
py-bbclib Documentation

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1.1 Subpackages

1.1.1 bbclib.compat package

1.1.1.1 Submodules

bbclib.compat.bbclib module

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class `bbclib.compat.bbclib.BBcAsset` (*user_id=None, asset_file=None, asset_body=None, format_type=0, id_length=32*)

Bases: `object`

Asset part in a transaction

add (*user_id=None, asset_file=None, asset_body=None*)
Add parts in this object

deserialize (*data*)
Deserialize into this object

Parameters *data* (*bytes*) – serialized binary data

Returns True if successful

Return type bool

deserialize_obj (*obj*)

Deserialize bson/msgpack data into this object

Parameters **obj** (*bytes*) – object data

Returns True if successful

Return type bool

digest ()

Calculate the digest

The digest corresponds to the `asset_id` of this object

Returns `asset_id` (or digest)

Return type bytes

get_asset_file ()

Get asset file content and its digest

Returns digest of the file content bytes: the file content

Return type bytes

get_dict (*for_digest_calculation=False*)

Serialize this object

recover_asset_file (*asset_file, id_length=32*)

Recover asset file info from the given raw content

serialize (*for_digest_calculation=False*)

Serialize this object

Parameters **for_digest_calculation** (*bool*) – True if digest calculation

Returns serialized binary data

Return type bytes

class `bbclib.compat.bbclib.BBcCrossRef` (*domain_id=None, transaction_id=None, deserialize=None, format_type=0*)

Bases: object

CrossRef part in a transaction

deserialize (*data*)

Deserialize into this object

Parameters **data** (*bytes*) – serialized binary data

Returns True if successful

Return type bool

deserialize_obj (*obj*)

Deserialize bson/msgpack data into this object

Parameters **obj** (*bytes*) – object data

Returns True if successful

Return type bool

get_dict ()

Serialize this object into bson format

serialize()

Serialize this object

Returns serialized binary data

Return type bytes

class bbclib.compat.bbclib.**BBcEvent** (*asset_group_id=None, format_type=0, id_length=32*)

Bases: object

Event part in a transaction

add (*asset_group_id=None, reference_index=None, mandatory_approver=None, option_approver_num_numerator=0, option_approver_num_denominator=0, option_approver=None, asset=None*)
Add parts

deserialize (*data*)

Deserialize into this object

Parameters *data* (*bytes*) – serialized binary data

Returns True if successful

Return type bool

deserialize_obj (*obj*)

Deserialize bson/msgpack data into this object

Parameters *obj* (*bytes*) – object data

Returns True if successful

Return type bool

get_dict ()

Serialize this object

serialize ()

Serialize this object

Returns serialized binary data

Return type bytes

class bbclib.compat.bbclib.**BBcFormat**

Bases: object

FORMAT_BINARY = 0

FORMAT_BSON = 1

FORMAT_BSON_COMPRESS_BZ2 = 2

FORMAT_BSON_COMPRESS_ZLIB = 3

FORMAT_MSGPACK = 4

FORMAT_MSGPACK_COMPRESS_BZ2 = 5

FORMAT_MSGPACK_COMPRESS_ZLIB = 6

class bbclib.compat.bbclib.**BBcPointer** (*transaction_id=None, asset_id=None, format_type=0, id_length=32*)

Bases: object

Pointer part in a transaction

add (*transaction_id=None, asset_id=None*)

Add parts

deserialize (*data*)

Deserialize into this object

Parameters **data** (*bytes*) – serialized binary data

Returns True if successful

Return type bool

deserialize_obj (*obj*)

Deserialize bson/msgpack data into this object

Parameters **obj** (*bytes*) – object data

Returns True if successful

Return type bool

get_dict ()

Serialize this object

serialize ()

Serialize this object

Returns serialized binary data

Return type bytes

```
class bbclib.compat.bbclib.BBcReference (asset_group_id, transaction,  
                                         ref_transaction=None, event_index_in_ref=0,  
                                         format_type=0, id_length=32)
```

Bases: object

Reference part in a transaction

add_signature (*user_id=None, signature=None*)

Add signature in the reserved space

Parameters

- **user_id** (*bytes*) – user_id of the signature owner
- **signature** ([BBcSignature](#)) – signature

deserialize (*data*)

Deserialize into this object

Parameters **data** (*bytes*) – serialized binary data

Returns True if successful

Return type bool

deserialize_obj (*obj*)

Deserialize bson/msgpack data into this object

Parameters **obj** (*bytes*) – object data

Returns True if successful

Return type bool

get_destinations ()

Return the list of approvers in the referred transaction

get_dict()
Serialize this object

get_referred_transaction()
Return referred transaction in serialized format

prepare_reference(ref_transaction)
Read the previous referencing transaction

serialize()
Serialize this object

Returns serialized binary data

Return type bytes

class bbclib.compat.bbclib.BBcRelation(asset_group_id=None, format_type=0, id_length=32)

Bases: object

Relation part in a transaction

add(asset_group_id=None, asset=None, pointer=None)
Add parts

deserialize(data)
Deserialize bson data into this object

Parameters data (*dict*) – bson data

Returns True if successful

Return type bool

deserialize_obj(obj)
Deserialize bson/msgpack data into this object

Parameters data (*bytes*) – object data

Returns True if successful

Return type bool

get_dict()
Serialize this object

serialize()
Serialize this object

Returns serialized binary data

Return type bytes

class bbclib.compat.bbclib.BBcSignature(key_type=2, deserialize=None, format_type=0)

Bases: object

Signature part in a transaction

add(signature=None, pubkey=None)
Add signature and public key

deserialize(data)
Deserialize into this object

Parameters data (*bytes*) – serialized binary data

Returns True if successful

Return type bool

deserialize_obj (*obj*)

Deserialize bson/msgpack data into this object

Parameters **obj** (*bytes*) – object data

Returns True if successful

Return type bool

get_dict ()

Serialize this object

serialize ()

Serialize this object

verify (*digest*)

Verify digest using pubkey in signature

Parameters **digest** (*bytes*) – digest to verify

Returns 0:invalid, 1:valid

Return type int

class bbclib.compat.bbclib.BBcTransaction (*version=1, deserialize=None, format_type=0, id_length=32*)

Bases: object

Transaction object

WITH_WIRE = True

add (*event=None, reference=None, relation=None, witness=None, cross_ref=None*)

Add parts

add_signature (*user_id=None, signature=None*)

Add signature in the reserved space

Parameters

- **user_id** (*bytes*) – user_id of the signature owner
- **signature** (BBcSignature) – signature

Returns True if successful

Return type bool

deserialize (*data*)

Deserialize into this object

Parameters **data** (*bytes*) – serialized binary data

Returns True if successful

Return type bool

deserialize_obj (*data*)

Deserialize bson/msgpack data into this object

Parameters **data** (*bytes*) – object data

Returns True if successful

Return type bool

digest ()

Calculate the digest

The digest corresponds to the transaction_id of this object

Returns transaction_id (or digest)

Return type bytes

get_sig_index (user_id)

Reserve a space for signature for the specified user_id

Parameters **user_id** (bytes) – user_id whose signature will be added to the signature part

Returns position (index) in the signature part

Return type int

serialize (for_id=False)

Serialize the whole parts

serialize_obj (for_id=False, no_header=False)

Serialize the whole parts

set_format_type (format_type)

sign (key_type=2, private_key=None, public_key=None, keypair=None)

Sign the transaction

Parameters

- **key_type** (int) – Type of encryption key's curve
- **private_key** (bytes) –
- **public_key** (bytes) –
- **keypair** (KeyPair) – keypair or set of private_key and public_key needs to be given

Returns

Return type BBcSignature

class bbclib.compat.bbclib.BBcWitness (format_type=0, id_length=32)

Bases: object

Witness part in a transaction

add_signature (user_id=None, signature=None)

Add signature in the reserved space for the user_id that was registered before

Parameters

- **user_id** (bytes) – user_id of the signature owner
- **signature** (bytes) – signature

add_witness (user_id)

Register user_id in the list

deserialize (data)

Deserialize into this object

Parameters **data** (bytes) – serialized binary data

Returns True if successful

Return type bool

deserialize_obj (*obj*)

Deserialize bson/msgpack data into this object

Parameters **obj** (*bytes*) – object data

Returns True if successful

Return type bool

get_dict ()

Serialize this object

serialize ()

Serialize this object

Returns serialized binary data

Return type bytes

class bbclib.compat.bbclib.**KeyPair** (*curvetype=2, compression=False, privkey=None, pubkey=None*)

Bases: object

POINT_CONVERSION_COMPRESSED = 2

POINT_CONVERSION_UNCOMPRESSED = 4

Key pair container

generate ()

Generate a new key pair

get_private_key_in_der ()

Return private key in DER format

get_private_key_in_pem ()

Return private key in PEM format

get_public_key_in_pem ()

Return public key in PEM format

import_publickey_cert_pem (*cert_pemstring, privkey_pemstring=None*)

Verify and import X509 public key certificate in pem format

mk_keyobj_from_private_key ()

Make a keypair object from the binary data of private key

mk_keyobj_from_private_key_der (*derdat*)

Make a keypair object from the private key in DER format

mk_keyobj_from_private_key_pem (*pemdat_string*)

Make a keypair object from the private key in PEM format

sign (*digest*)

Sign to the given value

Parameters **digest** (*bytes*) – given value

Returns signature

Return type bytes

to_binary (*dat*)

verify (*digest, sig*)

Verify the digest and the signature using the private key in this object

```
class bbclib.compat.bbclib.KeyType
    Bases: object

    ECDSA_P256v1 = 2
    ECDSA_SECP256k1 = 1
    NOT_INITIALIZED = 0

class bbclib.compat.bbclib.MsgType
    Bases: object

    Message types for between core node and client

    CANCEL_INSERT_NOTIFICATION = 16
    DOMAIN_PING = 12
    MESSAGE = 66
    NOTIFY_CROSS_REF = 74
    NOTIFY_DOMAIN_KEY_UPDATE = 19
    NOTIFY_INSERTED = 73
    REGISTER = 64
    REQUEST_CLOSE_DOMAIN = 31
    REQUEST_COUNT_TRANSACTIONS = 95
    REQUEST_CROSS_REF_LIST = 92
    REQUEST_CROSS_REF_VERIFY = 90
    REQUEST_ECDH_KEY_EXCHANGE = 33
    REQUEST_GATHER_SIGNATURE = 67
    REQUEST_GET_CONFIG = 8
    REQUEST_GET_DOMAINLIST = 13
    REQUEST_GET_FORWARDING_LIST = 25
    REQUEST_GET_NEIGHBORLIST = 21
    REQUEST_GET_NODEID = 27
    REQUEST_GET_NOTIFICATION_LIST = 29
    REQUEST_GET_STATS = 17
    REQUEST_GET_USERS = 23
    REQUEST_INSERT = 71
    REQUEST_INSERT_NOTIFICATION = 15
    REQUEST_MANIP_LEDGER_SUBSYS = 10
    REQUEST_REGISTER_HASH_IN_SUBSYS = 128
    REQUEST_REPAIR = 94
    REQUEST_SEARCH_TRANSACTION = 82
    REQUEST_SEARCH_WITH_CONDITIONS = 86
    REQUEST_SETUP_DOMAIN = 0
```

```
REQUEST_SET_STATIC_NODE = 4
REQUEST_SIGNATURE = 69
REQUEST_TRAVERSE_TRANSACTIONS = 88
REQUEST_VERIFY_HASH_IN_SUBSYS = 130
RESPONSE_CLOSE_DOMAIN = 32
RESPONSE_COUNT_TRANSACTIONS = 95
RESPONSE_CROSS_REF_LIST = 93
RESPONSE_CROSS_REF_VERIFY = 91
RESPONSE_ECDH_KEY_EXCHANGE = 34
RESPONSE_GATHER_SIGNATURE = 68
RESPONSE_GET_CONFIG = 9
RESPONSE_GET_DOMAINLIST = 14
RESPONSE_GET_FORWARDING_LIST = 26
RESPONSE_GET_NEIGHBORLIST = 22
RESPONSE_GET_NODEID = 28
RESPONSE_GET_NOTIFICATION_LIST = 30
RESPONSE_GET_STATS = 18
RESPONSE_GET_USERS = 24
RESPONSE_INSERT = 72
RESPONSE_MANIP_LEDGER_SUBSYS = 11
RESPONSE_REGISTER_HASH_IN_SUBSYS = 129
RESPONSE_SEARCH_TRANSACTION = 83
RESPONSE_SEARCH_WITH_CONDITIONS = 87
RESPONSE_SETUP_DOMAIN = 1
RESPONSE_SET_STATIC_NODE = 5
RESPONSE_SIGNATURE = 70
RESPONSE_TRAVERSE_TRANSACTIONS = 89
RESPONSE_VERIFY_HASH_IN_SUBSYS = 131
UNREGISTER = 65
```

`bbclib.compat.bbclib.add_event_asset` (*transaction*, *event_idx*, *asset_group_id*, *user_id*, *asset_body=None*, *asset_file=None*)

Utility to add BBcEvent object with BBcAsset in the transaction

`bbclib.compat.bbclib.add_pointer_in_relation` (*relation*, *ref_transaction_id=None*, *ref_asset_id=None*)

Utility to add BBcRelation object with BBcPointer in the BBcRelation object

`bbclib.compat.bbclib.add_reference_to_transaction` (*transaction*, *asset_group_id*, *ref_transaction_obj*, *event_index_in_ref*)

Utility to add BBcReference object in the transaction

Returns**Return type** *BBcReference*

`bbclib.compat.bbclib.add_relation_asset` (*transaction, relation_idx, asset_group_id, user_id, asset_body=None, asset_file=None*)

Utility to add BBcRelation object with BBcAsset in the transaction

`bbclib.compat.bbclib.add_relation_pointer` (*transaction, relation_idx, ref_transaction_id=None, ref_asset_id=None*)

Utility to add BBcRelation object with BBcPointer in the transaction

`bbclib.compat.bbclib.bin2str_base64` (*dat*)

`bbclib.compat.bbclib.convert_id_to_string` (*data, bytelen=32*)

Convert binary data to hex string

`bbclib.compat.bbclib.convert_idstring_to_bytes` (*datastr, bytelen=32*)

Convert hex string to binary data

`bbclib.compat.bbclib.deep_copy_with_key_stringify` (*u, d=None*)

Utility for updating nested dictionary

`bbclib.compat.bbclib.get_bigint` (*ptr, dat*)

`bbclib.compat.bbclib.get_n_byte_int` (*ptr, n, dat*)

`bbclib.compat.bbclib.get_n_bytes` (*ptr, n, dat*)

`bbclib.compat.bbclib.get_new_id` (*seed_str=None, include_timestamp=True*)

Return 256-bit binary data

Parameters

- **seed_str** (*str*) – seed string that is hashed by SHA256
- **include_timestamp** (*bool*) – if True, timestamp (current time) is appended to the seed string

Returns 256-bit binary**Return type** bytes

`bbclib.compat.bbclib.get_random_id` ()

Return 256-bit binary data

Returns 256-bit random binary**Return type** bytes

`bbclib.compat.bbclib.get_random_value` (*length=32*)

Return 1-byte random value

`bbclib.compat.bbclib.make_relation_with_asset` (*asset_group_id, user_id, asset_body=None, asset_file=None, format_type=0, id_length=32*)

Utility to make BBcRelation object

`bbclib.compat.bbclib.make_transaction` (*event_num=0, relation_num=0, witness=False, format_type=0, id_length=32*)

Utility to make transaction object

Parameters

- **event_num** (*int*) – the number of BBcEvent object to include in the transaction
- **relation_num** (*int*) – the number of BBcRelation object to include in the transaction

- **witness** (*bool*) – If true, BBcWitness object is included in the transaction
- **format_type** (*int*) – Data format defined in BBcFormat class
- **id_length** (*int*) – If <32, IDs will be truncated

Returns**Return type** *BBcTransaction*`bbclib.compat.bbclib.recover_signature_object (data, format_type=0)`

Deserialize signature data

`bbclib.compat.bbclib.reset_error ()``bbclib.compat.bbclib.set_error (code=-1, txt=)``bbclib.compat.bbclib.str_binary (dat)``bbclib.compat.bbclib.to_1byte (val)``bbclib.compat.bbclib.to_2byte (val)``bbclib.compat.bbclib.to_4byte (val)``bbclib.compat.bbclib.to_8byte (val)``bbclib.compat.bbclib.to_bigint (val, size=32)``bbclib.compat.bbclib.validate_transaction_object (txobj, asset_files=None)`

Validate transaction and its asset

Parameters

- **txobj** (*BBcTransaction*) – target transaction object
- **asset_files** (*dict*) – dictionary containing the asset file contents

Returns True if valid tuple: list of valid assets tuple: list of invalid assets**Return type** bool`bbclib.compat.bbclib.verify_using_cross_ref (domain_id, transaction_id, transaction_base_digest, cross_ref_data, sigdata, format_type=0)`

Confirm the existence of the transaction using cross_ref

Parameters

- **domain_id** (*bytes*) – target domain_id
- **transaction_id** (*bytes*) – target transaction_id of which existence you want to confirm
- **transaction_base_digest** (*bytes*) – digest obtained from the outer domain
- **cross_ref_data** (*bytes*) – serialized BBcCrossRef object
- **sigdata** (*bytes*) – serialized signature
- **format_type** (*int*) – Data format type when calculating the digest (transaction_id)

Returns True if valid**Return type** bool

1.1.1.2 Module contents

1.1.2 bbclib.libs package

1.1.2.1 Submodules

bbclib.libs.bbclib_asset module

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```
class bbclib.libs.bbclib_asset.BBcAsset (user_id=None,      asset_file=None,      as-
                                         set_body=None, id_length=None, version=2)
```

Bases: object

Asset part in a transaction

```
add (user_id=None, asset_file=None, asset_body=None)
```

Add parts in this object

```
digest ()
```

Calculate the digest

The digest corresponds to the asset_id of this object

Returns asset_id (or digest)

Return type bytes

```
get_asset_file ()
```

Get asset file content and its digest

Returns digest of the file content bytes: the file content

Return type bytes

```
pack (for_digest_calculation=False)
```

Pack this object

Parameters **for_digest_calculation** (*bool*) – True if digest calculation

Returns packed binary data

Return type bytes

```
recover_asset_file (asset_file)
```

Recover asset file info from the given raw content

```
unpack (data)
```

Unpack into this object

Parameters **data** (*bytes*) – packed binary data

Returns True if successful

Return type bool

bbclib.libs.bbclib_config module

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bbclib.libs.bbclib_crossref module

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```
class bbclib.libs.bbclib_crossref.BBcCrossRef (domain_id=None, transaction_id=None,  
                                              unpack=None)
```

Bases: object

CrossRef part in a transaction

```
pack ()
```

Pack this object

Returns packed binary data

Return type bytes

```
unpack (data)
```

Unpack into this object

Parameters **data** (*bytes*) – packed binary data

Returns True if successful

Return type bool

bbclib.libs.bbclib_error module

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bbclib.libs.bbclib_event module

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class bbclib.libs.bbclib_event.**BBcEvent** (*asset_group_id=None, id_length=None*)

Bases: object

Event part in a transaction

add (*asset_group_id=None, reference_index=None, mandatory_approver=None, option_approver_num_numerator=0, option_approver_num_denominator=0, option_approver=None, asset=None*)
Add parts

pack ()

Pack this object

Returns packed binary data

Return type bytes

unpack (*data*)

Unpack into this object

Parameters **data** (*bytes*) – packed binary data

Returns True if successful

Return type bool

bbclib.libs.bbclib_keypair module

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class bbclib.libs.bbclib_keypair.**KeyPair** (*curvetype=2, compression=False, privkey=None, pubkey=None*)

Bases: object

POINT_CONVERSION_COMPRESSED = 2

POINT_CONVERSION_UNCOMPRESSED = 4

Key pair container

generate ()

Generate a new key pair

```
get_private_key_in_der()  
    Return private key in DER format  
get_private_key_in_pem()  
    Return private key in PEM format  
get_public_key_in_der()  
    Return private key in DER format  
get_public_key_in_pem()  
    Return public key in PEM format  
import_publickey_cert_pem(cert_pemstring, privkey_pemstring=None)  
    Verify and import X509 public key certificate in pem format  
mk_keyobj_from_private_key()  
    Make a keypair object from the binary data of private key  
mk_keyobj_from_private_key_der(derdat)  
    Make a keypair object from the private key in DER format  
mk_keyobj_from_private_key_pem(pemdat_string)  
    Make a keypair object from the private key in PEM format  
sign(digest)  
    Sign to the given value  
        Parameters digest (bytes) – given value  
        Returns signature  
        Return type bytes  
to_binary(dat)  
verify(digest, sig)  
    Verify the digest and the signature using the private key in this object  
class bbclib.libs.bbclib_keypair.KeyType  
    Bases: object  
    ECDSA_P256v1 = 2  
    ECDSA_SECP256k1 = 1  
    NOT_INITIALIZED = 0
```

bbclib.libs.bbclib_msgtype module

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```
class bbclib.libs.bbclib_msgtype.MsgType  
    Bases: object  
    Message types for between core node and client
```

```
CANCEL_INSERT_NOTIFICATION = 16
DOMAIN_PING = 12
MESSAGE = 66
NOTIFY_CROSS_REF = 74
NOTIFY_DOMAIN_KEY_UPDATE = 19
NOTIFY_INSERTED = 73
REGISTER = 64
REQUEST_CLOSE_DOMAIN = 31
REQUEST_COUNT_TRANSACTIONS = 95
REQUEST_CROSS_REF_LIST = 92
REQUEST_CROSS_REF_VERIFY = 90
REQUEST_ECDH_KEY_EXCHANGE = 33
REQUEST_GATHER_SIGNATURE = 67
REQUEST_GET_CONFIG = 8
REQUEST_GET_DOMAINLIST = 13
REQUEST_GET_FORWARDING_LIST = 25
REQUEST_GET_NEIGHBORLIST = 21
REQUEST_GET_NODEID = 27
REQUEST_GET_NOTIFICATION_LIST = 29
REQUEST_GET_STATS = 17
REQUEST_GET_USERS = 23
REQUEST_INSERT = 71
REQUEST_INSERT_NOTIFICATION = 15
REQUEST_MANIP_LEDGER_SUBSYS = 10
REQUEST_REGISTER_HASH_IN_SUBSYS = 128
REQUEST_REPAIR = 94
REQUEST_SEARCH_TRANSACTION = 82
REQUEST_SEARCH_WITH_CONDITIONS = 86
REQUEST_SETUP_DOMAIN = 0
REQUEST_SET_STATIC_NODE = 4
REQUEST_SIGNATURE = 69
REQUEST_TRAVERSE_TRANSACTIONS = 88
REQUEST_VERIFY_HASH_IN_SUBSYS = 130
RESPONSE_CLOSE_DOMAIN = 32
RESPONSE_COUNT_TRANSACTIONS = 95
RESPONSE_CROSS_REF_LIST = 93
```

```
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```

bbclib.libs.bbclib_pointer module

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```
class bbclib.libs.bbclib_pointer.BBcPointer(transaction_id=None,      asset_id=None,
                                           id_length=None)
```

Bases: object

Pointer part in a transaction

```
add(transaction_id=None, asset_id=None)
```

Add parts

pack ()
 Pack this object

Returns packed binary data

Return type bytes

unpack (*data*)
 Unpack into this object

Parameters *data* (*bytes*) – packed binary data

Returns True if successful

Return type bool

bbclib.libs.bbclib_reference module

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```
class bbclib.libs.bbclib_reference.BBcReference (asset_group_id, transaction, ref_transaction=None,
                                                event_index_in_ref=0,
                                                id_length=None)
```

Bases: object

Reference part in a transaction

add_signature (*user_id=None*, *signature=None*)
 Add signature in the reserved space

Parameters

- **user_id** (*bytes*) – user_id of the signature owner
- **signature** (*BBcSignature*) – signature

get_destinations ()
 Return the list of approvers in the referred transaction

pack ()
 Pack this object

Returns packed binary data

Return type bytes

prepare_reference (*ref_transaction*)
 Read the previous referencing transaction

unpack (*data*)
 unpack into this object

Parameters *data* (*bytes*) – packed binary data

Returns True if successful

Return type bool

bbclib.libs.bbclib_relation module

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class bbclib.libs.bbclib_relation.BBcRelation(*asset_group_id=None, id_length=None, version=2*)

Bases: object

Relation part in a transaction

add (*asset_group_id=None, asset=None, asset_raw=None, asset_hash=None, pointer=None*)

Add parts

pack ()

Pack this object

Returns packed binary data

Return type bytes

unpack (*data, version=2*)

Unpack data into transaction object

Parameters

- **data** (*bytes*) – packed binary data
- **version** (*int*) – version of the data format

Returns True if successful

Return type bool

bbclib.libs.bbclib_signature module

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class bbclib.libs.bbclib_signature.BBcSignature(*key_type=2, unpack=None*)

Bases: object

Signature part in a transaction

add (*signature=None, pubkey=None*)
Add signature and public key

pack ()
Pack this object

unpack (*data*)
Unpack into this object

Parameters **data** (*bytes*) – packed binary data

Returns True if successful

Return type bool

verify (*digest, pubkey=None*)
Verify digest using pubkey in signature

Parameters

- **digest** (*bytes*) – digest to verify
- **pubkey** (*bytes*) – external public key for verification

Returns 0:invalid, 1:valid

Return type int

bbclib.libs.bbclib_transaction module

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class bbclib.libs.bbclib_transaction.**BBcTransaction** (*version=1, unpack=None, id_length=None*)

Bases: object

Transaction object

WITH_WIRE = **False**

add (*event=None, reference=None, relation=None, witness=None, cross_ref=None*)
Add parts

add_signature (*user_id=None, signature=None*)
Add signature in the reserved space

Parameters

- **user_id** (*bytes*) – user_id of the signature owner
- **signature** (*BBcSignature*) – signature

Returns True if successful

Return type bool

digest ()

Calculate the digest

The digest corresponds to the transaction_id of this object

Returns transaction_id (or digest)

Return type bytes

get_sig_index (user_id)

Reserve a space for signature for the specified user_id

Parameters **user_id** (bytes) – user_id whose signature will be added to the signature part

Returns position (index) in the signature part

Return type int

pack (for_id=False)

Pack the whole parts

set_sig_index (user_id, idx)

Map a user_id with the index of signature list

Parameters

- **user_id** (bytes) – user_id whose signature will be added to the signature part
- **idx** (int) – index number

sign (key_type=2, private_key=None, public_key=None, keypair=None, no_pubkey=False)

Sign the transaction

Parameters

- **key_type** (int) – Type of encryption key's curve
- **private_key** (bytes) –
- **public_key** (bytes) –
- **keypair** (KeyPair) – keypair or set of private_key and public_key needs to be given
- **no_pubkey** (bool) – If True, public key is not contained in the BBcSignature object (needs to be given externally when verification)

Returns

Return type BBcSignature

unpack (data)

Unpack into this object

Parameters **data** (bytes) – packed binary data

Returns True if successful

Return type bool

bbclib.libs.bbclib_utils module

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```
bbclib.libs.bbclib_utils.add_event_asset(transaction, event_idx, asset_group_id, user_id,
                                         asset_body=None, asset_file=None)
```

Utility to add BBcEvent object with BBcAsset in the transaction

```
bbclib.libs.bbclib_utils.add_pointer_in_relation(relation, ref_transaction_id=None,
                                                ref_asset_id=None)
```

Utility to add BBcRelation object with BBcPointer in the BBcRelation object

Parameters

- **relation** (`BBcRelation`) – BBcRelation object to manipulate
- **ref_transaction_id** (`bytes`) – transaction_id of the transaction that the base transaction object refers to
- **ref_asset_id** (`bytes`) – asset_id of the asset that the transaction object refers to

```
bbclib.libs.bbclib_utils.add_reference_to_transaction(transaction, asset_group_id,
                                                    ref_transaction_obj,
                                                    event_index_in_ref)
```

Utility to add BBcReference object in the transaction

Parameters

- **transaction** (`BBcTransaction`) – the base transaction object to manipulate
- **asset_group_id** (`bytes`) – asset_group_id of the asset in the object
- **ref_transaction_obj** (`BBcTransaction`) – the transaction object that the base transaction object refers to
- **event_index_in_ref** (`int`) – the number of BBcEvent object to include in the transaction that the base transaction object refers to

Returns

Return type `BBcReference`

```
bbclib.libs.bbclib_utils.add_relation_asset(transaction, relation_idx, asset_group_id,
                                           user_id, asset_body=None, asset_file=None)
```

Utility to add BBcRelation object with BBcAsset in the transaction

Parameters

- **transaction** (`BBcTransaction`) – transaction object to manipulate
- **relation_idx** (`int`) – the number of BBcRelation object to include in the transaction
- **asset_group_id** (`bytes`) – asset_group_id of the asset in the object
- **user_id** (`bytes`) – user_id of the owner of the asset
- **asset_body** (`str|bytes|dict`) – asset data
- **asset_file** (`bytes`) – file data (binary) for asset

```
bbclib.libs.bbclib_utils.add_relation_asset_hash(transaction, relation_idx, asset_group_id, asset_ids=None)
```

Utility to add BBcRelation object with BBcAssetHash in the transaction

Parameters

- **transaction** (`BBcTransaction`) – transaction object to manipulate
- **relation_idx** (`int`) – the number of BBcRelation object to include in the transaction
- **asset_group_id** (`bytes`) – asset_group_id of the asset in the object
- **asset_ids** (`list (bytes)`) – list of the identifiers of assets

```
bbclib.libs.bbclib_utils.add_relation_asset_raw(transaction, relation_idx, as-  
                                              set_group_id, asset_id=None, as-  
                                              set_body=None)
```

Utility to add BBcRelation object with BBcAssetRaw in the transaction

Parameters

- **transaction** (`BBcTransaction`) – transaction object to manipulate
- **relation_idx** (`int`) – the number of BBcRelation object to include in the transaction
- **asset_group_id** (`bytes`) – asset_group_id of the asset in the object
- **asset_id** (`bytes`) – the identifier of the asset
- **asset_body** (`str|bytes|dict`) – asset data

```
bbclib.libs.bbclib_utils.add_relation_pointer(transaction, relation_idx,  
                                              ref_transaction_id=None,  
                                              ref_asset_id=None)
```

Utility to add BBcRelation object with BBcPointer in the transaction

Parameters

- **transaction** (`BBcTransaction`) – the base transaction object to manipulate
- **relation_idx** (`int`) – the number of BBcRelation object to include in the transaction
- **ref_transaction_id** (`bytes`) – transaction_id of the transaction that the base transaction object refers to
- **ref_asset_id** (`bytes`) – asset_id of the asset that the transaction object refers to

```
bbclib.libs.bbclib_utils.bin2str_base64(dat)
```

```
bbclib.libs.bbclib_utils.convert_id_to_string(data, bytelen=32)
```

Convert binary data to hex string

Parameters

- **data** (`bytes`) – data to convert
- **bytelen** (`int`) – length of the result

Returns converted string

Return type `str`

```
bbclib.libs.bbclib_utils.convert_idstring_to_bytes(datastr, bytelen=32)
```

Convert hex string to binary data

Parameters

- **datastr** (`str`) – data to convert
- **bytelen** (`int`) – length of the result

Returns converted byte data

Return type bytes

`bbclib.libs.bbclib_utils.deep_copy_with_key_stringify(u, d=None)`

Utility for updating nested dictionary

`bbclib.libs.bbclib_utils.get_bigint(ptr, dat)`

`bbclib.libs.bbclib_utils.get_n_byte_int(ptr, n, dat)`

`bbclib.libs.bbclib_utils.get_n_bytes(ptr, n, dat)`

`bbclib.libs.bbclib_utils.get_new_id(seed_str=None, include_timestamp=True)`

Return 256-bit binary data

Parameters

- **seed_str** (*str*) – seed string that is hashed by SHA256
- **include_timestamp** (*bool*) – if True, timestamp (current time) is appended to the seed string

Returns 256-bit binary

Return type bytes

`bbclib.libs.bbclib_utils.get_random_id()`

Return 256-bit binary data

Returns 256-bit random binary

Return type bytes

`bbclib.libs.bbclib_utils.get_random_value(length=32)`

Return random bytes

Parameters **length** (*int*) – length of the result

Returns random bytes

Return type bytes

`bbclib.libs.bbclib_utils.make_relation_with_asset(asset_group_id, user_id, asset_body=None, asset_file=None)`

Utility to make BBcRelation object with BBcAsset

Parameters

- **asset_group_id** (*bytes*) – asset_group_id of the asset in the object
- **user_id** (*bytes*) – user_id of the owner of the asset
- **asset_body** (*str|bytes|dict*) – asset data
- **asset_file** (*bytes*) – file data (binary) for asset

Returns created BBcRelation object

Return type *BBcRelation*

`bbclib.libs.bbclib_utils.make_relation_with_asset_hash(asset_group_id, asset_ids=None)`

Utility to make BBcRelation object with BBcAssetHash

Parameters

- **asset_group_id** (*bytes*) – asset_group_id of the asset in the object
- **asset_ids** (*list(bytes)*) – list of the identifiers of assets

Returns created BBcRelation object

Return type *BBcRelation*

```
bbclib.libs.bbclib_utils.make_relation_with_asset_raw(asset_group_id,      as-
                                                    set_id=None,          as-
                                                    set_body=None)
```

Utility to make BBcRelation object with BBcAssetRaw

Parameters

- **asset_group_id** (*bytes*) – asset_group_id of the asset in the object
- **asset_id** (*bytes*) – the identifier of the asset
- **asset_body** (*str/bytes/dict*) – asset data

Returns created BBcRelation object

Return type *BBcRelation*

```
bbclib.libs.bbclib_utils.make_transaction(event_num=0, relation_num=0, witness=False,
                                           version=2)
```

Utility to make transaction object

Parameters

- **event_num** (*int*) – the number of BBcEvent object to include in the transaction
- **relation_num** (*int*) – the number of BBcRelation object to include in the transaction
- **witness** (*bool*) – If true, BBcWitness object is included in the transaction
- **version** (*int*) – version of the transaction format

Returns

Return type *BBcTransaction*

```
bbclib.libs.bbclib_utils.recover_signature_object(data)
Unpack signature data
```

Parameters **data** (*bytes*) – Serialized data of BBcSignature object

Returns BBcSignature object

Return type *BBcSignature*

```
bbclib.libs.bbclib_utils.str_binary(dat)
```

```
bbclib.libs.bbclib_utils.to_1byte(val)
```

```
bbclib.libs.bbclib_utils.to_2byte(val)
```

```
bbclib.libs.bbclib_utils.to_4byte(val)
```

```
bbclib.libs.bbclib_utils.to_8byte(val)
```

```
bbclib.libs.bbclib_utils.to_bigint(val, size=32)
```

```
bbclib.libs.bbclib_utils.validate_transaction_object(txobj, asset_files=None)
Validate transaction and its asset
```

Parameters

- **txobj** (*BBcTransaction*) – target transaction object
- **asset_files** (*dict*) – dictionary containing the asset file contents

Returns True if valid tuple: list of valid assets tuple: list of invalid assets

Return type bool

`bbclib.libs.bbclib_utils.verify_using_cross_ref(domain_id, transaction_id, transaction_base_digest, cross_ref_data, sigdata)`

Confirm the existence of the transaction using cross_ref

Parameters

- **domain_id** (*bytes*) – target domain_id
- **transaction_id** (*bytes*) – target transaction_id of which existence you want to confirm
- **transaction_base_digest** (*bytes*) – digest obtained from the outer domain
- **cross_ref_data** (*bytes*) – packed BBcCrossRef object
- **sigdata** (*bytes*) – packed signature

Returns True if valid

Return type bool

bbclib.libs.bbclib_wire module

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class `bbclib.libs.bbclib_wire.BBcFormat`

Bases: object

FORMAT_PLAIN = 0

FORMAT_ZLIB = 16

classmethod `generate(txobj, format_type=0)`

Transform transaction object in wire format

Parameters

- **txobj** – BBcTransaction object
- **format_type** – 2-byte value of BBcFormat type

Returns binary data

classmethod `strip(data)`

Strip 2-byte wire header and recover plain binary

Parameters **data** – binary data with wire header

Returns plain binary data without the header

bbclib.libs.bbclib_witness module

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class `bbclib.libs.bbclib_witness.BBcWitness` (*id_length=None*)

Bases: `object`

Witness part in a transaction

add_signature (*user_id=None, signature=None*)

Add signature in the reserved space for the *user_id* that was registered before

Parameters

- **user_id** (*bytes*) – *user_id* of the signature owner
- **signature** (*BBcSignature*) – signature

add_witness (*user_id*)

Register *user_id* in the list

pack ()

Pack this object

Returns packed binary data

Return type `bytes`

unpack (*data*)

Unpack into this object

Parameters **data** (*bytes*) – packed binary data

Returns `True` if successful

Return type `bool`

1.1.2.2 Module contents

1.2 Module contents

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`bbclib.configure_id_length` (*conf*)

`bbclib.configure_id_length_all(value)`

`bbclib.deserialize(txdata)`

Deserialize binary data with 2-byte wire header

Parameters `txdata` –

Returns BBcTransaction: BBcTransaction object int: 2-byte value of BBcFormat type

`bbclib.serialize(txobj, format_type=0)`

Serialize transaction object with 2-byte wire header

Parameters

- `txobj` – BBcTransaction object
- `format_type` – value defined in `bbclib_wire.BBcFormat`

Returns binary

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