListener(MoneroWalletListener listener): void
removeListener(MoneroWalletListener): void
getListeners(): MoneroWalletListener[]
isViewOnly(): bool
setDaemonConnection(MoneroDaemonConnection connection): void
getDaemonConnection(): MoneroDaemonConnection
setProxyUri(string proxyUri): void
isConnectedToDaemon(): bool
getVersion(): MoneroVersion
getNetworkType(): MoneroNetworkType
getPath(): string
getSeed(): string
getSeedLanguage(): string
getSeedLanguages(): string[]
getPrivateSpendKey(): string
getPrivateViewKey(): string
getPublicSpendKey(): string
getPublicViewKey(): string
getPrimaryAddress(): string
getAddress(uint accountIdx, uint subaddressIdx): string
getAddressIndex(string address): MoneroSubaddress
getDaemonConnection(): MoneroRpcConnection
getDaemonHeight(): ulong
getDaemonMaxPeerHeight(): ulong
getApproximateChainHeight(): ulong
getHeight(): ulong
getHeightByDate(uint year, uint month, uint day): ulong
sync(ulong startHeight=null, MoneroSyncListener listener=null): MoneroSyncResult
startSyncing(): void
stopSyncing(): void
scanTxs(string[] txHashes): void
rescanSpent(): void
rescanBlockchain(): void
getBalance(uint accountIdx=null, uint subaddressIdx=null): ulong
getUnlockedBalance(uint accountIdx=null, uint subaddressIdx=null): ulong
getAccounts(bool includeSubaddresses=false, string tag=null): MoneroAccount[]
getAccount(uint accountIdx, bool includeSubaddresses=false): MoneroAccount
createAccount(string label=null): void
getSubaddresses(uint accountIdx, uint[] subaddressIndices): void
getSubaddress(uint accountIdx, uint subaddressIdx): MoneroSubaddress
```

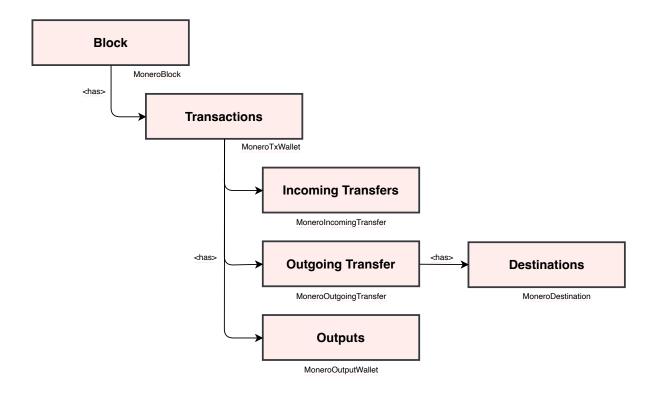
Monero Wallet Interface 2/3

```
createSubaddress(uint accountIdx, string label=null): MoneroSubaddress
setAccountLabel(uint accountIdx, string label): void
setSubaddressLabel(uint accountIdx, string subaddressIdx, string label): void
getTx(string txId): MoneroTxWallet
getTxs(MoneroTxQuery query=null): MoneroTxWallet[]
getTransfers(uint accountIdx=null, uint subaddressIdx=null): MoneroTransfer[]
getOutputs(MoneroOutputQuery query=null): MoneroOutputWallet[]
getOutgoingTransfers(MoneroTransferQuery query=null): MoneroOutgoingTransfer[]
getIncomingTransfers(MoneroTransferQuery query=null): MoneroIncomingTransfer[]
getTransfers(MoneroTransferQuery query=null): void
exportOutputs(bool all=false): string
importOutputs(string outputsHex): uint
exportKeyImages(bool all=false): MoneroKeyImage[]
importKeyImages(MoneroKeyImage[] keyImages): MoneroKeyImageImportResult
freezeOutput(String keyImage): void
thawOutput(String keyImage): void
isOutputFrozen(String keyImage): bool
getNewKeyImagesFromLastImport(): MoneroKeyImage[]
getDefaultFeePriority(): MoneroTxPriority
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[]
describeTxSet(MoneroTxSet txSet): MoneroTxSet
signTxs(string unsignedTxHex): MoneroTxSet
submitTxs(string signedTxHex): string[]
signMessage(string message, MoneroMessageSignatureType type, int accountIdx, int subaddressIdx): string
verifyMessage(string message, string address, string signature): MoneroMessageSignatureResult
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 accountIdx, 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
getPaymentUri(MoneroTxConfig 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): string
exchangeMultisigKeys(string[] multisigHexes, string password): MoneroMultisigInitResult
exportMultisigHex(): string
importMultisigHex(string[] multisigHexes): uint
signMultisigTxHex(string multsiigTxHex): MoneroMultisigSignResult
submitMultisig(string signedMultisigHex): string[]
moveTo(string path): void
changePassword(string oldPassword, string newPassword): void
save(): void
close(bool save=false): void
isClosed(): bool
getIntegratedAddress(string standardAddress=null, string paymentId=null): MoneroIntegratedAddress (deprecated)
decodeIntegratedAddress(string integratedAddress): MoneroIntegratedAddress (deprecated)
```

Monero Wallet Types 1/4 - Transactions, Transfers, and Outputs



Transactions are part of a block and have incoming transfers and/or an outgoing transfer.

The outgoing transfer may have destination amounts and addresses which are saved locally with the wallet and are not recoverable from the blockchain.

Transactions may also have outputs received by the wallet when requested.

Monero Wallet Types 2/4 - Send Request and Queries for Transactions, Transfers, and Outputs

MoneroTxConfig

address: string amount: ulong

destinations: MoneroDestination[]

subtract_fee_from: int[]
payment_id: string

priority: MoneroTxPriority

fee: ulong

account_index: uint

subaddress_index: uint

subaddress_indices: uint[]

can_split: bool relay: bool note: string

recipient_name: string below_amount: ulong

sweep_each_subaddress: bool

key_image: string

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.

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.

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 3/4

MoneroAccount

index: uint

primary_address: string

balance: ulong

unlocked_balance: ulong

subaddresses: MoneroSubaddress[]

tag: string

MoneroSubaddress

account index: uint

index: uint

address: string

label: string

balance: ulong

unlocked_balance: ulong

is_used: bool

num_unspent_outputs: ulong

num_blocks_to_unlock: ulong

MoneroDestination

address: string amount: ulong

MoneroOutputWallet extends MoneroOutput

account_index: uint

subaddress_index: uint

is_spent: bool
is_frozen: bool

MoneroTransfer

tx: MoneroTxWallet
is_incoming: bool
amount: ulong

account_index: uint

Extends

MoneroIncomingTransfer

subaddress index: uint

address: string

num_suggested_confirmations: ulong

MoneroOutgoingTransfer

subaddress indices: uint[]

addresses: string[]

destinations: MoneroDestination[]

MoneroTxSet

txs: MoneroTxWallet[]

multisig_tx_hex: string

unsigned_tx_hex: string

signed_tx_hex: string

MoneroTxWallet extends MoneroTx

tx_set: MoneroTxSet

incoming_amount: ulong

outgoing_amount: ulong

incoming_transfers: MoneroTransfer[]

outgoing_transfer: MoneroTransfer

note: string

is_locked: bool

input_sum: ulong

output_sum: ulong

change_address: string

change_amount: ulong

num dummy outputs: uint

extra_hex: string

MoneroSyncResult

num_blocks_fetched: ulong

received_money: bool

MoneroWalletListener

onSyncProgress(ulong height, ulong startHeight, ulong endHeight, double percentDone, string message): void

onNewBlock(ulong height): void

onOutputReceived(MoneroOutputWallet output): void

Extends

onOutputSpent(MoneroOutputWallet output): void

Monero Wallet Types 4/4

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

${\tt MoneroAddressBookEntry}$

index: uint

address: string

description: string payment_id: string

Monero Mult is ig In it Result

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[]

spend_key: 0

view_key: 1

MoneroCheck

is_good: bool

Extends Extends

MoneroCheckReserve

total_amount: ulong

unconfirmed_spent_amount: ulong

MoneroCheckTx

in_tx_pool: bool

num_confirmations: ulong

received_amount: ulong

MoneroMessageSignatureResult

<<enumeration>> ${\tt MoneroMessageSignatureType}$

is_good: bool

is_old: bool

signature_type: MoneroMessageSignatureType

version: int



46FR1GKVqFNQnDiFkH7AuzbUBrGQwz2VdaXTDD4jcjRE8YkkoTYTmZ2Vohsz9gLSqkj5EM6ai9Q7sBoX4FPPYJdGKQQXPVz



woodser

donation_address: const string

irc: "woodser"

reddit: "XmrApiDev"

time_committed_to_xmr: ulong

competing_interests: list<?>

Motivation tends to increase with support to donation address.