
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.KeyPairFast (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 rivate 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, as-
                                     set_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, as-
set_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, for-
mat_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_asset_hash module

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```
class bbclib.libs.bbclib_asset_hash.BBcAssetHash (asset_ids=None, id_length=None)
    Bases: object

    AssetHash part in a transaction

    add (asset_ids=None)
        Add parts in this object

    digest ()
        Return digest

        The digest is the first entry of asset_ids

        Returns asset_id

        Return type bytes

    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_asset_raw module

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```
class bbclib.libs.bbclib_asset_raw.BBcAssetRaw (asset_id=None,      asset_body=None,
                                              id_length=None)

    Bases: object

    AssetRaw part in a transaction

    In this object, asset_id should be given externally, meaning that this object does not care about how to calculate the digest.

    add (asset_id=None, asset_body=None)
        Add parts in this object

    digest ()
        Return digest

        The digest corresponds to the asset_id of this object. The asset_id is given externally, so bbclib does not care about how to calculate the digest of the asset_body.

        Returns asset_id
```

Return type bytes

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_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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```
bbclib.libs.bbclib_keypair.KeyPair
    alias of bbclib.libs.bbclib_keypair.KeyPairPy

class bbclib.libs.bbclib_keypair.KeyPairPy (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(privkey)
        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_keypair_fast module

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
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.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,      transac-  
                                                  tion, 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=1*)

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, as-
                                           set_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, as-
                                                set_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,      as-  
                                                       set_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=1)
```

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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