

Technical Report

General Description:

this document describes the detail requirement, rough design and detail design of Ont test tools.

Related Document:

1. Test tools source code: <https://github.com/ontio-test/test>

Unless otherwise stated, the latest issue of each of the above documents shall be the one used.

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1.1 Revision History

Revision History					
Date	PIC	Version	Description	Reviewer	Approver
2018-08-02	Lyon.liu	0.0.01	Initial		
2018-08-19	Yu Jing Chen Chao Tian Rong	1.0	release	Kevin Chen	(ONT) Li Xiping

1.2 Glossary and Definitions

2 DETAIL REQUIRIEMENT

Ont test tools is used for check ontology network provide the api and each function. Ont test tools can through RPC, restful, websocket to communication with the ontology network. Also can communication with the sign server. Current ont test tools developed with python. Data driven test. Request is using JSON.

Ont test tools can not only check the normal data and normal sequence for ontology but also can check the abnormal data and abnormal sequence for ontology.

Ont test tools is automatic test framework.it can automatic execute the test suit. And automatic check the result.

Software requirement:

OS: ubuntu 16.04.2

Python: python3

WireShark 2.2.6

Zabbix 3.4

Hardware(server) requirement:

CPU: E5-2673 V3 @ 2.40GHz

Memory: 8G

HD: 64G

2.1 Authenticate

current ont test tools support Ontology Authenticate related test , it need cover all follow requirements:

1. Init_admin—ont test tools can start init_admin process.check with different parameter combination ontology's robust.
2. bind role& bind user—ont test tools support to assign the function to the role and assign ontid to the role.
3. Delegate user & withdraw —ont test tools can delegate the user also can withdraw the delegate.
4. Invoke function—test tools can invoke other functions to verify the token
5. transfer—ont test tools can transfer the admine to new ont id

2.2 Benefit model

current ont test tools support Ontology benefit model related test , it need cover all follow requirements:

1. get benefit value—ont test tools support to get the benefit value from config file

2. get candidate benefit value—ont test tools support to get the candidate benefit value from config file
3. add candidate node—ont test tools support to add candidate node and check after add the node the ong value and dividends distribution .

2.3 Consensus

current ont test tools support Ontology consensus related test , it need cover all follow requirements:

1. Transfer —ont test tools can support transfer the contract from old address to a new address
2. Get storage config —ont test tools can get the storage config from ontology network
3. Multi sign transfer—ont test tools can support multi signed contract transfer from old address to a new address
4. add candidate node—ont test tools support to add candidate node and check after add the node the ong value and dividends distribution ..

2.4 Encryption

current ont test tools support Ontology encryption related test , it need cover all follow requirements:

1. Encryption pay —ont test tools can check the ong and ont value change after encryption pay is correct or not.

2.5 Governance

current ont test tools support Ontology governance related test , it need cover all follow requirements:

1. Vote & unvote —ont test tools can support wallet start vote and also start unvote the node and check the ont value correct or not
2. Withdraw —ont test tools can support wallet withdraw ont
3. Quit & block node—ont test tools can support quit or block the node for the wallet

2.6 Governance API

current ont test tools support Ontology governance API related test , it need cover all follow requirements:

1. init—ont test tools can restart the all nodes and register ontIDs, create role and bind ONTID with role
2. invoke vote—ont test tools can invoke vote function to check the vote For Peer process and the response
3. invoke update—ont test tools can invoke update function to check the update Config process and the response
4. invoke register—ont test tools can invoke register function to check the register Candidate process and the response
5. Invoke candidate — ont test tools can invoke candidate function to check the approve/reject Candidate or white node process and the response
6. Invoke node — ont test tools can invoke node function to check the black Node process and the response

7. Invoke commitDpos —ont test tools can invoke commitDpos functions to check the process and the response
8. Invoke quitNode — ont test tools can invoke quitNode function to check the quit Node process and the response
9. Invoke TransferPenalty — ont test tools can invoke transferPenalty function to check the transfer Penalty process and the response
10. Invoke SplitCurve—ont test tools can invoke SplitCurve function to check the update SplitCurve process and the response
11. NodeCountCheck—ont test tools can get the node count from ontology network and check the result correct or not

2.7 Muti Contract

current ont test tools support Ontology muti contract related test , it need cover all follow requirements:

1. Set premise—ont test tools can support multi contract with mutli user and multi role combination

2.8 Neo API

current ont test tools support Ontology NEO API related test , it need cover all follow requirements:

1. Invoke function with different parameter—ont test tools can invoke function with example: “height/ header/ Transaction/ Block/Contact/ Hash/Version/Prehash/ Index/ Merkle_root/ Timestamp” param to check the each process and the result
2. Invoke storage put—ont test tools can invoke the storage put from ontology network and check the process and the result
3. Invoke storage get—ont test tools can invoke the storage get from ontology network and check the process and the result

2.9 Neo Param

current ont test tools support Ontology Neo Param related test , it need cover all follow requirements:

1. invoke function——ont test tools support invoke function with different function string to ontology network and check the each process and the result

2.10 Ong native

current ont test tools support Ontology ong native related test , it need cover all follow requirements:

1. Transfer —ont test tools can transfer the pay follow contract in ong native to ontology network
2. Provide —ont test tools can provide transfer the pay follow contract in ong native to ontology network
3. Transfer from —ont test tools can provide transfer the pay follow contract from somebody in ong native to ontology network
4. Get information —ont test tools can get the name,symbol,decimals,totalsupply, balanceof and allowance in ong native to check the process and the result

2.11 Ont native

Ont native should support the same requirement with ong native.

2.12 Ontid API

current ont test tools support Ontology ontid API related test , it need cover all follow requirements:

1. Register —ont test tools can register the ontid not only from public key but also from attributes
2. Key operation —ont test tools can provide function for add/ remove public key with the ontid
3. Recovery—ont test tools can provide function for add/ change recovery with the ontid
4. Attributes operation —ont test tools can provide function for add/remove attributes with the ontid
5. Get information —ont test tools can get the publickeys,key state,attribute,DDO with the ontid
6. verifySignature—ont test tools can verify the signature with ontid
7. Multi sig contract—ont test tools can not only support single contract but also support multi sig contract

2.13 Ontid others

current ont test tools support Ontology ontid others related test , it need cover all follow requirements:

1. Register —ont test tools can register the ontid not only from public key but also from attributes
2. Key operation —ont test tools can provide function for add/ remove public key with the ontid
3. Recovery—ont test tools can provide function for add/ change recovery with the ontid
4. Attributes operation —ont test tools can provide function for add/remove attributes with the ontid
5. Get information —ont test tools can get the publickeys,key state,attribute,DDO with the ontid
6. verifySignature—ont test tools can verify the signature with ontid

2.14 RPC

current ont test tools support Ontology RPC related test , it need cover all follow requirements:

1. RPC all API—ont test tools should support all RPC apis process check and result check .

2.15 Restful

current ont test tools support Ontology Restful related test , it need cover all follow requirements:

1. Restful all API—ont test tools should support all Restful apis process check and result check .

2.16 Websocket

current ont test tools support Ontology Websocket related test , it need cover all follow requirements:

1. Websocket API—ont test tools should support all Websocket apis process check and result check

3 ROUGH DESIGN

3.1 Architecture Design

See following picture about the test tool architecture:

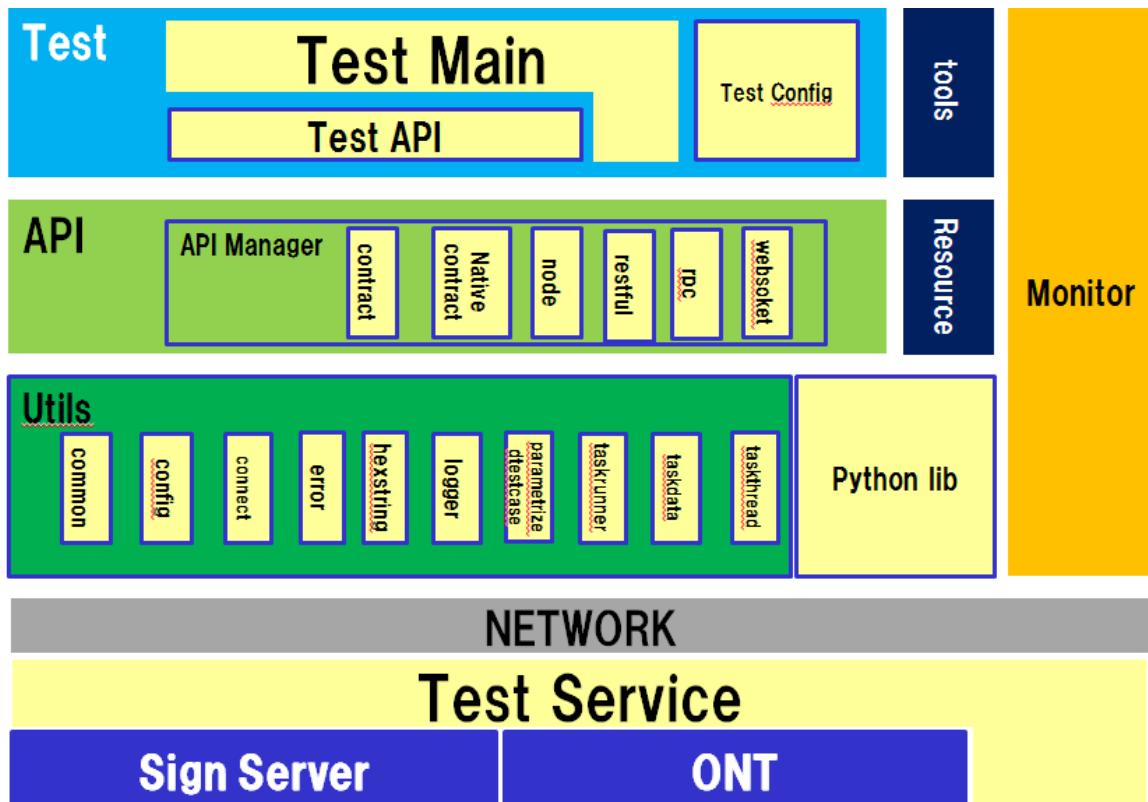


Figure 1 Test Tool Architecture

The Test, API, Utils, Tools, Resource, Monitor blocks are tool modules.

For the test tools we have following modules:

- Test :
 - define the special API for each test in test API file;
 - define the test case in test main file;
 - define the test special config file in test config file
 - execut the test case
- API:
 - provide the common function which is used in Test main case and Test API file;
 - sendback the result & response to Test module
 - communication with Utils module & monitor module
- Utils:
 - provide the basic function for test tools using;
 - communication with the sign server and ont network
 - Sendback the sign server & ONT network result and response to API module
- Tools:
 - provide the basic tools for test tools using;

- Resource:
 - a) provide the data for test tools using
- Monitor:
 - a) Monite the test process during test case execute;
 - b) Restart and recover the test environment
 - c) Collect the the test data during test case execute.
 - d) Analysis the test result

3.2 Sequence Definition

3.2.1 Test_Auth

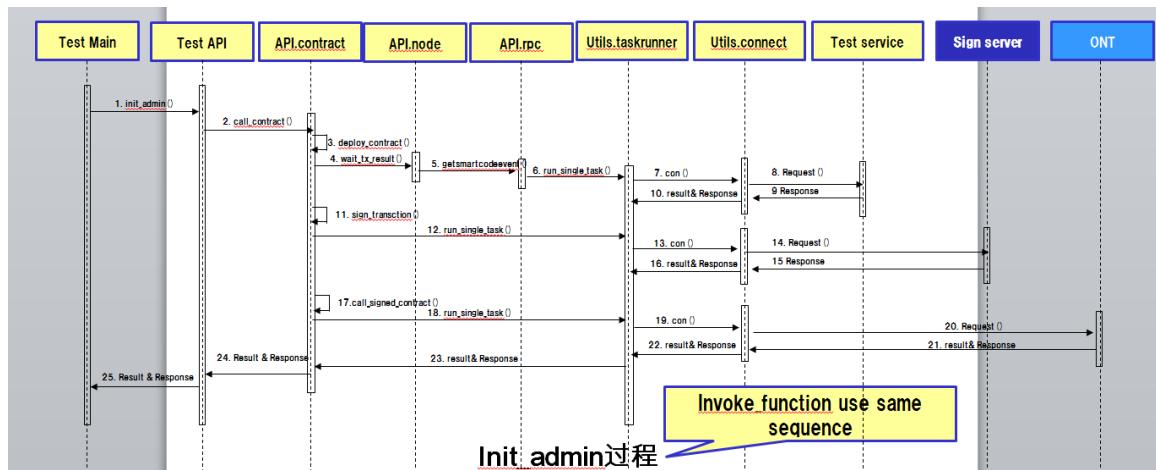


Figure 2 Test_Auth

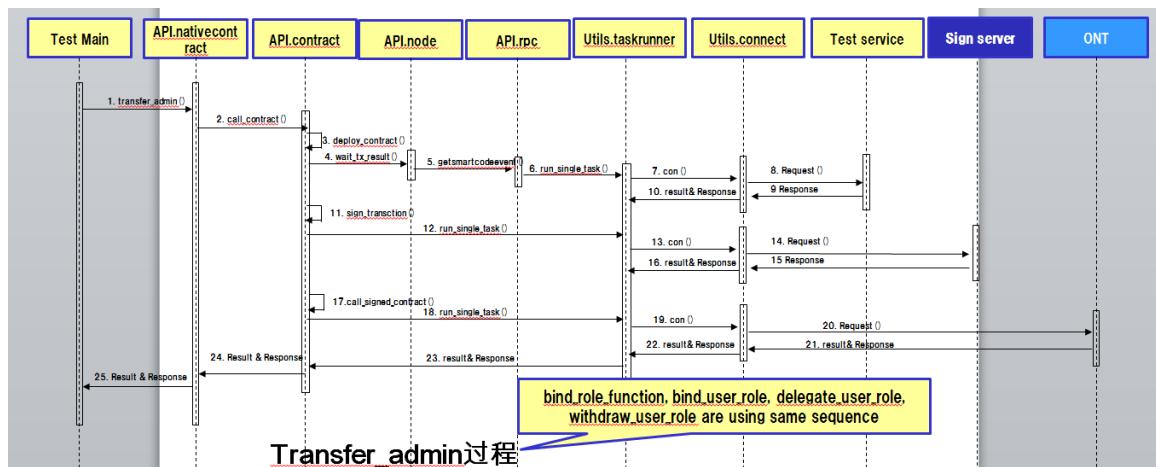


Figure 3 Transfer_admin

3.2.2 Test_benefit_model

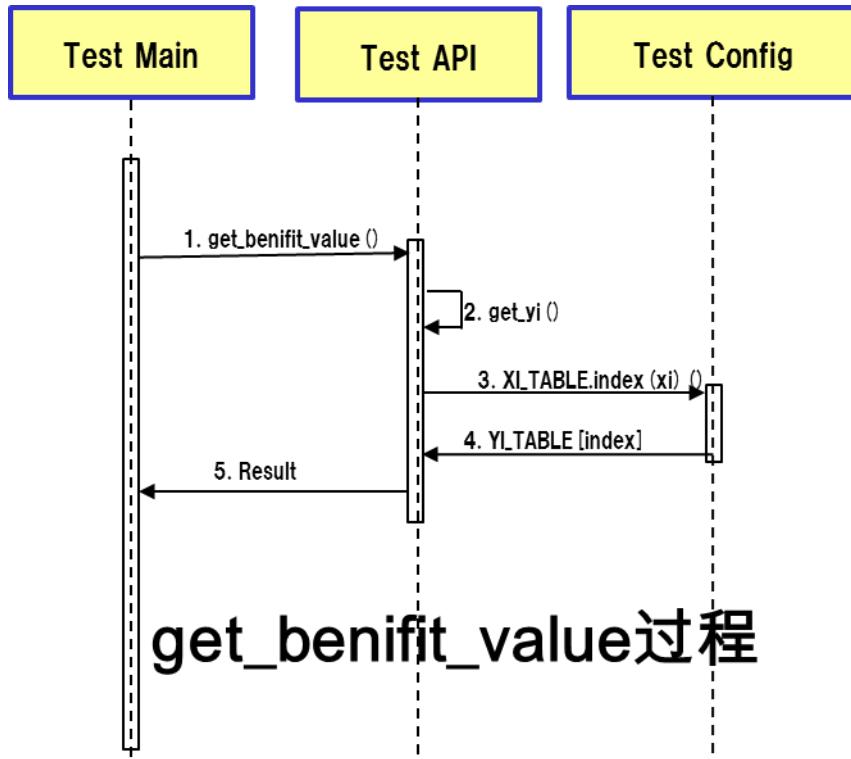


Figure 4 Transfer_admin

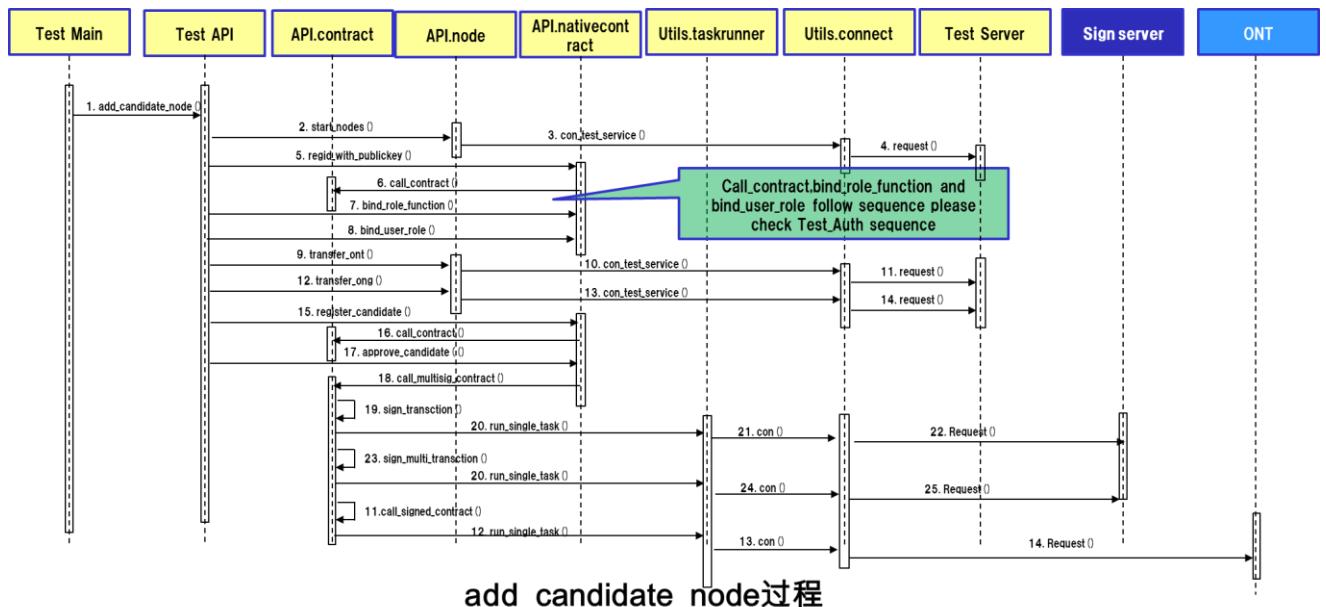


Figure 5 add_candidate_node

3.2.3 Test_consensus

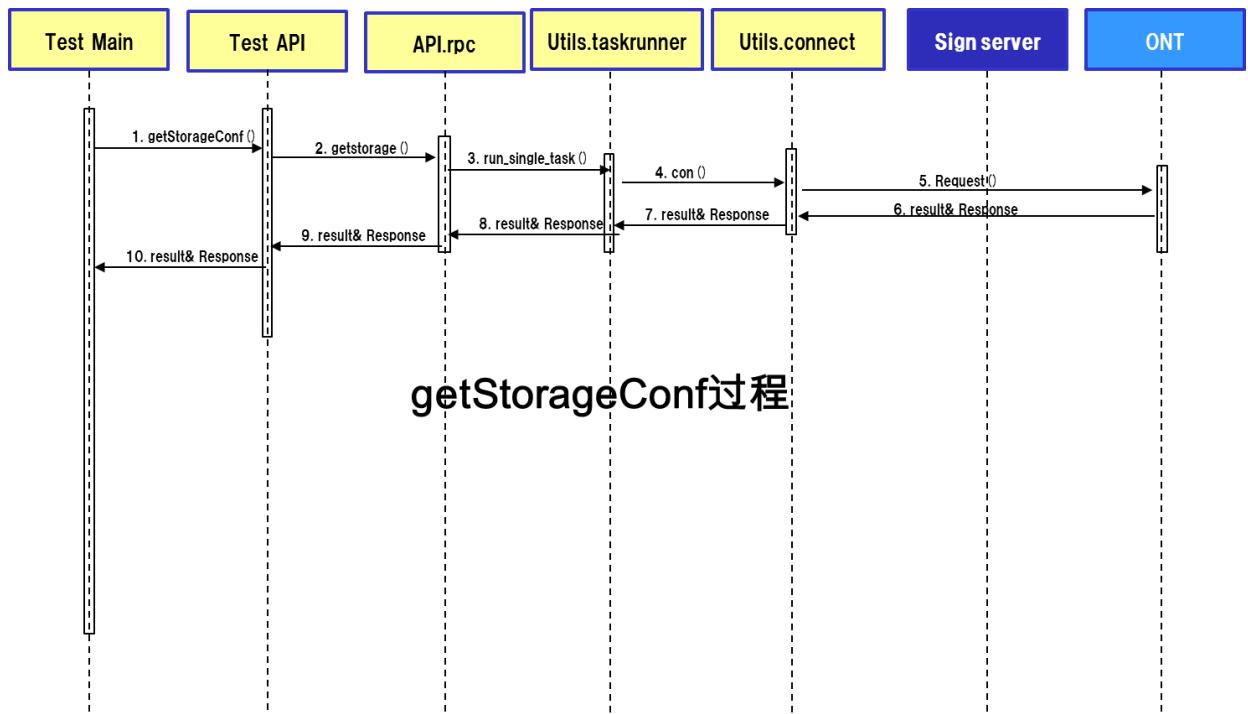


Figure 6 getStorageConf

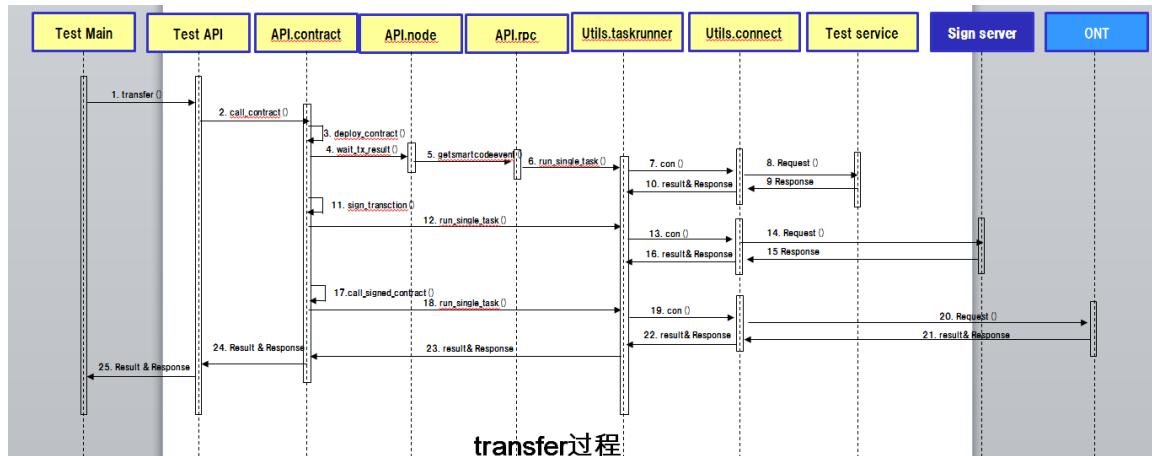


Figure 7 transfer

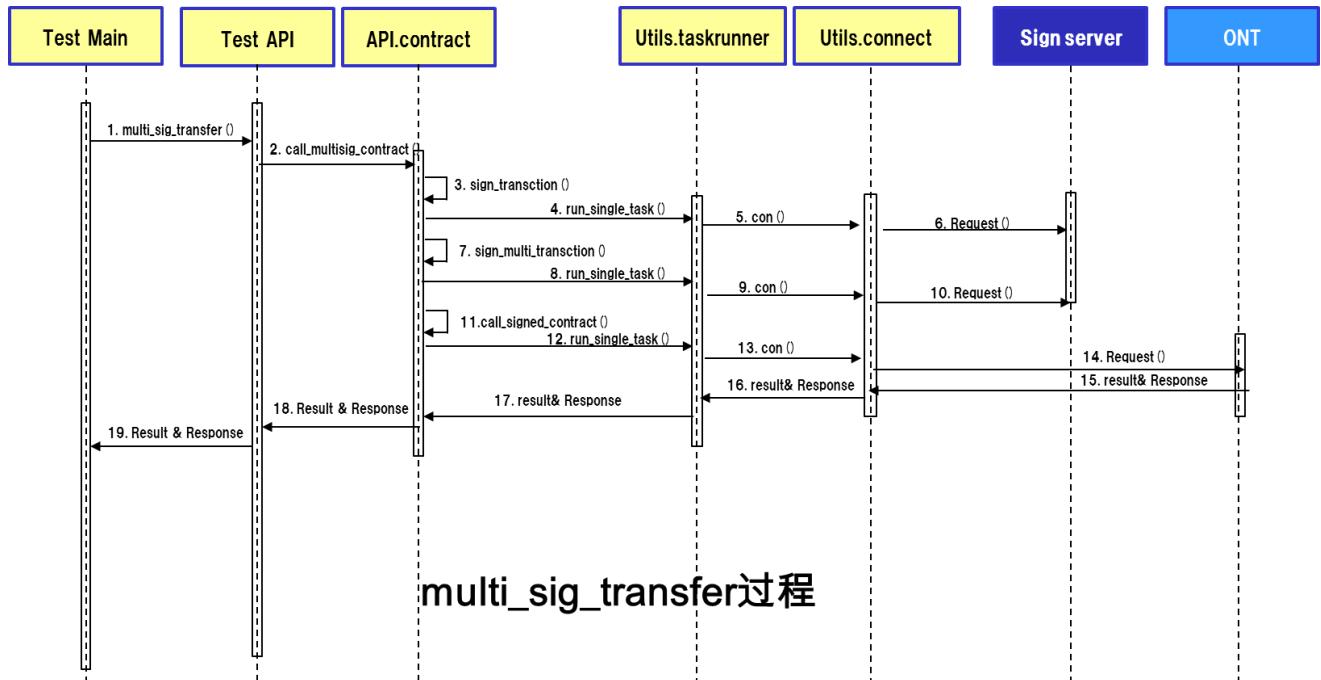


Figure 8 multi_sig_transfer

3.2.4 Test_encryption

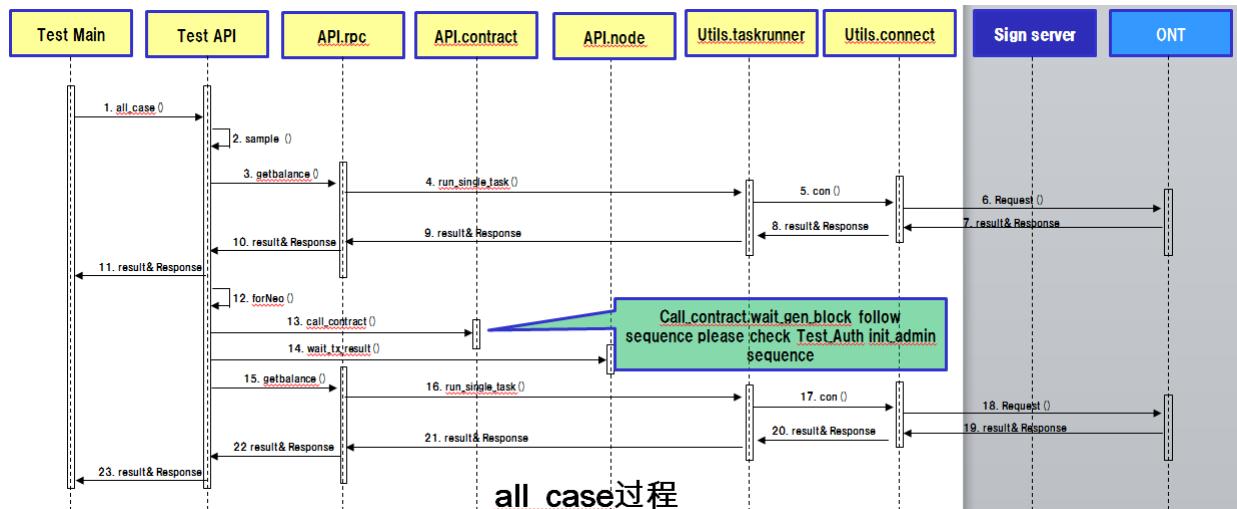


Figure 9 Test_encryption

3.2.5 Test_governance

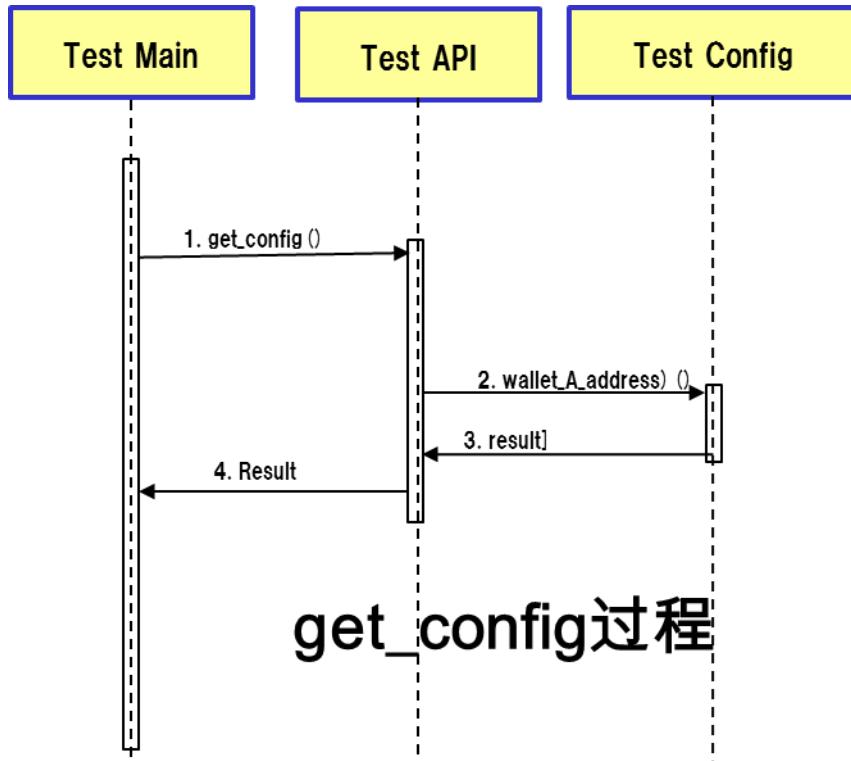


Figure 10 get_config

3.2.6 Test_governance_API

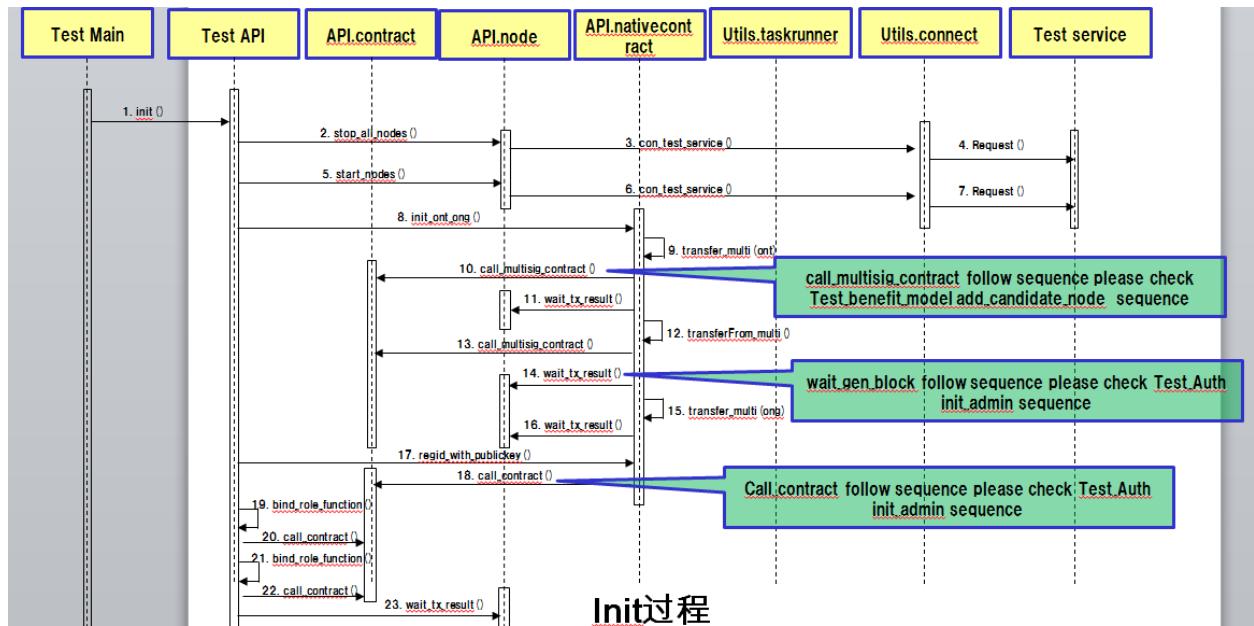


Figure 11 Test_governance_API

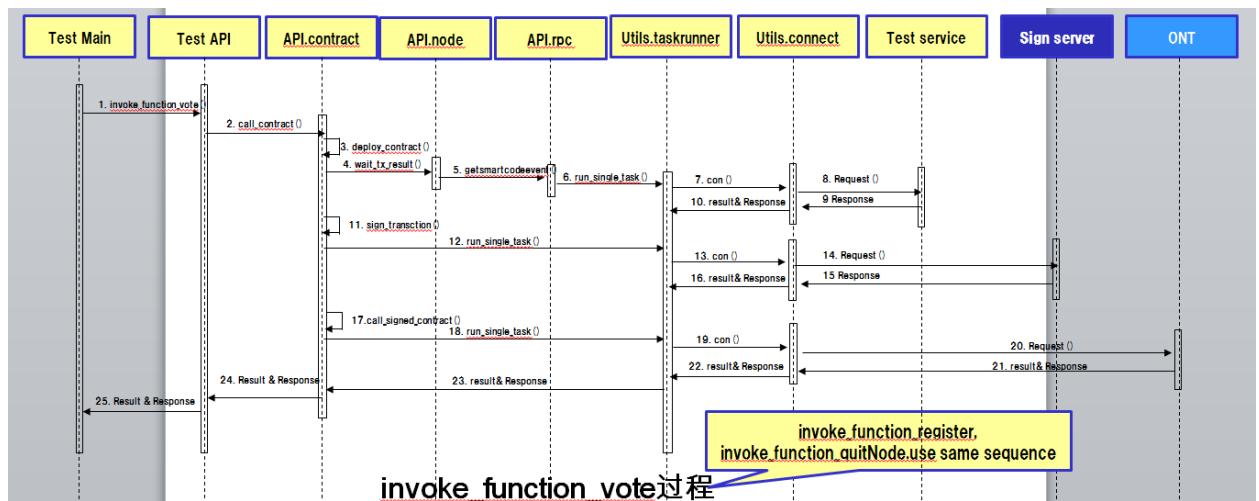


Figure 12 invoke_function_vote

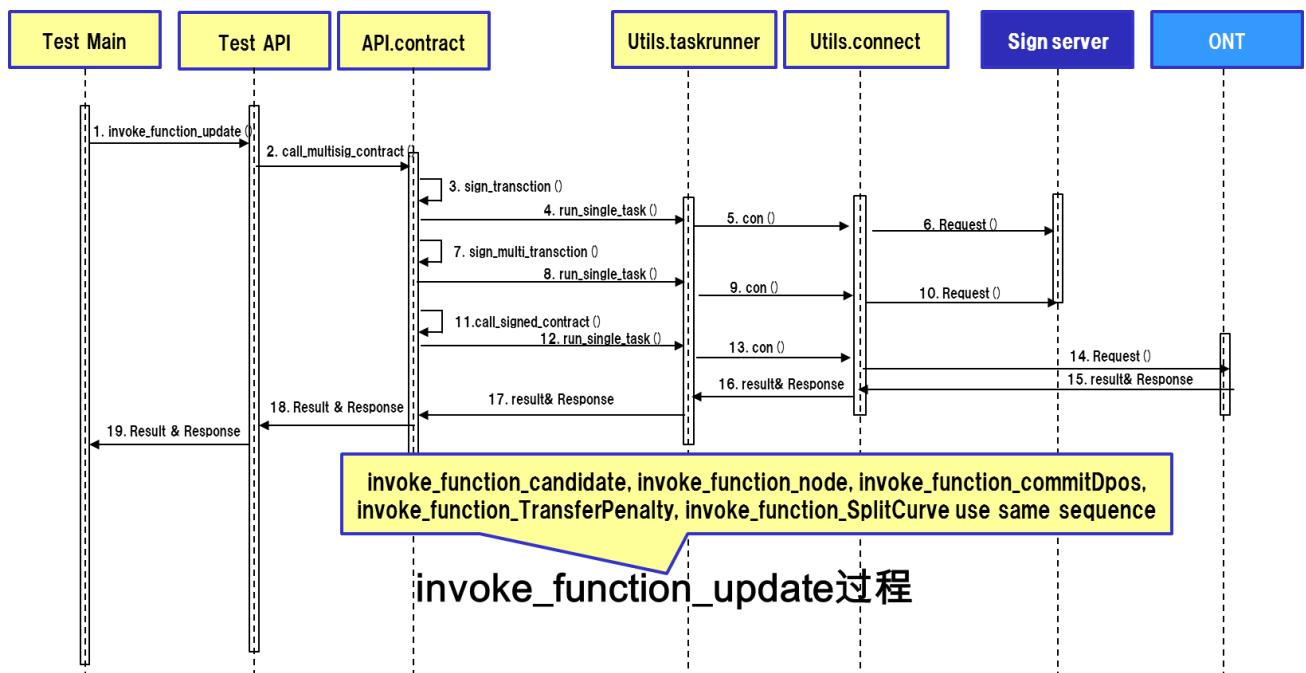


Figure 13 invoke_function_update

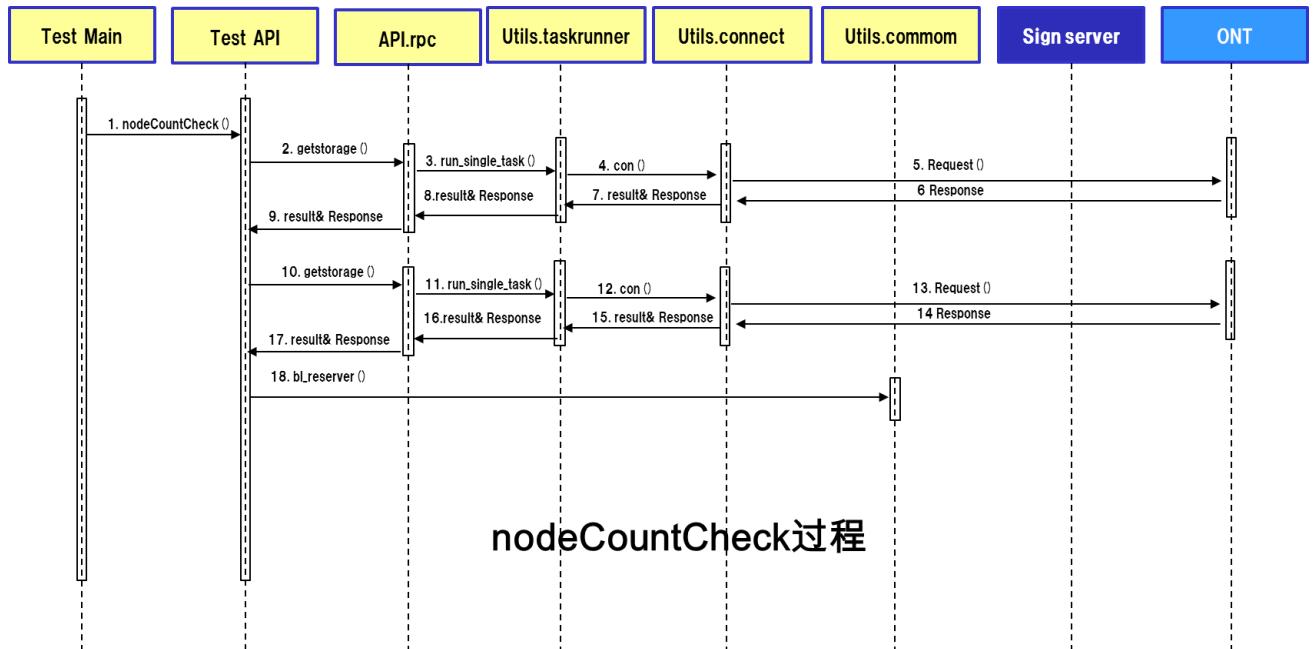


Figure 14 nodeCountCheck

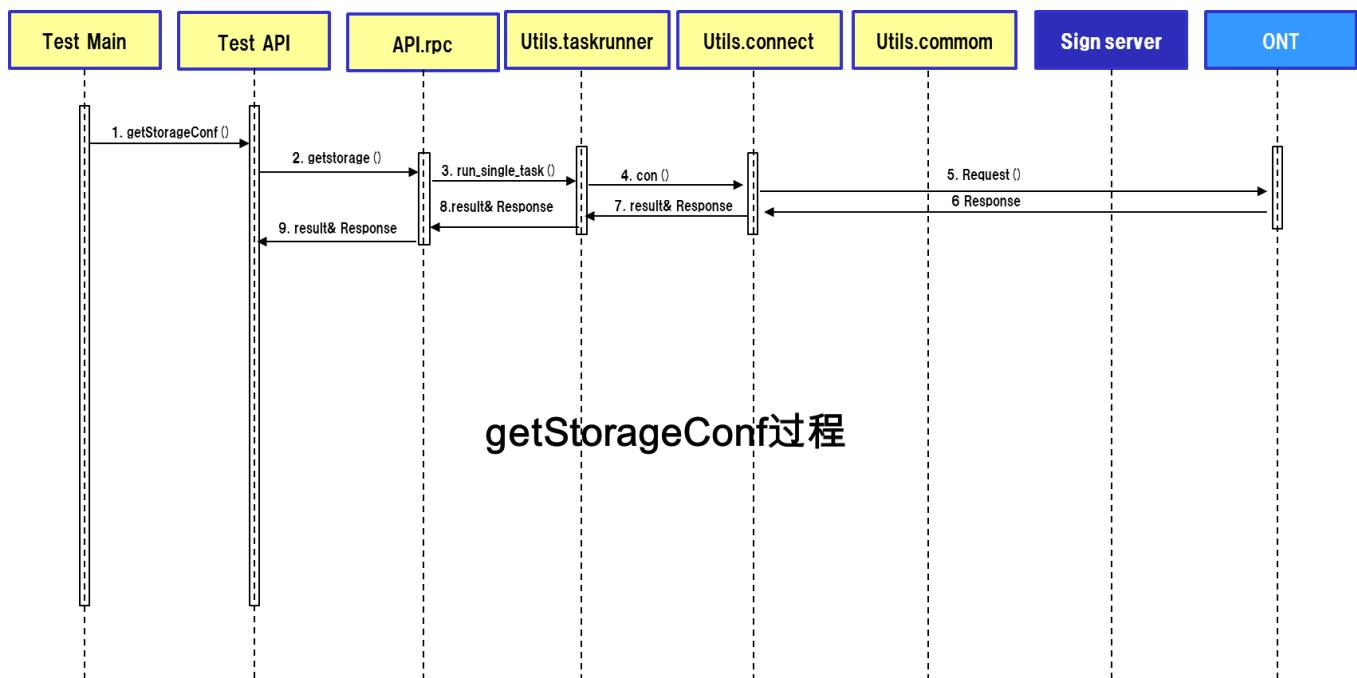


Figure 15 getStorageConf

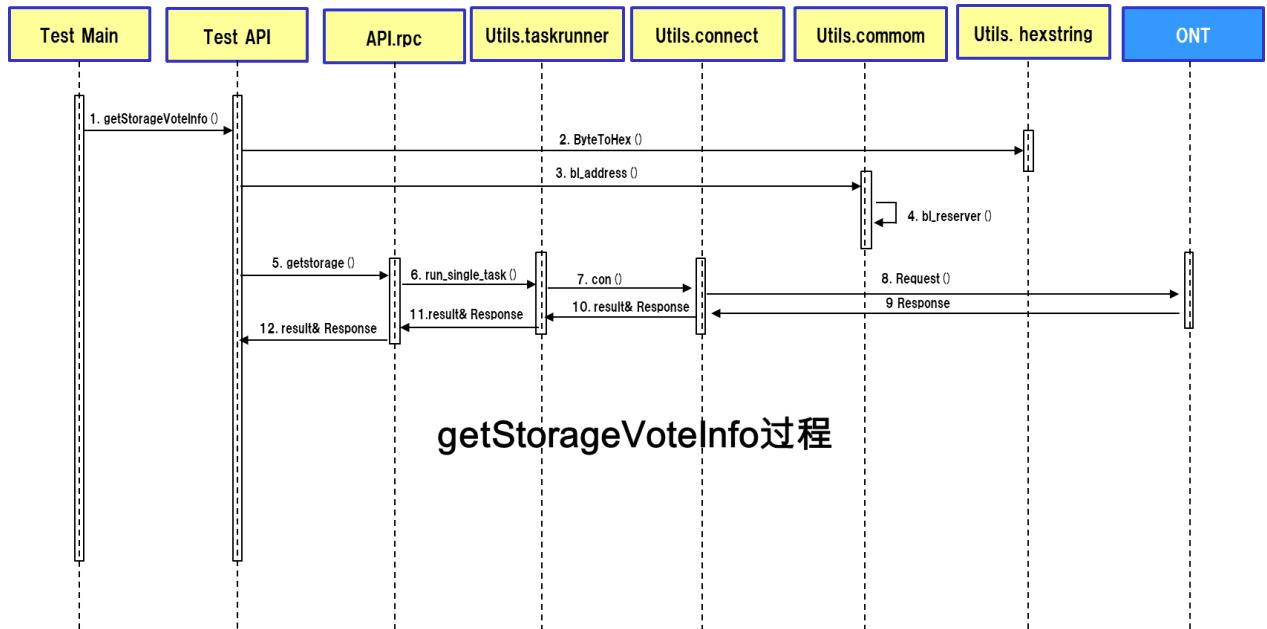


Figure 16 getStorageVoteInfo

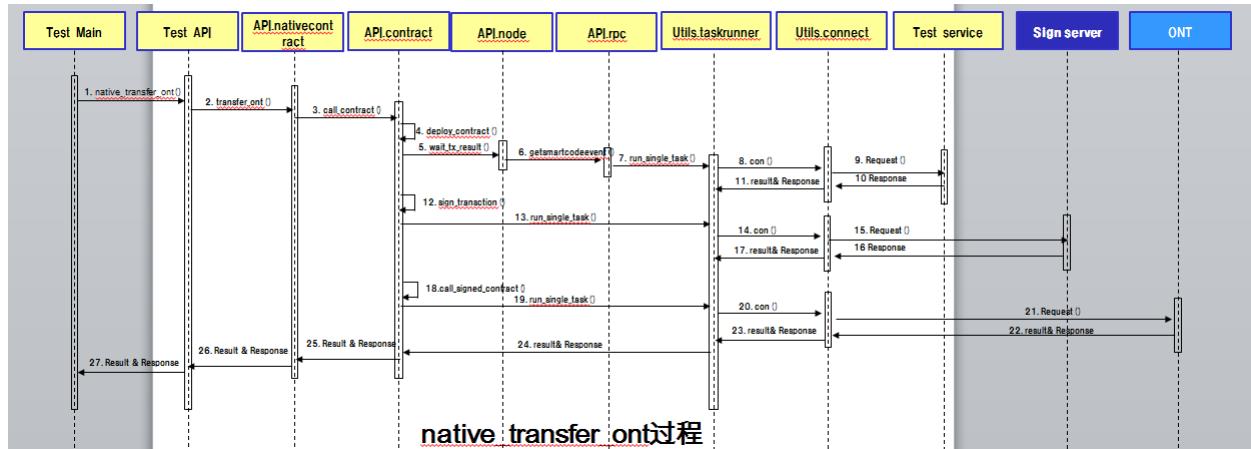


Figure 17 native_transfer_ont

3.2.7 Test_multi_contract

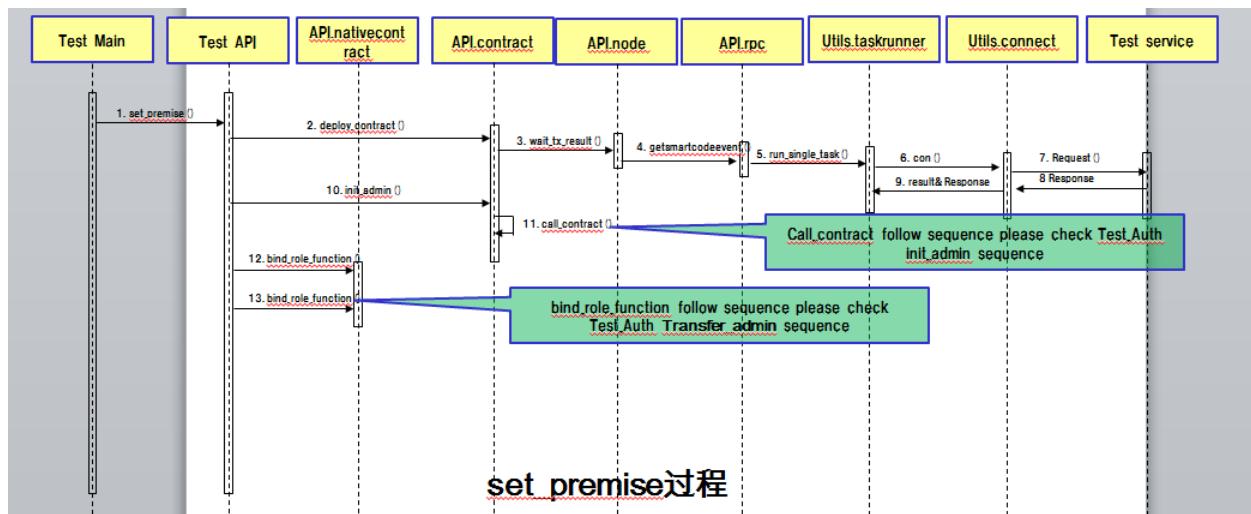


Figure 18 set_premise

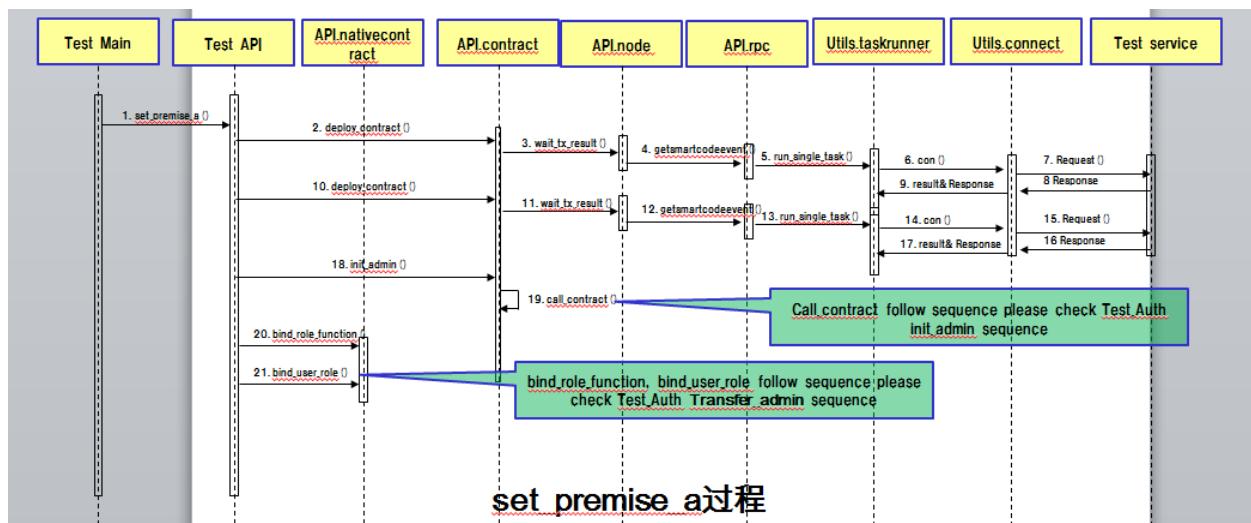


Figure 19 set_premise_a

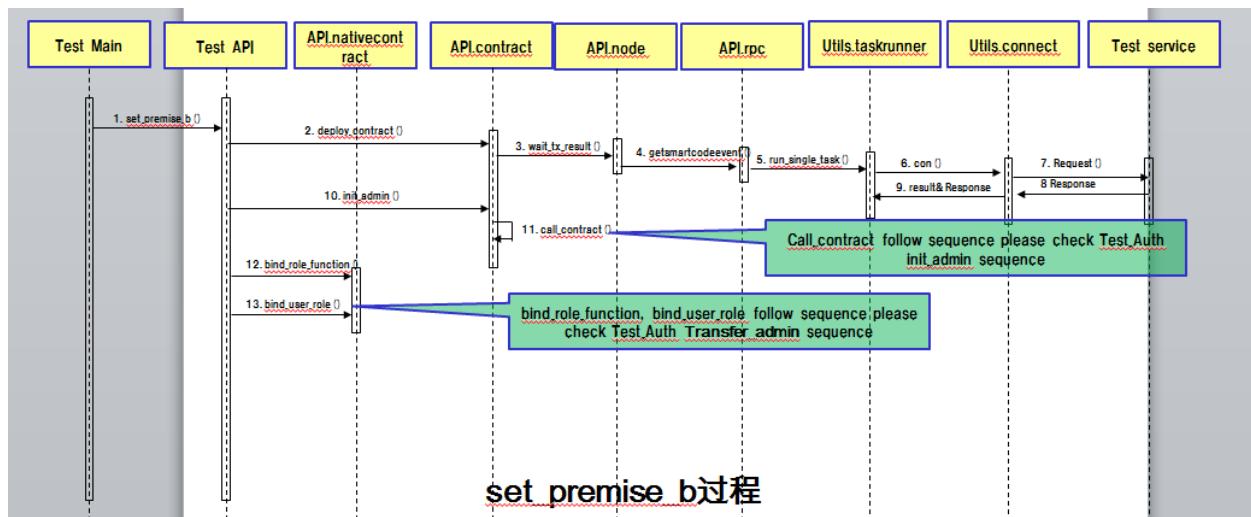


Figure 20 set_premise_b

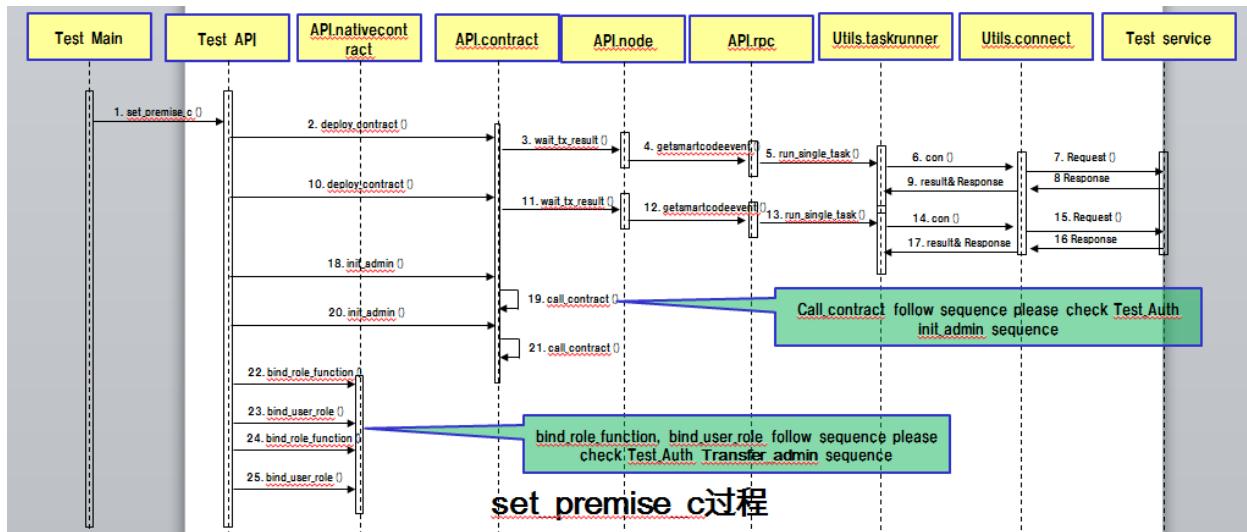


Figure 21 set_premise_c

3.2.8 Test_neo_api

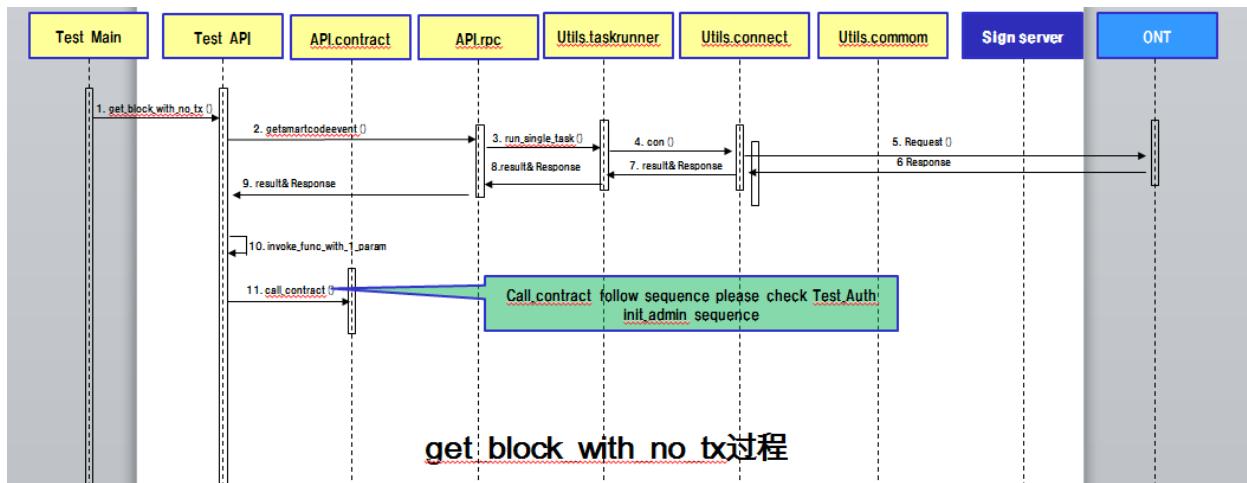


Figure 22 get_block_with_no_tx

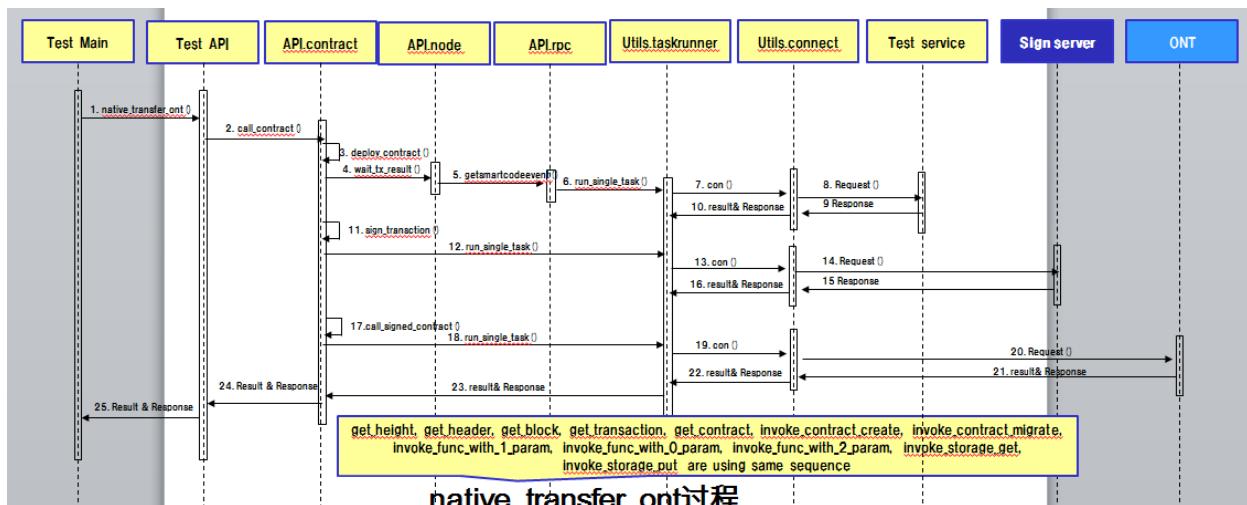


Figure 23 native_transfer_ont

3.2.9 Test_neo_param

Test_neo_param no special sequence. It will use Test_neo_api sequence

3.2.10 Test_ong_native

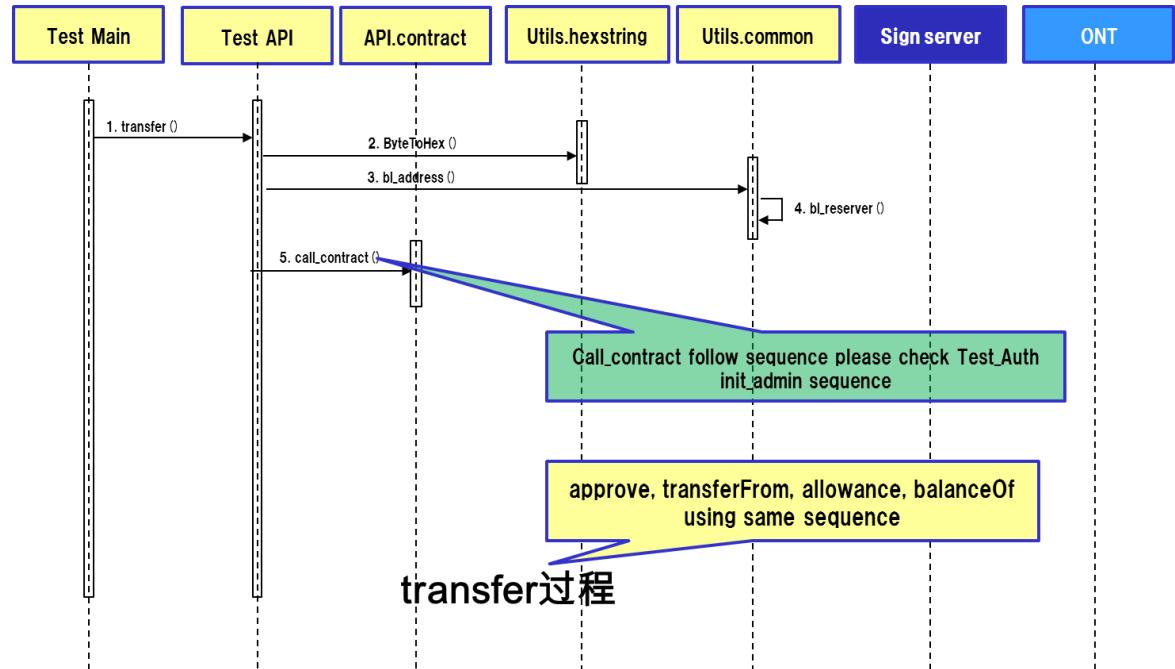


Figure 24 transfer

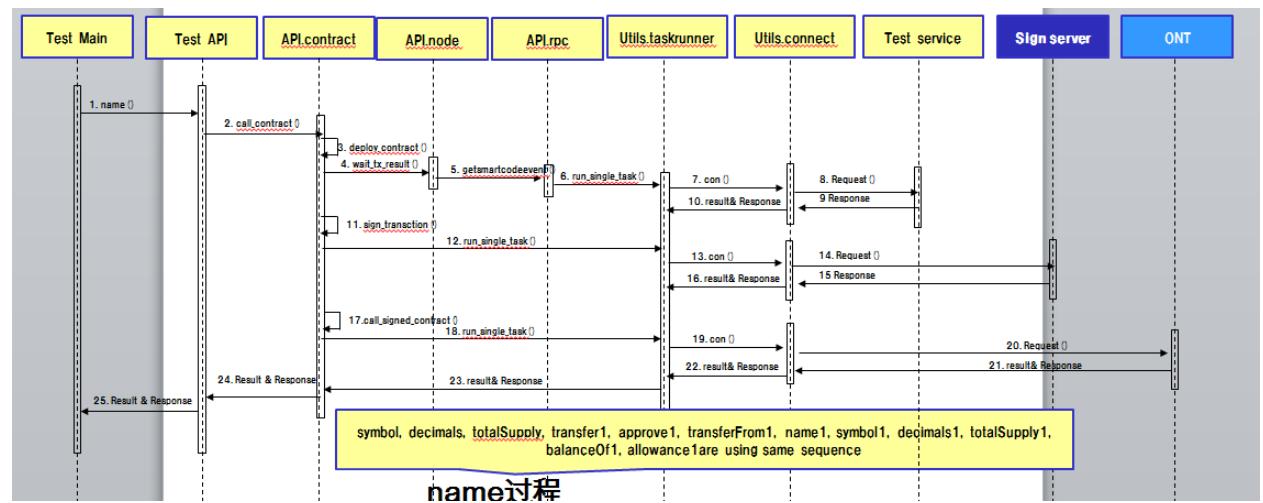


Figure 25 name

3.2.11 Test_ont_native

Test_ont_native function call sequence is same as Test_ong_native call sequence

3.2.12 Test_ontid_api

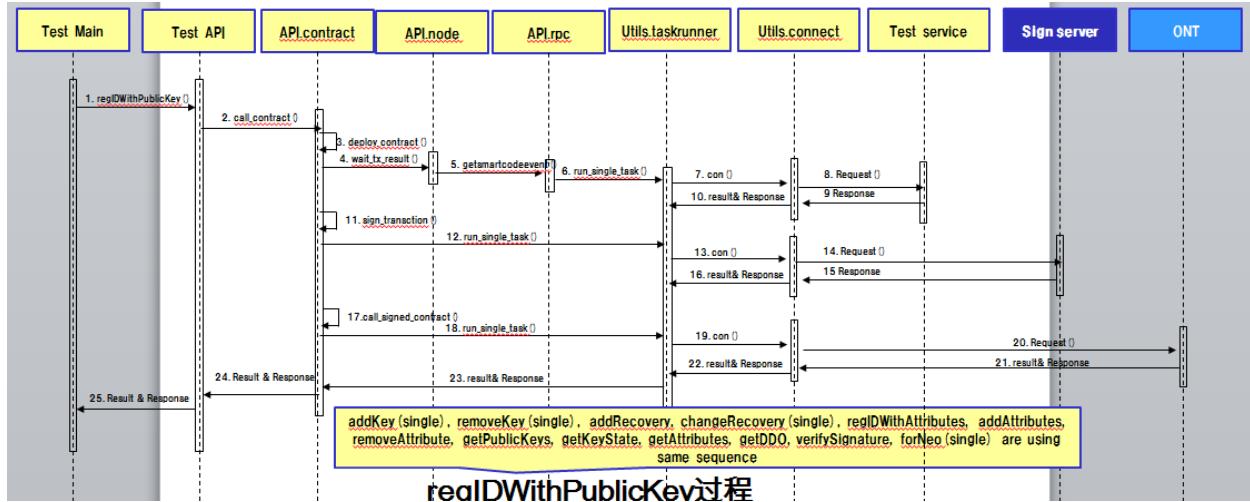


Figure 26 regIDWithPublicKey

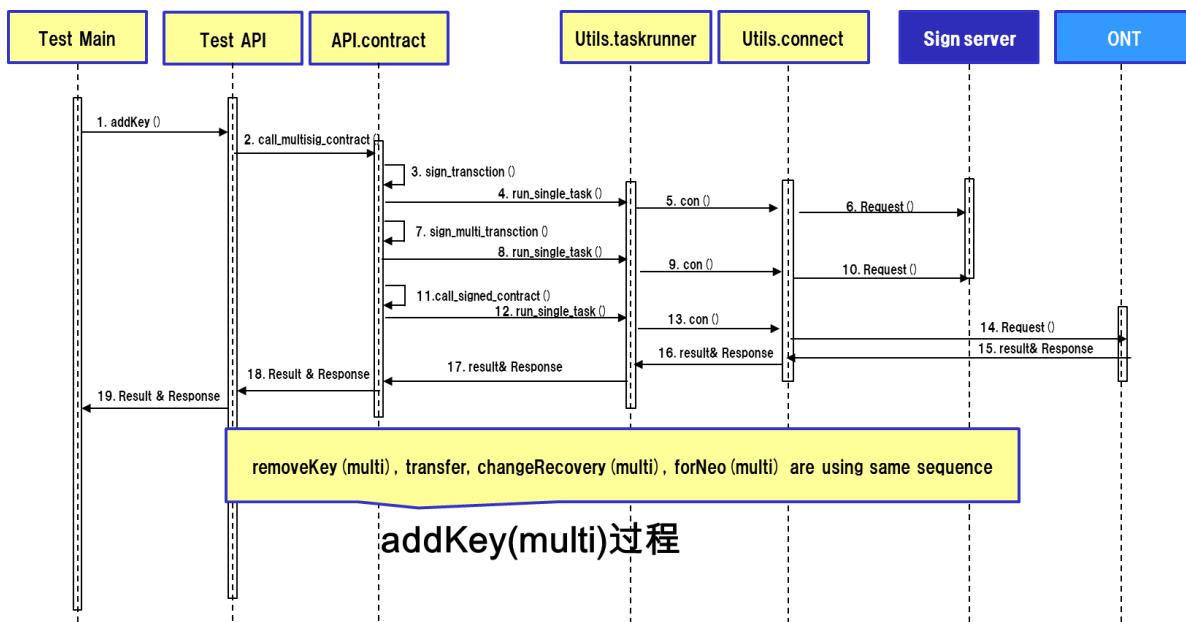


Figure 27 Test_ontid_api

3.2.13 Test_ontid_others

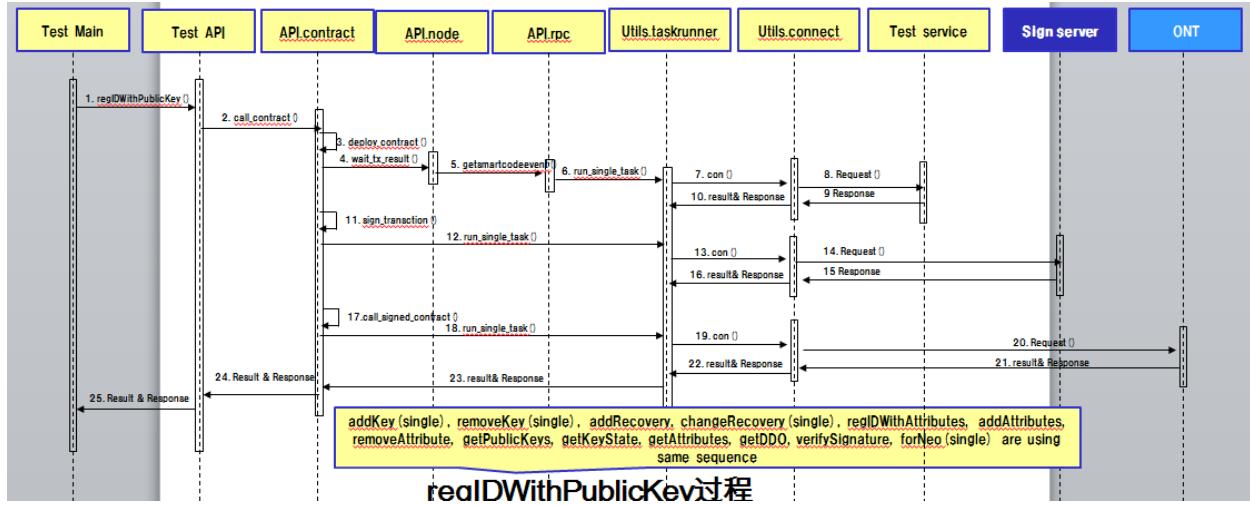


Figure 28 regIDWithPublicKey

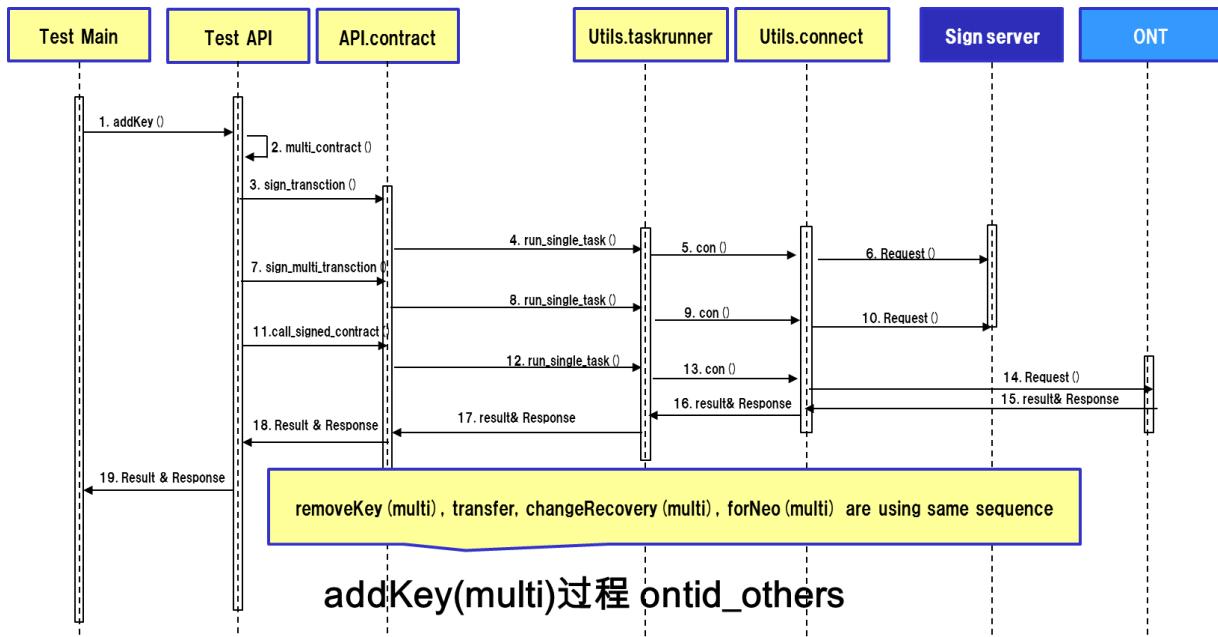


Figure 29 Test_ontid_others

3.2.14 Test_restful

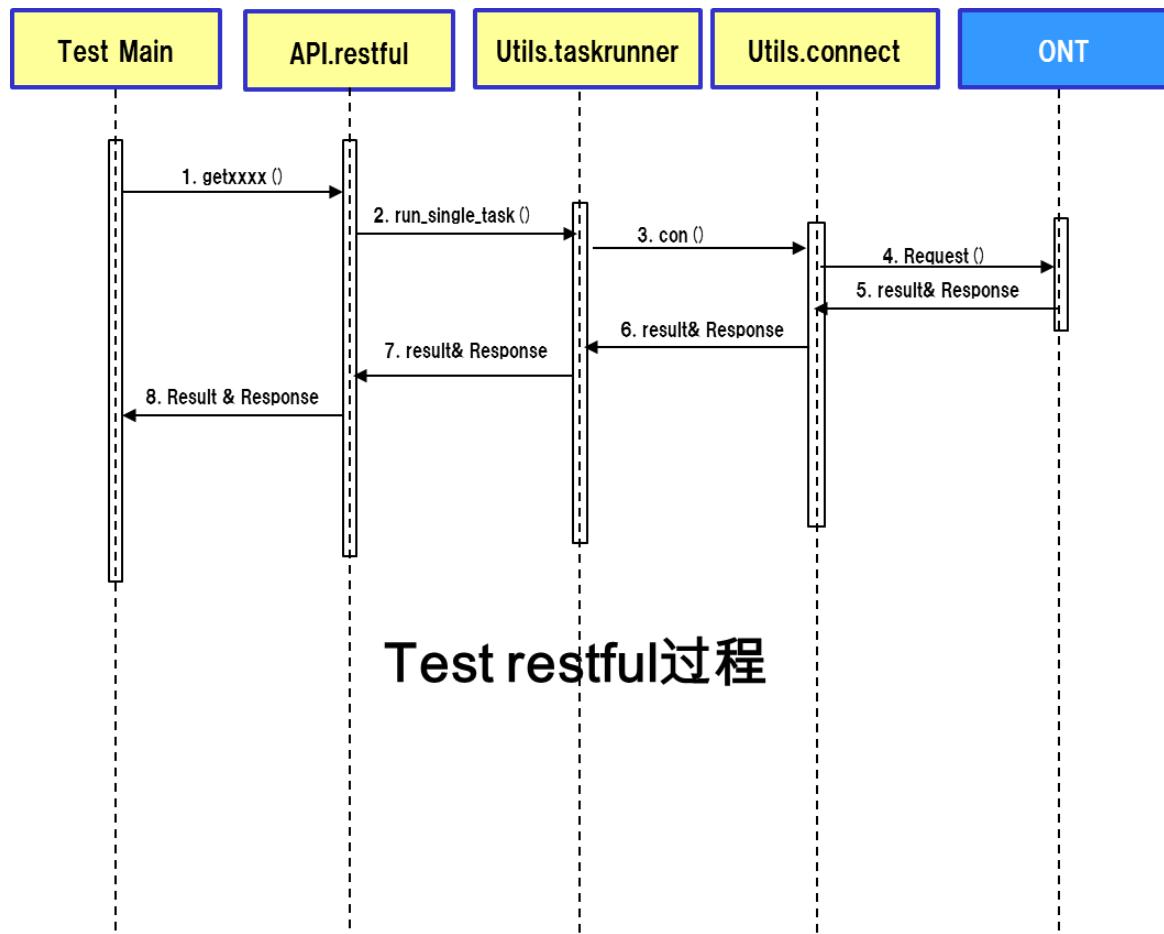


Figure 30 Test_restful

3.2.15 Test_rpc

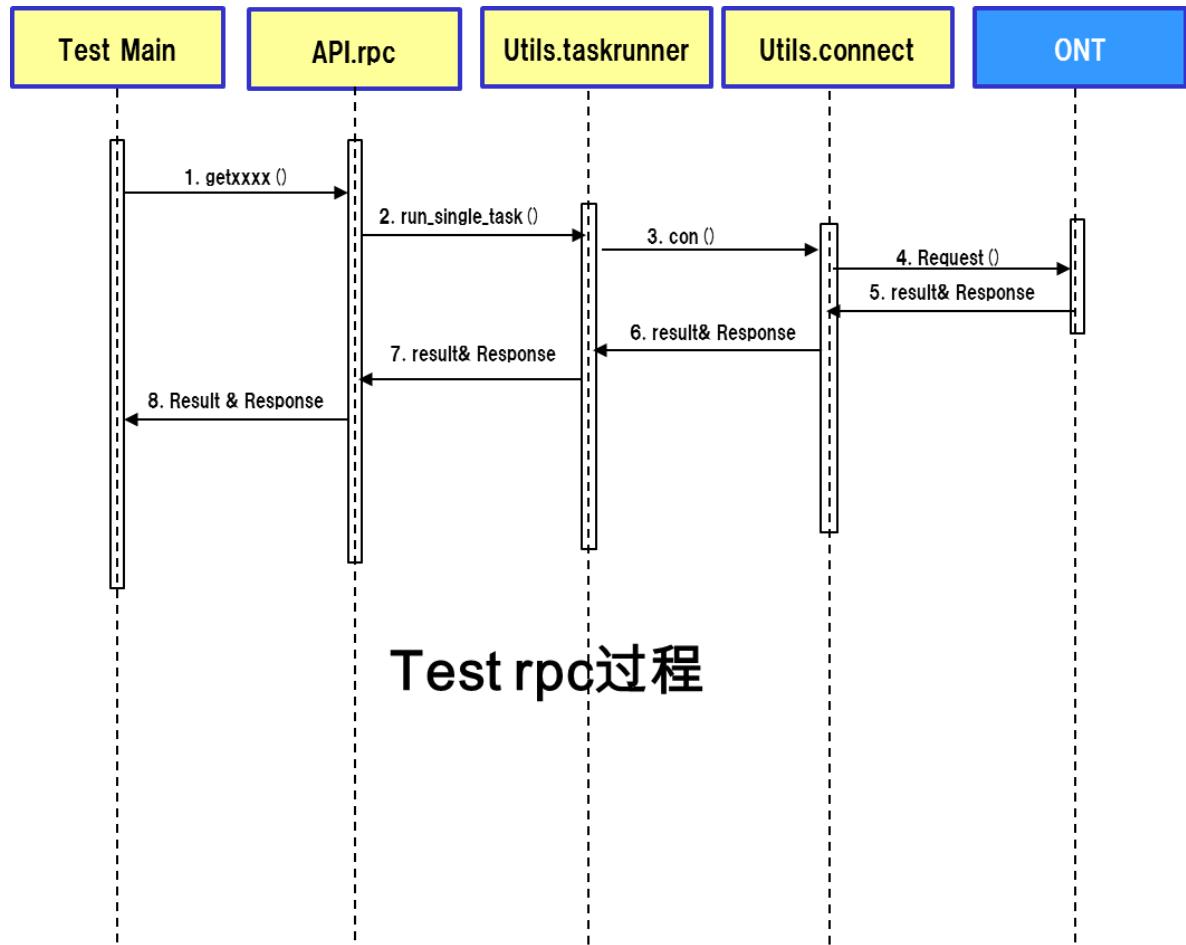


Figure 31 Test_rpc

3.2.16 Test_websocket

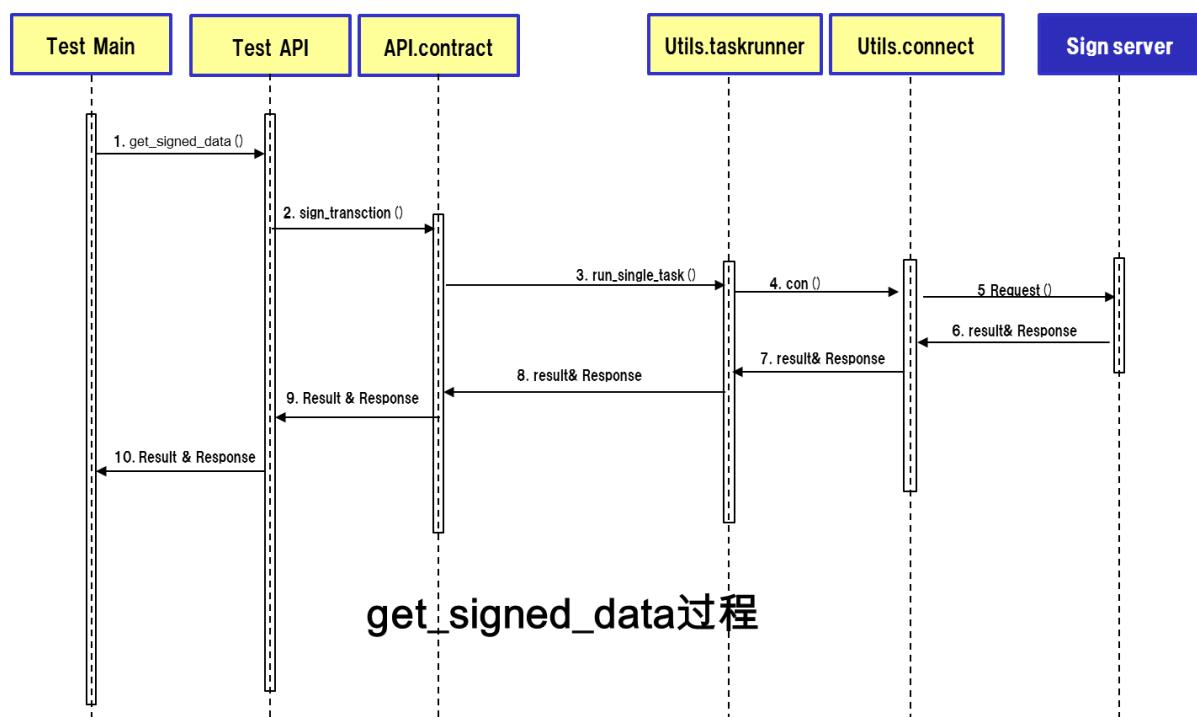


Figure 32 get_signed_data

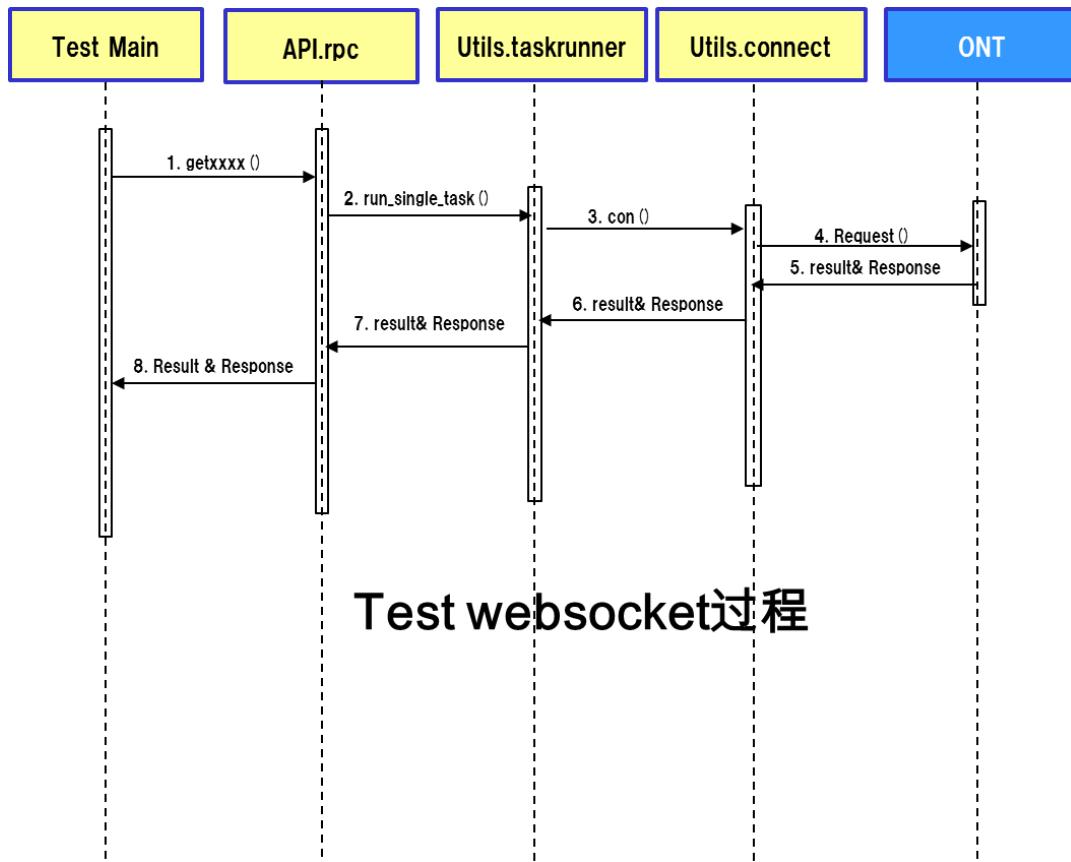


Figure 33 Test_websocket

4 DETAIL DESIGN

4.1 General

Current test tools include follow modules:

- API
- Monitor
- Resource
- Test
- tools
- Utils

4.2 Common modules

Current test tools import a lot of 3rd party modules and python modules. Follow will describe import each module's purpose.

Unittest: this is python module. we can use it to create the test case, test suit in python. Also it package init method and some result check method.

DDT: Data-Driven Tests. Because of python unittest not include the data driven function. So if you want to use data driven this library is needed.

URLlib: this is the python module for http request.

Json: JavaScript Object Notation this is python module. we can use it encoding and decoding JSON objects

OS: using OS module we can use system define the command

Sys: The sys is python module, it contains functions related to the Python interpreter and its environment

Getopt: this is python module ,we can use it to process command line parameters

Subprocess: this is python module. we can use it to fork a sub process.

Re: this is the python module. It will support of regular expressions

4.3 API

For API modules, test tools define follow the data and APIs.

4.3.1 Internal structure

```
|-api                               测试 API 目录
  |
  |-----|-requests                  Request 目录
  |       |-----|-cli             cli request 目录
  |       |       |-----|-signinvoke.json      signinvoke request 结构
  |       |       |-----|-restful          restful request 目录
  |       |       |       |-----|-get_allowance.json    get allowance request 结构
  |
  |-----|.....|
  |       |-----|-rpc              rpc request 目录
  |       |       |-----|-getbalance.json     get balance request 结构
  |
  |-----|.....|
  |       |-----|-ws               websocket request 目录
  |       |       |-----|-getbalance.json     get balance request 结构
  |
  |-----|-apimanager.py           api manager 构造封装
```

```
| |
| |-contract.py      测试 contract API 参数构造封装
| |
| |-nativecontract.py  navtive contract API 参数构造封装
| |-node.py          node API 参数构造封装
| |-restful.py        restful API 参数构造封装
| |-rpc.py           rpc API 参数构造封装
| |-websocket.py     websocket API 参数构造封装
```

4.3.2 Internal data

API module using the data like follow:

Example:

```
request = {

    "REQUEST": {

        "Qid": "t",

        "Method": "signeovminvoketx",

        "Params": {

            "gas_price": 0,

            "gas_limit": 10000000000,

            "address": contract_address,

            "version": 1,

            "params": [

                {

                    "type": "string",

                    "value": "initContractAdmin"
                },
                {
                    "type": "array",

                    "value": [
                        {

```

```

        "type" : "string",
        "value" : ""
    }
]
},
{
    "type": "array",
    "value": [
        {
            "type" : "string",
            "value" : ""
        }
    ]
}
},
"RESPONSE":{"error" : 0}
}

```

4.3.3 APIs

API module include follow APIs:

4.3.3.1 API manager

4.3.3.1.1 contract

[功能]

调用 contract api

[格式]

contract(self)

[参数]

类型	名称	说明	IN/OUT
----	----	----	--------

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.1.2 node

[功能]

调用 node api

[格式]

node(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.1.3 native

[功能]

调用 native api

[格式]

native(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.1.4 rpc

[功能]

调用 rpc api

[格式]

rpc(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.1.5 restful

[功能]

调用 restful api

[格式]

```
restful(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.1.6 ws

[功能]

调用 websocket api

[格式]

ws (self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.2 Contract

4.3.3.2.1 init_admin

[功能]

初始化合同管理

[格式]

```
init_admin(self, contract_address, admin_address, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT

类型	名称	说明	IN/OUT
address	contract_address	需要初始化的合同地址	IN
string	admin_address	管理员地址	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.2.2 deploy_contract_full

[功能]

部署合同

[格式]

```
deploy_contract_full(self, neo_code_path, name = "name", desc = "this is desc", price = 0)
```

[参数]

类型	名称	说明	IN/OUT
string	<i>neo_code_path</i>	neo 合约路径	IN
string	<i>name</i>	名字	IN
string	<i>desc</i>	描述	IN
int	<i>price</i>	价格	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.2.3 deploy_contract

[功能]

部署合同

[格式]

```
deploy_contract(self, neo_code_path, name = "name", desc = "this is desc", price = 0)
```

[参数]

类型	名称	说明	IN/OUT
string	<i>neo_code_path</i>	neo 合约路径	IN
string	<i>name</i>	名字	IN
string	<i>desc</i>	描述	IN
int	<i>price</i>	价格	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.2.4 sign_transction

[功能]

交易签名

[格式]

```
sign_transction(self, task, judge = True, process_log = True)
```

[参数]

类型	名称	说明	IN/OUT
string	<i>task</i>	任务	IN
Bool	<i>judge</i>	是否结果判断	IN
Bool	<i>process_log</i>	是否记录过程 log	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.2.5 call_signed_contract

[功能]

调用签名的合同

[格式]

```
call_signed_contract(self, signed_tx, pre = True, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
string	<i>signed_tx</i>	签名交易	IN
Bool	<i>pre</i>	是否预执行	IN
Int	<i>node_index</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.2.6 call_contract

[功能]

调用合同

[格式]

```
call_contract(self, task, judge = True, pre = True, twice = False, sleep = 5)
```

[参数]

类型	名称	说明
string	<i>task</i>	任务
Bool	<i>judge</i>	判断
bool	<i>pre</i>	是否预执行
bool	<i>twice</i>	既预执行，也实际执行
Int	<i>Sleep</i>	睡眠时间 (S)

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.2.7 sign_multi_transction

[功能]

多签交易

[格式]

```
sign_multi_transction(self, task, judge = True, process_log = True)
```

[参数]

类型	名称	说明
string	<i>task</i>	任务
Bool	<i>judge</i>	是否结果判断
Bool	<i>process_log</i>	是否记录过程 log

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.2.8 call_multisig_contract

[功能]

调用多签交易

[格式]

```
call_multisig_contract(self, task, m, pubkeyArray, sleep = 5)
```

[参数]

类型	名称	说明
string	task	任务
String	m	0nt 多签 m 参数
Array	pubkeyArray	公钥数组
Int	sleep	睡眠时间 (S)

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	

Error Code	Content	Note
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.2.9 Invoke_function

[功能]

调用合约功能

[格式]

```
invoke_function(self, contract_address, function_str, callerOntID, public_key="1", argvs = [{"type": "string", "value": ""}], node_index = None, sleep = 5)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	智能合同地址	IN
string	function_str	函数名	IN
string	callerOntID	调用者 ONTID	IN
int	public_key	公开密钥	IN
Array	argvs	调用参数	IN
int	node_index	节点索引	IN
Int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	

Error Code	Content	Note
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.2.10 Invoke_function_test

[功能]

调用合约功能

[格式]

```
invoke_function_test(self, contract_address, function_str, argvs = [{"type": "string", "value": ""}], node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	智能合同地址	IN
string	function_str	函数名	IN
Array	argvs	调用参数	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3 nativeContract

4.3.3.3.1 allowance_ont

[功能]

查询 Ont 津贴

[格式]

```
allowance_ont(self, from_address, to_address, amount, node_index=None, errorcode=0,
gas_price=Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
address	from_address	转出地址	IN
address	to_address	转入地址	IN
int	amount	交易数量	IN
int	node_index	节点索引	IN

类型	名称	说明	IN/OUT
int	<i>errorcode</i>	需要比较的错误代码	IN
int	<i>gas_price</i>	Gas 价格	IN
int	<i>gas_limit</i>	Gas 上限	IN
int	<i>sleep</i>	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.2 approve_ont

[功能]

释放 Ont

[格式]

```
approve_ont(self, from_address, to_address, amount, node_index=None, errorcode=0, gas_price=
Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
address	from_address	转出地址	IN
address	to_address	转入地址	IN
int	amount	交易数量	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.3 transfer_ont

[功能]

Ont 转移

[格式]

```
transfer_ont(self, pay_address, get_address, amount, node_index=None, errorcode=0, gas_price=Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT, sleep=5, pre=True, twice=True)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>pay_address</i>	支付地址	IN
address	<i>get_address</i>	获取地址	IN
int	<i>amount</i>	交易数量	IN
int	<i>node_index</i>	节点索引	IN
int	<i>errorcode</i>	需要比较的错误代码	IN
int	<i>gas_price</i>	Gas 价格	IN
int	<i>gas_limit</i>	Gas 上限	IN
int	<i>sleep</i>	睡眠时长 (S)	IN
Bool	<i>pre</i>	是否需要预执行	IN
Bool	<i>twice</i>	既预执行，也实际执行	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	

Error Code	Content	Note
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.4 allowance_ong

[功能]

查询 Ong 津贴

[格式]

```
allowance_ong(self, from_address, to_address, amount, node_index=None, errorcode=0, gas_price=
Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
address	from_address	转出地址	IN
address	to_address	转入地址	IN
int	amount	数量	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	

Error Code	Content	Note
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.5 approve_ong

[功能]

释放 Ong

[格式]

```
approve_ong(self, from_address, to_address, amount, node_index=None, errorcode=0, gas_price=
Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
address	from_address	转出地址	IN
address	to_address	转入地址	IN
int	amount	数量	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常

名称	说明
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.6 transfer_ong

[功能]

Ong 转移

[格式]

```
transfer_ong(self, pay_address, get_address, amount, node_index=None, errorcode=0, gas_price=
Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>pay_address</i>	支付地址	IN
address	<i>get_address</i>	获取地址	IN

类型	名称	说明	IN/OUT
int	amount	数量	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.7 regid_with_publickey

[功能]

使用公用密钥注册 id

[格式]

```
regid_with_publickey(self, node_index, errorcode = 0, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
int	node_index	节点索引	IN
int	errorcode	错误代码	IN
Int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.8 transfer_admin

[功能]

管理员转移

[格式]

```
transfer_admin(self, contract_address, new_admin_ontid, public_key="1", node_index = None,  
errorcode = 0, gas_price= Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT,  
sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>contract_address</i>	合同地址	IN
String	<i>new_admin_ontid</i>	新管理员 ONTID	IN
Int	<i>public_key</i>	公钥	IN
int	<i>node_index</i>	节点索引	IN
int	<i>errorcode</i>	需要比较的错误代码	IN
int	<i>gas_price</i>	Gas 价格	IN
int	<i>gas_limit</i>	Gas 上限	IN
int	<i>sleep</i>	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	

Error Code	Content	Note
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.9 bind_role_function

[功能]

绑定合约函数的角色

[格式]

```
bind_role_function(self, contract_address, admin_address, role_str, functions, public_key="1",
node_index = 0, errorcode = 0, gas_price= Config.DEFAULT_GAS_PRICE, gas_limit =
Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要绑定角色的合同地址	IN
string	admin_address	管理员地址	IN
string	role_str	角色	IN
string	functions	函数	IN
int	public_key	公开密钥	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	

Error Code	Content	Note
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.10 Bind_user_role

[功能]

绑定用户角色

[格式]

```
bind_user_role(self, contract_address, admin_address, role_str, ontIDs, public_key="1",
    node_index = 0, error_code = 0, gas_price= Config.DEFAULT_GAS_PRICE, gas_limit =
        Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要绑定的合同地址	IN
string	admin_address	管理员地址	IN
string	role_str	角色	IN
string	ontIDs	本地 ID	IN
int	public_key	公开密钥	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.11 Delegate_user_role

[功能]

代理用户角色

[格式]

```
delegate_user_role(self, contract_address, owner_user, delegate_user, delegate_role, period,
level, public_key="1", node_index = 0, errorcode = 0, gas_price= Config.DEFAULT_GAS_PRICE,
gas_limit = Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要绑定的合同地址	IN
string	owner_user	用户的所有人	IN
string	delegate_user	代理的用户	IN
string	delegate_role	代理的角色	IN
string	period	周期	IN

类型	名称	说明	IN/OUT
string	level	级别	IN
int	<i>public_key</i>	公开密钥	IN
int	node_index	节点索引	IN
int	<i>errorcode</i>	错误代码	IN
int	<i>gas_price</i>	Gas 价格	IN
int	<i>gas_limit</i>	Gas 上限	IN
int	<i>sleep</i>	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.12 Withdraw_user_role

[功能]

撤销用户角色

[格式]

```
withdraw_user_role(self, contract_address, call_user, delegate_user, delegate_role,
public_key="1", node_index = 0, errorcode = 0, gas_price= Config.DEFAULT_GAS_PRICE, gas_limit
= Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要绑定的合同地址	IN
string	call_user	调用的用户	IN
string	delegate_user	删除的用户	IN
string	delegate_role	删除的角色	IN
int	public_key	公开密钥	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	

Error Code	Content	Note
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.13 vote_for_peer

[功能]

相互表决

[格式]

```
vote_for_peer(self, walletAddress, voteList, voteCount, node_index=None, errorcode=0, gas_price=
Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
address	wallet_address	钱包地址	IN
int	voteList	表决的列表	IN
int	voteCount	表决的票数	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	

Error Code	Content	Note
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.14 unvote_for_peer

[功能]

相互不表决

[格式]

```
unvote_for_peer(self, wallet_address, nodes_to_vote, ballot_to_vote, node_index=None,
errorcode=0, gas_price= Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT,
sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
address	wallet_address	钱包地址	IN
int	nodes_to_vote	表决的节点	IN
int	ballot_to_vote	表决的票数	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.15 withdraw_ont

[功能]

撤销 ont

[格式]

```
withdraw_ont(self, wallet_address, nodes_to_vote, ballot_to_vote, node_index=None,
errorcode=0, gas_price= Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT,
sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
address	wallet_address	钱包地址	IN
int	nodes_to_vote	表决的节点	IN
int	ballot_to_vote	表决的票数	IN
int	node_index	节点索引	IN

类型	名称	说明	IN/OUT
int	<i>errorcode</i>	错误代码	IN
int	<i>gas_price</i>	Gas 价格	IN
int	<i>gas_limit</i>	Gas 上限	IN
int	<i>sleep</i>	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.16 update_global_param

[功能]

升级全局变量

[格式]

```
update_global_param(self, param0, param1, param2, param3, param4, param5, param6, param7, errorcode=0,
gas_price= Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
int	param0	参数 0	IN
int	Param1	参数 1	IN
int	Param2	参数 2	IN
int	Param3	参数 3	IN
int	Param4	参数 4	IN
int	Param5	参数 5	IN
int	Param6	参数 6	IN
int	Param7	参数 7	IN
int	<i>errorcode</i>	错误代码	IN
int	<i>gas_price</i>	Gas 价格	IN
int	<i>gas_limit</i>	Gas 上限	IN
int	<i>sleep</i>	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	

Error Code	Content	Note
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.17 quit_node

[功能]

退出节点

[格式]

```
quit_node(self, node_public_key, wallet_address, node_index=None, errorcode=0, gas_price=
Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
int	node_public_key	节点公用密钥	IN
address	wallet_address	钱包地址	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	

Error Code	Content	Note
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.18 black_node

[功能]

黑色节点？

[格式]

```
black_node(self, node_public_key, errorcode=0, gas_price= Config.DEFAULT_GAS_PRICE, gas_limit  
= Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
int	node_public_key	节点公用密钥	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	

Error Code	Content	Note
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.19 white_node

[功能]

白色节点

[格式]

```
white_node(self, node_public_key, errorcode=0, gas_price= Config.DEFAULT_GAS_PRICE, gas_limit  
= Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
int	node_public_key	节点公用密钥	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.20 commit_dpos

[功能]

[格式]

```
commit_dpos(self, errorcode = 0, gas_price = Config.DEFAULT_GAS_PRICE, gas_limit =
Config.DEFAULT_GAS_LIMIT, sleep = 5)
```

[参数]

类型	名称	说明	IN/OUT
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN

类型	名称	说明	IN/OUT
int	<i>gas_limit</i>	Gas 上限	IN
int	<i>sleep</i>	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.21 approve_candidate

[功能]

批准候选人

[格式]

```
approve_candidate(self, publicKey, errorcode = 0, gas_price= Config.DEFAULT_GAS_PRICE, gas_limit
                  = Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>pubKey</i>	公用密钥	IN
int	<i>errorcode</i>	错误代码	IN
int	<i>gas_price</i>	Gas 价格	IN
int	<i>gas_limit</i>	Gas 上限	IN
int	<i>sleep</i>	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.22 reject_candidate

[功能]

拒绝候选人

[格式]

```
reject_candidate (self, publicKey, errorcode = 0, gas_price= Config.DEFAULT_GAS_PRICE, gas_limit  
= Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>pubKey</i>	公用密钥	IN
int	<i>errorcode</i>	错误代码	IN
int	<i>gas_price</i>	Gas 价格	IN
int	<i>gas_limit</i>	Gas 上限	IN
int	<i>sleep</i>	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.23 register_candidate

[功能]

注册候选人

[格式]

```
register_candidate(self, publicKey, walletAddress, ontCount, ontID, user, node_index = None,  
errorcode = 0, gas_price= Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT,  
sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
string	pubKey	公共密钥	IN
address	walletAddress	钱包地址	IN
int	ontCount	本体计数	IN
string	ontID	本体 ID	IN
string	user	用户	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	

Error Code	Content	Note
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.24 transferFrom_multi

[功能]

从多人转移

[格式]

```
transferFrom_multi(self, put_address, amount, node_index =
None, errorcode=0, public_key_Array=[], errorkey = "error", gas_price= Config.DEFAULT_GAS_PRICE,
gas_limit = Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
string	<i>put_address</i>	放入地址	IN
address	<i>amount</i>	数量	IN
int	<i>node_index</i>	节点索引	IN
int	<i>errorcode</i>	需要比较的错误代码	IN
Array	<i>public_key_Array</i>	公用密钥数组	IN
String	<i>errorkey</i>	需要比较的错误关键字	IN
int	<i>gas_price</i>	Gas 价格	IN
int	<i>gas_limit</i>	Gas 上限	IN
int	<i>sleep</i>	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	

Error Code	Content	Note
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.25 transfer_multi

[功能]

多人转移

[格式]

```
transfer_multi(self, assetStr, put_address, get_address, amount, node_index = None, errorcode=0, public_key_Array=[], errorkey = "error", gas_price= Config.DEFAULT_GAS_PRICE, gas_limit = Config.DEFAULT_GAS_LIMIT, sleep=5)
```

[参数]

类型	名称	说明	IN/OUT
String	assetStr	Asset	IN
string	put_address	存入地址	IN
string	get_address	获取地址	IN
address	amount	数量	IN
int	node_index	节点索引	IN
int	errorcode	需要比较的错误代码	IN
Array	public_key_Array	公用密钥数组	IN
String	errorkey	需要比较的错误关键字	IN
int	gas_price	Gas 价格	IN
int	gas_limit	Gas 上限	IN
int	sleep	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.3.26 init_ont_ong

[功能]

初始化 ont_ong

[格式]

```
init_ont_ong(self, node_count = 7, sleep=0)
```

[参数]

类型	名称	说明	IN/OUT
int	node_count	节点数	IN

类型	名称	说明	IN/OUT
int	<i>sleep</i>	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4 node

4.3.3.4.1 wait_gen_block

[功能]

获取当前 block 节点数

[格式]

```
wait_gen_block(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
True	正常
False	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.2 get_current_node

[功能]

获取当前节点

[格式]

```
get_current_node(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
Int	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.3 findSystemNode

[功能]

发现系统节点

[格式]

findSystemNode(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
Array	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.4 check_node_state

[功能]

检查节点状态

[格式]

```
check_node_state(self, node_list)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>node_list</i>	节点列表	IN

[返回值]

名称	说明
True	正常
False	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.5 check_node_ledgerevent

[功能]

检查节点 ledgerevent

[格式]

```
check_node_ledgerevent(self, node_list)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>node_list</i>	节点列表	IN

[返回值]

名称	说明
True	正常
False	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.6 check_node_block

[功能]

检查节点 block

[格式]

```
check_node_block(self, node_list)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>node_list</i>	节点列表	IN

[返回值]

名称	说明
True	正常
False	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.7 check_node_all

[功能]

检查节点所有内容

[格式]

```
check_node_all(self, node_list)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>node_list</i>	节点列表	IN

[返回值]

名称	说明
True	正常
False	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.8 start_nodes

[功能]

启动多个节点

[格式]

```
start_nodes(self, indexs, start_params = Config.DEFAULT_NODE_ARGS, clear_chain = False,
            clear_log = False, program = "ontology", config = "config.json")
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>indexs</i>	索引	IN
String	<i>start_params</i>	启动参数	IN
Bool	<i>clear_chain</i>	是否清除 chain	IN
Bool	<i>clear_log</i>	是否清除 log	IN
String	<i>program</i>	启动程序名	IN
String	<i>config</i>	配置文件	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.9 start_node

[功能]

启动单个节点

[格式]

```
start_node(self, index, start_params = Config.DEFAULT_NODE_ARGS, clear_chain = False,
           clear_log = False, program = "ontology", config = "config.json")
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>index</i>	索引	IN
String	<i>start_params</i>	启动参数	IN
Bool	<i>clear_chain</i>	是否清除 chain	IN
Bool	<i>clear_log</i>	是否清除 log	IN
String	<i>program</i>	启动程序名	IN
String	<i>config</i>	配置文件	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.10 stop_all_nodes

[功能]

停止所有节点

[格式]

```
stop_all_nodes(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	

Error Code	Content	Note
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.11 stop_nodes

[功能]

停止多个节点

[格式]

```
stop_nodes(self, indexs):
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>indexs</i>	索引	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	

Error Code	Content	Note
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.12 stop_node

[功能]

停止单个节点

[格式]

```
stop_node(self, index):
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>index</i>	索引	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	

Error Code	Content	Note
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.13 replace_configs

[功能]

替换多个配置文件

[格式]

```
replace_configs(self, indexs, config = None)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>indexs</i>	索引	IN
Int	<i>config</i>	配置文件	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.14 replace_config

[功能]

替换单个配置文件

[格式]

```
replace_config(self, index, config = None)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>index</i>	索引	IN
Int	<i>config</i>	配置文件	IN

[返回值]

名称	说明

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.15 transfer_ont

[功能]

Ont 转移

[格式]

```
transfer_ont(self, from_index, to_index, amount, price = 0)
```

[参数]

类型	名称	说明	IN/OUT
Int	from_index	转出节点索引	IN
Int	to_index	转入节点索引	IN

类型	名称	说明	IN/OUT
int	amount	数量	IN
int	price	Gas 价格	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.16 transfer_ong

[功能]

ong 转移

[格式]

```
transfer_ong(self, from_index, to_index, amount, price = 0)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>from_index</i>	转出节点索引	IN
Int	<i>to_index</i>	转入节点索引	IN
int	amount	数量	IN
int	price	Gas 价格	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.17 withdrawong

[功能]

Ong 撤销

[格式]

`withdrawong(self, index)`

[参数]

类型	名称	说明	IN/OUT
Int	<i>index</i>	索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.18 exec_cmd

[功能]

执行命令

[格式]

exec_cmd(self, cmd, index)

[参数]

类型	名称	说明	IN/OUT
String	<i>cmd</i>	命令	IN
Int	<i>index</i>	索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.19 stop_sigsrv

[功能]

停止签名服务

[格式]

```
stop_sigsrv(self, index)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>index</i>	索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.4.20 start_sigsrv

[功能]

启动签名服务

[格式]

```
start_sigsrv(self, wallet, index)
```

[参数]

类型	名称	说明	IN/OUT
Address	<i>wallet</i>	钱包地址	IN
Int	<i>index</i>	索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5 Restful

4.3.3.5.1 getgenerateblocktime

[功能]

获取 generateblock 时间

[格式]

```
getgenerateblocktime(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.2 getconnectioncount

[功能]

获取连接数

[格式]

getconnectioncount (self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	

Error Code	Content	Note
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.3 getblocktxsbyheight

[功能]

通过高度获取 blocktx 数

[格式]

```
getblocktxsbyheight(self, height)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>height</i>	高	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	

Error Code	Content	Note
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.4 getblockbyheight

[功能]

通过高度获取 block 数

[格式]

```
getblockbyheight(self, height)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>height</i>	高	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	

Error Code	Content	Note
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.5 getblockbyhash

[功能]

通过 hash 表获取 block 数

[格式]

```
getblockbyhash(self, _hash, raw = 0)
```

[参数]

类型	名称	说明	IN/OUT
String	hash	Hash 表	IN
Int	raw	0	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	

Error Code	Content	Note
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.6 getblockheight

[功能]

获取 block height

[格式]

```
getblockheight(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	

Error Code	Content	Note
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.7 getblockhashbyheight

[功能]

通过高度获取 blockhash 数

[格式]

```
getblockhashbyheight(self, height)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>height</i>	高	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.8 gettransactionbytxhash

[功能]

通过 txhash 获取 transaction 数

[格式]

```
gettransactionbytxhash(self, _hash, raw = 0)
```

[参数]

类型	名称	说明	IN/OUT
String	hash	Hash 表	IN
Int	raw	是否输出详细信息	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.9 postrawtx

[功能]

[格式]

```
postrawtx(self, rawtxdata, action = "sendrawtransaction", version = "1.0.0", pre = 0)
```

[参数]

类型	名称	说明	IN/OUT
String	rawtxdata	Hash 表	IN
String	action	交易动作	IN
String	version	版本号	IN
Int	pre	是否预执行	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.10 getstorage

[功能]

获取存储

[格式]

```
getstorage(self, script_hash, key)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>script_hash</i>	Hash 表	IN
String	<i>key</i>	关键字	IN

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.11 getbalance

[功能]

获取平衡

[格式]

```
getbalance(self, addr)
```

[参数]

类型	名称	说明	IN/OUT
Address	<i>addr</i>	地址	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.12 getcontract

[功能]

获取合同

[格式]

```
getcontract(self, script_hash)
```

[参数]

类型	名称	说明	IN/OUT
Address	<i>script_hash</i>	Hash 表	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.13 getsmartcodeeventbyheight

[功能]

通过 height 获取 smart code event

[格式]

```
getsmartcodeeventbyheight(self, height)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>height</i>	高	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.14 getsmartcodeeventbyhash

[功能]

通过 hash 获取 smart code event

[格式]

```
getsmartcodeeventbyhash(self, txhash)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>txhash</i>	Hash	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.15 getblockheightbytxhash

[功能]

通过 txhash 获取 block height

[格式]

```
getblockheightbytxhash(self, txhash)
```

[参数]

类型	名称	说明	IN/OUT
String	_txhash	Hash	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.16 getmerkleproofbytxhash

[功能]

通过 txhash 获取 merkleproof

[格式]

```
getmerkleproofbytxhash(self, _hash)
```

[参数]

类型	名称	说明	IN/OUT
String	_hash	Hash	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.17 getgasprice

[功能]

获取 gas 价格

[格式]

```
getgasprice(self, _hash)
```

[参数]

类型	名称	说明	IN/OUT
String	_hash	Hash	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.5.18 getallowance

[功能]

获取津贴

[格式]

```
getallowance(self, _hash)
```

[参数]

类型	名称	说明	IN/OUT
String	_hash	Hash	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6 RPC

4.3.3.6.1 getbestblockhash

[功能]

获取最佳 block hash

[格式]

getbestblockhash(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.2 getblock

[功能]

获取 block

[格式]

```
getblock(self, height, blockhash, verbose = None)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>height</i>	高	IN
Int	<i>blockhash</i>	Block hash	IN
Int	<i>verbose</i>	是否输出详细信息	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.3 getblockcount

[功能]

获取 block 数

[格式]

```
getblockcount(self, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>node_index</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.4 getblockhash

[功能]

获取 block hash 数

[格式]

```
getblockhash(self, height)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>Height</i>	高	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	

Error Code	Content	Note
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.5 getconnectioncount

[功能]

获取连接数

[格式]

getconnectioncount(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	

Error Code	Content	Note
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.6 getgenerateblocktime

[功能]

获取 generate block 时间

[格式]

```
getgenerateblocktime(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	

Error Code	Content	Note
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.7 getrawtransaction

[功能]

获取 raw transaction

[格式]

```
getrawtransaction(self, transactionhash, verbose = None)
```

[参数]

类型	名称	说明	IN/OUT
String	transactionhash	交易 hash	IN
Int	verbose	是否输出详细信息	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	

Error Code	Content	Note
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.8 sendrawtransaction

[功能]

发送 raw transaction

[格式]

```
sendrawtransaction(self, _hex, pre = True)
```

[参数]

类型	名称	说明	IN/OUT
String	_hex	交易 hash	IN
Bool	pre	是否预执行	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
------------	---------	------

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.9 getstorage

[功能]

获取存储

[格式]

```
getstorage(self, script_hash, key)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>script_hash</i>	Hash 表	IN
String	<i>key</i>	关键字	IN

[返回值]

名称	说明
0	正常

名称	说明
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.10 getversion

[功能]

获取版本

[格式]

```
getversion(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.11 getblocksysfee

[功能]

获取 block system fee

[格式]

```
getblocksysfee(self)
```

[参数]

类型	名称	说明	IN/OUT

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.12 getcontractstate

[功能]

获取合同状态

[格式]

```
getcontractstate(self, script_hash, verbose = None)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>script_hash</i>	Hash 表	IN
Int	<i>verbose</i>	是否输出详细信息	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.13 getmempooltxstate

[功能]

获取 mempool tx 状态

[格式]

```
getmempooltxstate(self, tx_hash)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>tx_hash</i>	Hash 表	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.14 getsmartcodeevent

[功能]

获取 smart code event

[格式]

```
getsmartcodeevent(self, height = None, tx_hash = None)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>height</i>	高	IN
String	<i>tx_hash</i>	Hash	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.15 getblockheightbytxhash

[功能]

通过 hash 获取 block height

[格式]

```
getblockheightbytxhash(self, tx_hash)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>tx_hash</i>	Hash	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.16 getbalance

[功能]

获取 balance

[格式]

```
getbalance(self, address)
```

[参数]

类型	名称	说明	IN/OUT
Address	<i>address</i>	地址	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.17 getmerkleproof

[功能]

获取 merkleproof

[格式]

```
getmerkleproof(self, tx_hash)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>tx_hash</i>	hash	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.18 getgasprice

[功能]

获取 gas 价格

[格式]

getgasprice(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.6.19 getallowance

[功能]

获取津贴

[格式]

```
getallowance(self, asset, _from, _to)
```

[参数]

类型	名称	说明	IN/OUT
string	<i>asset</i>	货币种类	IN
Address	<i>_from</i>	出	IN
address	<i>_to</i>	入	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7 Websocket

4.3.3.7.1 heartbeat

[功能]

心跳

[格式]

heartbeat(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	

Error Code	Content	Note
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.2 subscribe

[功能]

提交

[格式]

```
subscribe(self, contractaddrlist, sevent = False, sjsonblock = False, srawblock = False,
          sblocktxhashs = False)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>contractaddrlist</i>	ConstructsFilter	IN
Bool	<i>sevent</i>	SubscribeEvent	IN
Bool	<i>sjsonblock</i>	SubscribeJsonBlock	IN
Bool	<i>srawblock</i>	SubscribeRawBlock	IN
Bool	<i>sblocktxhashs</i>	SubscribeBlockTxHashs	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	

Error Code	Content	Note
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.3 getgenerateblocktime

[功能]

获取 generate block 时间

[格式]

```
getgenerateblocktime(self, param = None)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>param</i>	参数	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	

Error Code	Content	Note
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.4 getconnectioncount

[功能]

获取连接数

[格式]

```
getconnectioncount(self, param = None)
```

[参数]

类型	名称	说明	IN/OUT
Int	param	参数	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.5 getblockbyheight

[功能]

通过高度获取 block 数

[格式]

```
getblockbyheight(self, height, raw = 0)
```

[参数]

类型	名称	说明	IN/OUT
Int	height	高	IN
Int	Raw	是否输出详细信息	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.6 getblockbyhash

[功能]

通过 hash 表获取 block 数

[格式]

```
getblockbyhash(self, _hash, raw = 0)
```

[参数]

类型	名称	说明	IN/OUT
String	hash	Hash 表	IN
Int	raw	是否输出详细信息	IN

[返回值]

名称	说明

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.7 getblockheight

[功能]

获取 block height

[格式]

```
getblockheight(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.8 getblockhashbyheight

[功能]

通过高度获取 blockhash 数

[格式]

```
getblockhashbyheight(self, height)
```

[参数]

类型	名称	说明	IN/OUT

类型	名称	说明	IN/OUT
Int	<i>height</i>	高	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.9 gettransaction

[功能]

获取 transaction 数

[格式]

```
gettransaction(self, _hash, raw = 0)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>hash</i>	Hash 表	IN
Int	<i>raw</i>	是否输出详细信息	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.10 sendrawtransaction

[功能]

发送 raw transaction

[格式]

```
sendrawtransaction(self, _hex, pre = 0)
```

[参数]

类型	名称	说明	IN/OUT
String	_hex	交易 hash	IN
Int	pre	是否预执行	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.11 getstorage

[功能]

获取存储

[格式]

```
getstorage(self, script_hash, key)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>script_hash</i>	Hash 表	IN
String	<i>key</i>	关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.12 getbalancebyaddr

[功能]

通过地址获取 balance

[格式]

```
getbalancebyaddr(self, addr)
```

[参数]

类型	名称	说明	IN/OUT
Address	<i>addr</i>	地址	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.13 getcontract

[功能]

获取合同

[格式]

```
getcontract(self, _hash)
```

[参数]

类型	名称	说明	IN/OUT
Address	_hash	Hash 表	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.14 getsmartcodeeventbyheight

[功能]

通过 height 获取 smart code event

[格式]

```
getsmartcodeeventbyheight(self, height)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>height</i>	高	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.15 getsmartcodeeventbyhash

[功能]

通过 hash 获取 smart code event

[格式]

```
getsmartcodeeventbyhash(self, hash)
```

[参数]

类型	名称	说明	IN/OUT
String	_hash	Hash	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.16 getblockheightbytxhash

[功能]

通过 txhash 获取 block height

[格式]

```
getblockheightbytxhash(self, _hash)
```

[参数]

类型	名称	说明	IN/OUT
String	_hash	Hash	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.17 getmerkleproof

[功能]

获取 merkleproof

[格式]

```
getmerkleproof(self, _hash)
```

[参数]

类型	名称	说明	IN/OUT
String	_hash	hash	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.18 getsessioncount

[功能]

获取 session 数

[格式]

getsessioncount (self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.19 getgasprice

[功能]

获取 gas 价格

[格式]

getgasprice(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.3.3.7.20 getallowance

[功能]

获取津贴

[格式]

```
getallowance(self, asset, _from, _to)
```

[参数]

类型	名称	说明	IN/OUT
string	<i>asset</i>	货币种类	IN
Address	<i>_from</i>	出	IN
address	<i>_to</i>	入	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.4 Monitor

For Monitor, test tools define the follow datas and APIs.

4.4.1 Internal structure



4.4.2 Internal data

Monitor module test using the data like follow:

Example:

TRY_RECOVER_TIMES = 2

CHECK_LOOP = 50

FAILED_RADIO = 40 # 40%

4.4.3 APIs

Monitor module will include follow APIs:

4.4.3.1 reset

[功能]

重启

[格式]

reset(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.4.3.2 need_retry

[功能]

需要重试

[格式]

```
need_retry(self)
```

[参数]

类型	名称	说明	IN/OUT
----	----	----	--------

[返回值]

名称	说明
true	正常
false	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.4.3.3 recover_env

[功能]

恢复环境

[格式]

recover_env(self)

[参数]

类型	名称	说明	IN/OUT
----	----	----	--------

[返回值]

名称	说明
True	正常
False	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.4.3.4 retry

[功能]

重试

[格式]

retry(self)

[参数]

类型	名称	说明	IN/OUT
----	----	----	--------

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.4.3.5 analysis_case

[功能]

分析 case

[格式]

```
analysis_case(self, case, logpath)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>case</i>	Case 名	IN
String	<i>logpath</i>	Log 路径	IN

[返回值]

名称	说明
True	正常
False	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.4.3.6 run_case

[功能]

运行 case

[格式]

```
run_case(self, case)
```

[参数]

类型	名称	说明	IN/OUT
String	case	Case 名	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.4.3.7 set_retry_block

[功能]

设置重试 block

[格式]

```
set_retry_block(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	

Error Code	Content	Note
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.4.3.8 exec

[功能]

执行

[格式]

```
exec(self, runner, testcases, monitor = True)
```

[参数]

类型	名称	说明	IN/OUT
Point	<i>runner</i>	执行进程	IN
String	<i>testcases</i>	Test case 名	IN
Bool	<i>monitor</i>	是否监控	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	

Error Code	Content	Note
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.5 Resource

For resource module, test tools define follow the datas and APIs.

4.5.1 Internal structure

```

|- resource                         resource 目录
  |
  |   |-abi                          abi 文件目录
  |       |   |-auth.json          auth json 文件
  |
  |       .....
  |       |   |-wallet            wallet 文件目录
  |           |   |-wallet00.dat      电子钱包数据文件
  |
  |           .....
  |           |   |-id_rsa           密钥文件
  |               |
  |               |   |-onto_config.json    onto 配置 json 文件
  |
  |               |   |-ontology         ontology 本体
  |
  |               |

```

```
| -rpcserver.py          rpc server 启动文件  
| |  
| -sigsvr              签名服务器  
| |  
| -test_config.json    测试配置 json 文件
```

4.5.2 Internal data

Authenticate function test using the data like follow:

Example:

```
resource module no special data internal use
```

4.5.3 APIs

resource module no API for other modules using. Rpcserver API please refer to service tools TN

4.6 Test

For Test Module, test tools define follow the datas and APIs.

4.6.1 Internal structure

```
- test                  测试工程  
| |  
| test_auth             测试 auth 工程  
| | | -resource         auth 测试所需 resource 文件目录  
| | | | -auth.neo       auth 测试数据  
.....  
| | | -test_api.py      auth 测试 API 结构封装  
| | | -test_config.py   auth 测试配置文件结构封装  
| | | -test_main.py     auth 测试执行器
```

*other test projects structure almost same as test auth.

4.6.2 Internal data

Test module using the data like follow:

Example:

```
address="AXbevnGZBypZrcQwQfdYZxXj5zcFTtiMEA"  
cost1="tasks/cost_1.json"  
filterfile="tasks/004.json"
```

4.6.3 APIs

Test Module will include follow APIs:

4.6.3.1 Test Auth

4.6.3.1.1 init_admin

[功能]

初始化合同管理

[格式]

```
init_admin(contract_address, admin_address, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要初始化的合同地址	IN
string	admin_address	管理员地址	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	

Error Code	Content	Note
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.1.2 Invoke_function

[功能]

调用功能

[格式]

```
invoke_function(contract_address, function_str, callerOntID, public_key="1", node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	智能合同地址	IN
string	function_str	功能名	IN
string	callerOntID	调用者本地 ID	IN
int	public_key	公开密钥	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
------------	---------	------

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2 Test Benefit Model

4.6.3.2.1 get_yi

[功能]

获取 Yi

[格式]

get_yi(*initpos*, *avgpos*)

[参数]

类型	名称	说明	IN/OUT
Int	<i>initpos</i>	初始点	IN
Int	<i>avgpos</i>	平均点	IN

[返回值]

名称	说明

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.2 get_benifit_value

[功能]

获取 benefit 值

[格式]

```
get_benifit_value(totalgas, initpos, totalpos = [1000, 1000, 1000, 1000, 1000, 1000])
```

[参数]

类型	名称	说明	IN/OUT
Int	totalgas	gas 总数	IN
Int	initpos	初始点	IN

类型	名称	说明	IN/OUT
Array	<i>totalpos</i>	全部点	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.3 get_candidate_benifit_value

[功能]

获取候选 benefit 值

[格式]

```
get_candidate_benifit_value(totalgas, initpos, totalpos = [1000, 1000, 1000, 1000, 1000, 1000, 1000])
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>totalgas</i>	gas 总数	IN
Int	<i>initpos</i>	初始点	IN
Array	<i>totalpos</i>	全部点	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.4 add_candidate_node

[功能]

添加候选节点

[格式]

```
add_candidate_node(new_node, init_ont = 5000000, init_ong = 1000, init_pos = 1000, from_node
= 0)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>new_node</i>	新节点	IN
Int	<i>init_ont</i>	初始 ont	IN
Int	<i>init_ong</i>	初始 ong	IN
Int	<i>init_pos</i>	初始位置	IN
Int	<i>from_node</i>	老节点	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

[功能]

初始化合同管理

[格式]

```
init_admin(contract_address, admin_address, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要初始化的合同地址	IN
string	admin_address	管理员地址	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.6 invoke_transfer

[功能]

调用转移

[格式]

```
invoke_transfer(contract_address, from_address, to_address, amount, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要初始化的合同地址	IN
address	from_address	起始地址	IN
address	to_address	转移后地址	IN
Int	amount	数量	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.7 bind_role_function

[功能]

创建角色

[格式]

```
bind_role_function(contract_address, admin_address, role_str, functions, public_key="1",
                    node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要绑定角色的合同地址	IN
string	admin_address	管理员地址	IN
string	role_str	角色	IN
string	functions	功能	IN
int	public_key	公开密钥	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	

Error Code	Content	Note
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.8 Bind_user_role

[功能]

绑定用户角色

[格式]

```
bind_user_role(contract_address, admin_address, role_str, ontIDs, public_key="1", node_index  
= None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要绑定的合同地址	IN
string	admin_address	管理员地址	IN
string	role_str	角色	IN
string	ontIDs	本地 ID	IN
int	pub_key	公开密钥	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	

Error Code	Content	Note
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.9 Delegate_user_role

[功能]

代表用户角色

[格式]

```
delegate_user_role(contract_address, owner_user, delegate_user, delegate_role, period, level,
                    public_key="1", node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要绑定的合同地址	IN
string	owner_user	所有的所有人	IN
string	delegate_user	代表的用户	IN
string	delegate_role	代表的角色	IN
string	period	周期	IN
string	level	级别	IN
int	public_key	公开密钥	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
------------	---------	------

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.10 withdraw_user_role

[功能]

撤销用户角色

[格式]

```
withdraw_user_role(contract_address, call_user, delegate_user, delegate_role, public_key="1",
node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要绑定的合同地址	IN
string	call_user	调用用户	IN
string	delegate_user	代表的用户	IN
string	delegate_role	代表的角色	IN
int	public_key	公开密钥	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.11 Invoke_function

[功能]

调用功能

[格式]

```
invoke_function(contract_address, function_str, callerOntID, public_key="1", argvs = [{"type": "string", "value": ""}], node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	智能合同地址	IN

类型	名称	说明	IN/OUT
string	function_str	功能名	IN
string	callerOntID	调用者本地 ID	IN
int	public_key	公开密钥	IN
Array	argvs	参数	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.12 Invoke_function_test

[功能]

调用功能测试

[格式]

```
invoke_function_test(contract_address, function_str, argvs = [{"type": "string", "value": ""}],  
node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	智能合同地址	IN
string	function_str	功能名	IN
Array	argvs	参数	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.13 invoke_function_vote

[功能]

调用功能投票

[格式]

```
invoke_function_vote(func_, walletAddress, voteList, voteCount)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>func_</i>	功能名	IN
Address	<i>walletAddress</i>	钱包地址	IN
String	<i>voteList</i>	投票列表	IN
int	<i>voteCount</i>	投票数	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.14 invoke_function_update

[功能]

调用功能升级

[格式]

invoke_function_update(func_, param0, param1, param2, param3, param4, param5, param6, param7)

[参数]

类型	名称	说明	IN/OUT
string	func_	功能名	IN
int	param0	参数 0	IN
int	Param1	参数 1	IN
int	Param2	参数 2	IN
int	Param3	参数 3	IN
int	Param4	参数 4	IN
int	Param5	参数 5	IN
int	Param6	参数 6	IN
int	Param7	参数 7	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	

Error Code	Content	Note
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.15 invoke_function_register

[功能]

调用功能注册

[格式]

```
invoke_function_register(func_, pubKey, walletAddress, ontCount, ontID, user)
```

[参数]

类型	名称	说明	IN/OUT
String	func_	功能名	IN
string	pubKey	公共密钥	IN
address	walletAddress	钱包地址	IN
int	ontCount	本体计数	IN
string	ontID	本体 ID	IN
string	user	用户	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	

Error Code	Content	Note
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.16 invoke_function_candidate

[功能]

调用功能候选

[格式]

```
invoke_function_candidate(func_, pubKey)
```

[参数]

类型	名称	说明	IN/OUT
string	<i>func_</i>	功能名	IN
String	<i>pubKey</i>	公用密钥	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	

Error Code	Content	Note
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.17 invoke_function_node

[功能]

调用功能节点

[格式]

```
invoke_function_node(func_, pubKey)
```

[参数]

类型	名称	说明	IN/OUT
string	<i>func_</i>	功能名	IN
String	<i>pubKey</i>	公用密钥	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
------------	---------	------

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.18 invoke_function_quitNode

[功能]

调用功能退出节点

[格式]

```
invoke_function_quitNode(func_, pubKey, walletAddress) :
```

[参数]

类型	名称	说明	IN/OUT
string	func_	节点索引	IN
string	pubKey	公用密钥	IN
address	walletAddress	钱包地址	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.2.19 invoke_function_SplitCurve

[功能]

调用功能分裂曲线

[格式]

invoke_function_SplitCurve (func_, array) :

[参数]

类型	名称	说明	IN/OUT
string	func_	节点索引	IN
array	array	数组	IN

[返回值]

名称	说明

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.3 Test_consensus

4.6.3.3.1 getStorageConf

[功能]

取得储存的配置文件

[格式]

```
getStorageConf(confName)
```

[参数]

类型	名称	说明	IN/OUT
string	<i>confName</i>	配置文件名	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.3.2 multi_sig_transfer

[功能]

多个签名转移

[格式]

```
multi_sig_transfer(neo_contract_address, from_address, to_address, amount, m, pubkey_array,
node_index=0)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>neo_contract</i>	智能合约地址	IN
address	<i>from_address</i>	转出地址	IN
address	<i>to_address</i>	转入地址	IN
Int	<i>amount</i>	数量	IN
Int	<i>m</i>		IN
array	<i>pubkey_array</i>	公用密钥数组	IN
Int	<i>node_index</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.3.3 add_candidate_node

[功能]

添加候选节点

[格式]

```
add_candidate_node(new_node, init_ont = 5000000, init_ong = 1000, init_pos = 10000, from_node  
= 0)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>new_node</i>	新节点	IN
Int	<i>init_ont</i>	初始 ont	IN
Int	<i>init_ong</i>	初始 ong	IN
Int	<i>init_pos</i>	初始位置	IN
Int	<i>from_node</i>	老节点	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.4 Test_encryption

4.6.3.4.1 forNeo

[功能]

加密支付

[格式]

```
forNeo(contract_address, pay_address, get_address, node_index = None):
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	智能合同地址	IN
address	pay_address	支付地址	IN
address	get_address	得到的地址	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	

Error Code	Content	Note
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.4.2 sample

[功能]

例子

[格式]

```
sample(contract_address, pay_address, get_address, node_index, charge=False, nodePath=""):
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	智能合同地址	IN
address	pay_address	支付地址	IN
address	get_address	得到的地址	IN
int	node_index	节点索引	IN
Bool	charge	支付	IN
String	nodePath	节点路径	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	

Error Code	Content	Note
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.4.3 all_case

[功能]

所有 case

[格式]

```
all_case(contractaddress, pay_address, get_address, node_index, nodePath1) :
```

[参数]

类型	名称	说明	IN/OUT
address	contractaddress	智能合同地址	IN
address	pay_address	支付地址	IN
address	get_address	得到的地址	IN
int	node_index	节点索引	IN
String	nodePath1	节点路径	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.5 Test_governance

4.6.3.5.1 get_config

[功能]

取得配置文件

[格式]

```
get_config():
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
wallet_A_address, wallet_B_address, vote_price, node_B_public_key, blocks_per_round, punish_ratio	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6 test_governance_api

4.6.3.6.1 init

[功能]

初始化系统

[格式]

```
init(node_index=7, candidate=False, register_ontid=False, restart=False, pub_key="1",
     ont_count="10000")
```

[参数]

类型	名称	说明	IN/OUT
int	<i>node_index</i>	节点索引	IN
bool	<i>candidate</i>	候选	IN
bool	<i>register_ontid</i>	注册 ontid	IN
Bool	<i>restart</i>	重启	IN
Int	<i>pub_key</i>	公用密钥	IN
Int	<i>ont_count</i>	Ont 数	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.2 init_admin

[功能]

初始化合同管理

[格式]

```
init_admin(contract_address, admin_address, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要初始化的合同地址	IN
string	admin_address	管理员地址	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.3 bind_role_function

[功能]

创建角色

[格式]

```
bind_role_function(contract_address, admin_address, role_str, functions, public_key="1",
                    node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要绑定角色的合同地址	IN
string	admin_address	管理员地址	IN
string	role_str	角色	IN
string	functions	功能	IN
int	public_key	公开密钥	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	

Error Code	Content	Note
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.4 Bind_user_role

[功能]

绑定用户角色

[格式]

```
bind_user_role(contract_address, admin_address, role_str, ontIDs, public_key="1", node_index  
= None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要绑定的合同地址	IN
string	admin_address	管理员地址	IN
string	role_str	角色	IN
string	ontIDs	本地 ID	IN
int	public_key	公开密钥	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	

Error Code	Content	Note
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.5 Delegate_user_role

[功能]

代表用户角色

[格式]

```
delegate_user_role(contract_address, owner_user, delegate_user, delegate_role, period, level,
                    public_key="1", node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要绑定的合同地址	IN
string	owner_user	所有的所有人	IN
string	delegate_user	代表的用户	IN
string	delegate_role	代表的角色	IN
string	period	周期	IN
string	level	级别	IN
int	public_key	公开密钥	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
------------	---------	------

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.6 withdraw_user_role

[功能]

撤销用户角色

[格式]

```
withdraw_user_role(contract_address, call_user, delegate_user, delegate_role, public_key="1",
node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	需要绑定的合同地址	IN
string	call_user	调用用户	IN
string	delegate_user	代表的用户	IN
string	delegate_role	代表的角色	IN
int	public_key	公开密钥	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.7 Invoke_function

[功能]

调用功能

[格式]

```
invoke_function(contract_address, function_str, callerOntID, public_key="1", argvs = [{"type": "string", "value": ""}], node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	智能合同地址	IN

类型	名称	说明	IN/OUT
string	function_str	功能名	IN
string	callerOntID	调用者本地 ID	IN
int	public_key	公开密钥	IN
Array	argvs	参数	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.8 Invoke_function_test

[功能]

调用功能测试

[格式]

```
invoke_function_test(contract_address, function_str, argvs = [{"type": "string", "value": ""}],  
node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	contract_address	智能合同地址	IN
string	function_str	功能名	IN
Array	argvs	参数	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.9 invoke_function_vote

[功能]

调用功能投票

[格式]

```
invoke_function_vote(func_, walletAddress, voteList, voteCount, errorcode=47001, node_index=None)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>func_</i>	功能名	IN
Address	<i>walletAddress</i>	钱包地址	IN
String	<i>voteList</i>	投票列表	IN
int	<i>voteCount</i>	投票数	IN
int	<i>errorcode</i>	错误代码	IN
int	<i>node_index</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.10 invoke_function_update

[功能]

调用功能升级

[格式]

```
invoke_function_update(func_, param0, param1, param2, param3, param4, param5, param6, param7, errorcode=47001)
```

[参数]

类型	名称	说明	IN/OUT
string	func_	功能名	IN
int	param0	参数 0	IN
int	Param1	参数 1	IN
int	Param2	参数 2	IN
int	Param3	参数 3	IN
int	Param4	参数 4	IN
int	Param5	参数 5	IN
int	Param6	参数 6	IN
int	Param7	参数 7	IN
int	errorcode	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	

Error Code	Content	Note
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.11 invoke_function_register

[功能]

调用功能注册

[格式]

```
invoke_function_register(func_, pubKey, walletAddress, ontCount, ontID, user, errorcode = 47001)
```

[参数]

类型	名称	说明	IN/OUT
String	func_	功能名	IN
string	pubKey	公共密钥	IN
address	walletAddress	钱包地址	IN
int	ontCount	本体计数	IN
string	ontID	本体 ID	IN
string	user	用户	IN
int	errorcode	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
------------	---------	------

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.12 invoke_function_candidate

[功能]

调用功能候选

[格式]

```
invoke_function_candidate(func_, pubKey, errorcode=47001)
```

[参数]

类型	名称	说明	IN/OUT
string	func_	功能名	IN
String	pubKey	公用密钥	IN
int	errorcode	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.13 invoke_function_node

[功能]

调用功能节点

[格式]

```
invoke_function_node(func_, pubKey, errorcode=47001)
```

[参数]

类型	名称	说明	IN/OUT
string	func_	功能名	IN
String	pubKey	公用密钥	IN
int	errorcode	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.14 invoke_function_commitDpos

[功能]

调用功能 commitDpos

[格式]

```
invoke_function_commitDpos(nodeIndex=0)
```

[参数]

类型	名称	说明	IN/OUT
int	<i>nodeIndex</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.15 invoke_function_quitNode

[功能]

调用功能退出节点

[格式]

```
invoke_function_quitNode(func_, pubKey, walletAddress, node_index=None, errorcode=47001):
```

[参数]

类型	名称	说明	IN/OUT
string	<i>func_</i>	节点索引	IN
string	<i>pubKey</i>	公用密钥	IN
address	<i>walletAddress</i>	钱包地址	IN
Int	<i>node_index</i>	节点索引	IN
int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.16 invoke_function_TransferPenalty

[功能]

调用功能 transferpenalty

[格式]

invoke_function_TransferPenalty(func_, pubKey, walletAddress, errorcode=47001) :

[参数]

类型	名称	说明	IN/OUT
string	<i>func_</i>	节点索引	IN
string	<i>pubKey</i>	公用密钥	IN
address	<i>walletAddress</i>	钱包地址	IN
int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.17 invoke_function_SplitCurve

[功能]

调用功能分裂曲线

[格式]

```
invoke_function_SplitCurve(func_, array) :
```

[参数]

类型	名称	说明	IN/OUT
string	<i>func_</i>	节点索引	IN
array	<i>array</i>	数组	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.18 nodeCountCheck

[功能]

检查节点数

[格式]

nodeCountCheck (InResponse, nodeCount)

[参数]

类型	名称	说明	IN/OUT
string	InResponse	内部答复	IN
int	nodeCount	节点数	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.19 getStorageConf

[功能]

取得储存的配置文件

[格式]

getStorageConf (confName)

[参数]

类型	名称	说明	IN/OUT
string	<i>confName</i>	配置文件名	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.20 getStorageVoteInfo

[功能]

取得储存的投票信息

[格式]

getStorageVoteInfo (pubkey, address)

[参数]

类型	名称	说明	IN/OUT
string	<i>pubkey</i>	公用密钥	IN
address	<i>address</i>	地址	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	

Error Code	Content	Note
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.21 native_transfer_ont

[功能]

本地网络转移

[格式]

```
native_transfer_ont(pay_address, get_address, amount, node_index1 = None, errorcode1=47001):
```

[参数]

类型	名称	说明	IN/OUT
address	pay_address	支付地址	IN
address	get_address	取得地址	IN
int	amount	数量	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	

Error Code	Content	Note
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.6.22 native_transfer_multi

[功能]

重复本地转移

[格式]

```
native_transfer_multi(pay_address, get_address, amount, node_index = None, errorcode=47001)::
```

[参数]

类型	名称	说明	IN/OUT
address	<i>pay_address</i>	支付地址	IN
address	<i>get_address</i>	接收地址	IN
Int	<i>amount</i>	数量	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	

Error Code	Content	Note
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.7 Test_muti_contract

4.6.3.7.1 set_premise

[功能]

设置 premise

[格式]

```
set_premise(neo_path)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>neo_path</i>	合约路径	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.7.2 set_premise_a

[功能]

设置 premise_a

[格式]

```
set_premise_a(neo_path_a, neo_path_b)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>neo_path_a</i>	合约 a 路径	IN
String	<i>neo_path_b</i>	合约 b 路径	IN

[返回值]

名称	说明

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.7.3 set_premise_b

[功能]

设置 premise_b

[格式]

```
set_premise_b(neo_path)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>neo_path</i>	合约路径	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.7.4 set_premise_c

[功能]

设置 premise_c

[格式]

```
set_premise_c(neo_path_a, neo_path_b)
```

[参数]

类型	名称	说明	IN/OUT
String	neo_path_a	合约 a 路径	IN

类型	名称	说明	IN/OUT
String	<i>neo_path_b</i>	合约 b 路径	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8 Test_neo_api

4.6.3.8.1 get_block_with_no_tx

[功能]

获取 block

[格式]

```
get_block_with_no_tx(contract_address)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.2 native_transfer_ont

[功能]

本地网络转移

[格式]

```
native_transfer_ont(pay_address, get_address, amount, node_index = 0, errorcode=0)
```

[参数]

类型	名称	说明	IN/OUT
address	pay_address	支付地址	IN
address	get_address	取得地址	IN
int	amount	数量	IN
int	node_index	节点索引	IN
int	errorcode	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.3 get_height

[功能]

获取 height

[格式]

```
get_height(contract_address, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合约地址	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.4 get_header

[功能]

获取 header

[格式]

```
get_header(contract_address, height, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合约地址	IN
int	<i>height</i>	高	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	

Error Code	Content	Note
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.5 get_block

[功能]

获取 block

[格式]

```
get_block(contract_address, block_hash, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合约地址	IN
Array	<i>block_hash</i>	Hash 数组	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	

Error Code	Content	Note
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.6 get_transaction

[功能]

获取 transaction

[格式]

```
get_transaction(contract_address, tx_hash, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合约地址	IN
Array	<i>tx_hash</i>	Hash 数组	IN
int	<i>node_index</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	

Error Code	Content	Note
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.7 get_contract

[功能]

获取 contract

[格式]

```
get_contract(contract_address, script_hash, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合约地址	IN
Array	<i>cript_hash</i>	Hash 数组	IN
int	node_index	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	

Error Code	Content	Note
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.8 invoke_contract_create

[功能]

创建合同

[格式]

```
invoke_contract_create(contract_address, script_hash, name, version, author, email, desc,
node_index = None):
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
array	<i>script_hash</i>	脚本 hash	IN
string	<i>name</i>	名字	IN
string	<i>version</i>	版本	IN
string	<i>author</i>	作者	IN
string	<i>email</i>	邮件地址	IN
string	<i>desc</i>	描述	IN
Int	<i>node_index</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.9 invoke_contract_migrate

[功能]

调用合同迁移

[格式]

```
invoke_contract_migrate(contract_address, script_hash, name, version, author, email, desc,  
node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
array	<i>script_hash</i>	脚本 hash	IN
string	<i>name</i>	名字	IN
string	<i>version</i>	版本	IN
string	<i>author</i>	作者	IN
string	<i>email</i>	邮件地址	IN
string	<i>desc</i>	描述	IN
Int	<i>node_index</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.10 invoke_func_with_1_param

[功能]

[格式]

```
invoke_func_with_1_param(contract_address, func_name, param_type, param_value, node_index = None, twice=True, sleep =5)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
string	<i>func_name</i>	功能名	IN
string	<i>param_type</i>	参数类型	IN
string	<i>param_value</i>	参数值	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>twice</i>	既预执行，也实际执行	IN
Int	<i>sleep</i>	睡眠时长 (S)	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.11 invoke_func_with_0_param

[功能]

[格式]

```
invoke_func_with_0_param(contract_address, func_name, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
string	<i>func_name</i>	功能名	IN
Int	<i>node_index</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	

Error Code	Content	Note
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.12 invoke_func_with_2_param

[功能]

[格式]

```
invoke_func_with_2_param(contract_address, func_name, param_type_1, param_value_1,
                          param_type_2, param_value_2, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
string	<i>func_name</i>	功能名	IN
string	<i>param_type_1</i>	参数类型 1	IN
string	<i>param_value_1</i>	参数值 1	IN
string	<i>param_type_2</i>	参数类型 2	IN
string	<i>param_value_2</i>	参数值 2	IN
Int	<i>node_index</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	

Error Code	Content	Note
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.13 invoke_storage_get

[功能]

[格式]

```
invoke_storage_get(contract_address, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
Int	<i>node_index</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	

Error Code	Content	Note
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.8.14 invoke_storage_put

[功能]

[格式]

```
invoke_storage_put(contract_address, node_index = None)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
Int	<i>node_index</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.9 Test_neo_param

Test Neo Param not define API

4.6.3.10 Test_ong_native

4.6.3.10.1 transfer

[功能]

转移

[格式]

```
transfer(contract_address, pay_address, get_address, amount, node_index =
None, errorcode=47001, errorkey="error"
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
address	<i>pay_address</i>	支付地址	IN
address	<i>get_address</i>	取得地址	IN
Int	<i>amount</i>	数量	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误标识	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.2 provide

[功能]

批准

[格式]

```
provide(contract_address, pay_address, get_address, amount, node_index =
        None, errorcode=47001, errorkey="error")
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
address	<i>pay_address</i>	支付地址	IN
address	<i>get_address</i>	取得地址	IN
Int	<i>amount</i>	数量	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误标识	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.3 transferFrom

[功能]

转出

[格式]

```
transferFrom(contract_address, sender, pay_address, get_address, amount, node_index =  
None, senderType=False, errorcode=47001, errorkey="error"):
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
Array	<i>sender</i>	发送人	IN
address	<i>pay_address</i>	支付地址	IN
address	<i>get_address</i>	取得地址	IN
Int	<i>amount</i>	数量	IN
Int	<i>node_index</i>	节点索引	IN
Bool	<i>senderType</i>	发送者类型	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误标识	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	

Error Code	Content	Note
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.4 name

[功能]

名字

[格式]

```
name(contract_address, node_index = None, errorcode=47001)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	

Error Code	Content	Note
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.5 symbol

[功能]

符号

[格式]

```
symbol(contract_address, node_index = None, errorcode=47001)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	

Error Code	Content	Note
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.6 decimals

[功能]

小数

[格式]

```
decimals(contract_address, node_index = None, errorcode=47001) :
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	

Error Code	Content	Note
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.7 totalSupply

[功能]

总供给量

[格式]

```
totalSupply(contract_address, node_index = None, errorcode=47001) :
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	

Error Code	Content	Note
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.8 balanceOf

[功能]

[格式]

```
balanceOf(contract_address, address, node_index = None, errorcode=47001):
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
address	<i>address</i>	地址	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.9 allowance

[功能]

津贴

[格式]

```
allowance(contract_address, pay_address, get_address, node_index =
None, errorcode=47001, errorkey="error"):
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
address	<i>pay_address</i>	支付地址	IN
address	<i>get_address</i>	取得地址	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10 transfer1

[功能]

[格式]

```
transfer1(contract_address, pay_address, get_address, amount, node_index =
None, errorcode=47001, errorkey="error"):
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN

类型	名称	说明	IN/OUT
address	<i>pay_address</i>	支付地址	IN
address	<i>get_address</i>	取得地址	IN
Int	<i>amount</i>	数量	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.11 provide1

[功能]

[格式]

```
provide1(contract_address, pay_address, get_address, amount, node_index =
    None, errorcode=47001, errorkey="error"):
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
address	<i>pay_address</i>	支付地址	IN
address	<i>get_address</i>	取得地址	IN
Int	<i>amount</i>	数量	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.12 transferFrom1

[功能]

转出

[格式]

```
transferFrom1(contract_address, sender, pay_address, get_address, amount, node_index =  
None, senderType=False, errorcode=47001, errorkey="error"):
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
Array	<i>sender</i>	发送人	IN
address	<i>pay_address</i>	支付地址	IN
address	<i>get_address</i>	取得地址	IN
Int	<i>amount</i>	数量	IN
Int	<i>node_index</i>	节点索引	IN
Bool	<i>senderType</i>	发送者类型	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误标识	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	

Error Code	Content	Note
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.13 name1

[功能]

名字

[格式]

```
name1(contract_address, node_index = None, errorcode=47001)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	

Error Code	Content	Note
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.14 symbol1

[功能]

符号

[格式]

```
symbol1(contract_address, node_index = None, errorcode=47001)
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	

Error Code	Content	Note
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.15 decimals1

[功能]

小数

[格式]

```
decimals1(contract_address, node_index = None, errorcode=47001):
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	

Error Code	Content	Note
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.16 totalSupply1

[功能]

总供给量

[格式]

```
totalSupply1(contract_address, node_index = None, errorcode=47001) :
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	

Error Code	Content	Note
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.17 balanceOf1

[功能]

[格式]

```
balanceOf1(contract_address, address, node_index = None, errorcode=47001):
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
address	<i>address</i>	地址	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.10.18 allowance1

[功能]

[格式]

```
allowance1(contract_address, pay_address, get_address, node_index =
None, errorcode=47001, errorkey="error"):
```

[参数]

类型	名称	说明	IN/OUT
address	<i>contract_address</i>	合同地址	IN
address	<i>pay_address</i>	支付地址	IN
address	<i>get_address</i>	取得地址	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.11 Test_ont_native

Test_ont_native all APIs are same as Test_ong_native

4.6.3.12 Test_ontid_api

4.6.3.12.1 regIDWithPublicKey

[功能]

使用公用密钥注册 ID

[格式]

```
regIDWithPublicKey(ontId, public_key, node_index = None, errorcode=47001, errorkey = "error") :
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ontID	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.2 addKey

[功能]

新增密钥

[格式]

```
addKey(ontId, new_public_key, public_key, node_index =
None, errorcode=47001, public_key_Array=[], errorkey = "error"):
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ontID	IN
String	<i>new_public_key</i>	新增密钥	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
Array	<i>public_key_Array</i>	密钥数组	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	

Error Code	Content	Note
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.3 removeKey

[功能]

移除密钥

[格式]

```
removeKey(ontId, remove_public_Key, public_key, node_index =
None, errorcode=47001, public_key_Array=[], errorkey = "error"):
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ontID	IN
String	<i>remove_public_key</i>	移除密钥	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
Array	<i>public_key_Array</i>	密钥数组	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	

Error Code	Content	Note
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.4 addRecovery

[功能]

新增恢复

[格式]

```
addRecovery(ontId, recovery_address, public_key, node_index = None, errorcode=47001, errorkey = "error")
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ontID	IN
Address	<i>recovery_address</i>	恢复地址	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	

Error Code	Content	Note
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.5 transfer

[功能]

转移

[格式]

transfer()

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	

Error Code	Content	Note
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.6 changeRecovery

[功能]

改变恢复

[格式]

```
changeRecovery(ontId, new_recovery_address, old_recovery_address, public_key, node_index = None, errorcode=47001, old_recovery_address_Array=[], errorkey = "error")
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ontID	IN
Address	<i>new_recovery_address</i>	新恢复地址	IN
Address	<i>old_recovery_address</i>	旧的恢复地址	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
Array	<i>old_recovery_address_Array</i>	旧恢复地址数组	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.7 regIDWithAttributes

[功能]

按照属性注册 ID

[格式]

```
regIDWithAttributes(ontId, attributes_array, public_key, node_index = None, errorcode=47001,
                     errorkey = "error")
```

[参数]

类型	名称	说明	IN/OUT
String	ontID	ont ID	IN

类型	名称	说明	IN/OUT
Array	<i>attributes_array</i>	属性数组	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.8 addAttributes

[功能]

添加属性

[格式]

```
addAttributes(ontId, attributes_array, public_key, node_index = None, errorcode=47001, errorkey
              = "error")
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ont ID	IN
Array	<i>attributes_array</i>	属性数组	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.9 removeAttribute

[功能]

删除属性

[格式]

```
removeAttribute(ontId, attributePath, public_key, node_index = None, errorcode=47001, errorkey  
= "error"):
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ontID	IN
String	<i>attributePath</i>	属性路径	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	

Error Code	Content	Note
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.10 getPublicKeys

[功能]

取得公用密钥

[格式]

```
getPublicKeys(ontId, public_key, node_index = None, errorcode=47001, errorkey = "error") :
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ont ID	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	

Error Code	Content	Note
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.11 getKeyState

[功能]

取得公用密钥状态

[格式]

```
getKeyState(ontId, keyNum, public_key, node_index = None, errorcode=47001, errorkey = "error") :
```

[参数]

类型	名称	说明	IN/OUT
String	ontID	ont ID	IN
Int	keyNum	密钥数	IN
String	public_key	公用密钥	IN
Int	node_index	节点索引	IN
Int	errorcode	错误代码	IN
String	errorkey	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	

Error Code	Content	Note
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.12 getAttributes

[功能]

取得属性

[格式]

```
getAttributes(ontId, public_key, node_index = None, errorcode=47001, errorkey = "error"):
```

[参数]

类型	名称	说明	IN/OUT
String	ontID	ont ID	IN
String	public_key	公用密钥	IN
Int	node_index	节点索引	IN
Int	errorcode	错误代码	IN
String	errorkey	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.13 getDDO

[功能]

取得 DDO

[格式]

```
getDDO(ontId, public_key, node_index = None, errorcode=47001, errorkey = "error") :
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ont ID	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.14 verifySignature

[功能]

验证签名

[格式]

```
verifySignature(ontId, keyNum, public_key, node_index = None, errorcode=47001, errorkey =
    "error"):
```

[参数]

类型	名称	说明	IN/OUT
String	ontID	ontID	IN

类型	名称	说明	IN/OUT
Int	<i>keyNum</i>	密钥数	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
String	<i>errorkey</i>	错误关键字	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.12.15 forNeo

[功能]

[格式]

```
forNeo(contract_address, functionName, params, public_key, node_index = None,
       recovery_address_Array=[]):
```

[参数]

类型	名称	说明	IN/OUT
Address	<i>contract_address</i>	合同地址	IN
String	<i>functionName</i>	功能名	IN
array	<i>params</i>	参数	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
array	<i>recovery_address_Array</i>	恢复地址数组	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13 Test_ontid_others

4.6.3.13.1 Init_server

[功能]

初始化 server

[格式]

```
init_server():
```

[参数]

类型	名称	说明	IN/OUT
----	----	----	--------

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	

Error Code	Content	Note
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.2 Multi_contract

[功能]

多个合约

[格式]

```
multi_contract(task, m, pubkeyArray)
```

[参数]

类型	名称	说明	IN/OUT
String	task	任务	IN
Int	m		IN
Array	pubkeyArray	公用密钥数组	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	

Error Code	Content	Note
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.3 sign_multi_transction

[功能]

转移多个签名合同

[格式]

```
sign_multi_transction(task, judge = True, process_log = True)
```

[参数]

类型	名称	说明
string	task	任务
Bool	judge	是否结果判断
Bool	process_log	是否记录过程 log

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	

Error Code	Content	Note
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.4 regIDWithPublicKey

[功能]

使用公用密钥注册 ID

[格式]

```
regIDWithPublicKey(ontId, public_key, node_index = None, errorcode=47001):
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ontID	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	

Error Code	Content	Note
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.5 addKey

[功能]

新增密钥

[格式]

```
addKey(ontId, new_public_key, public_key, node_index =
    None, errorcode=47001, public_key_Array=[]):
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ontID	IN
String	<i>new_public_key</i>	新增密钥	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
Array	<i>public_key_Array</i>	密钥数组	IN

[返回值]

名称	说明

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.6 removeKey

[功能]

移除密钥

[格式]

```
removeKey(ontId, remove_public_Key, public_key, node_index =
None, errorcode=47001, public_key_Array=[]):
```

[参数]

类型	名称	说明	IN/OUT
String	ontID	ont ID	IN
String	remove_public_key	移除密钥	IN
String	public_key	公用密钥	IN

类型	名称	说明	IN/OUT
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
Array	<i>public_key_Array</i>	密钥数组	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.7 addRecovery

[功能]

新增恢复

[格式]

```
addRecovery(ontId, recovery_address, public_key, node_index = None, errorcode=47001)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ont ID	IN
Address	<i>recovery_address</i>	恢复地址	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.8 changeRecovery

[功能]

改变恢复

[格式]

```
changeRecovery(ontId, new_recovery_address, old_recovery_address, public_key, node_index = None, errorcode=47001, old_recovery_address_Array=[])
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ont ID	IN
Address	<i>new_recovery_address</i>	新恢复地址	IN
Address	<i>old_recovery_address</i>	旧的恢复地址	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN
Array	<i>old_recovery_address</i> <i>_Array</i>	旧恢复地址数组	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.9 regIDWithAttributes

[功能]

按照属性注册 ID

[格式]

```
regIDWithAttributes(ontId, attributes_array, public_key, node_index = None, errorcode=47001)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ontID	IN
Array	<i>attributes_array</i>	属性数组	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	

Error Code	Content	Note
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.10 addAttributes

[功能]

添加属性

[格式]

```
addAttributes(ontId, attributes_array, public_key, node_index = None, errorcode=47001)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ontID	IN
Array	<i>attributes_array</i>	属性数组	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	

Error Code	Content	Note
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.11 removeAttribute

[功能]

删除属性

[格式]

```
removeAttribute(ontId, attributePath, public_key, node_index = None, errorcode=47001) :
```

[参数]

类型	名称	说明	IN/OUT
String	ontID	ontID	IN
String	attributePath	属性路径	IN
String	public_key	公用密钥	IN
Int	node_index	节点索引	IN
Int	errorcode	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	

Error Code	Content	Note
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.12 getPublicKeys

[功能]

取得公用密钥

[格式]

```
getPublicKeys(ontId, public_key, node_index = None, errorcode=47001):
```

[参数]

类型	名称	说明	IN/OUT
String	ontID	ontID	IN
String	public_key	公用密钥	IN
Int	node_index	节点索引	IN
Int	errorcode	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.13 getKeyState

[功能]

取得公用密钥状态

[格式]

```
getKeyState(ontId, keyNum, public_key, node_index = None, errorcode=47001, resultStr=""):
```

[参数]

类型	名称	说明	IN/OUT
String	ontID	ont ID	IN
Int	keyNum	密钥数	IN
String	public_key	公用密钥	IN
Int	node_index	节点索引	IN
Int	errorcode	错误代码	IN
String	resultStr	结果	OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.14 getAttributes

[功能]

取得属性

[格式]

```
getAttributes(ontId, public_key, node_index = None, errorcode=47001):
```

[参数]

类型	名称	说明	IN/OUT

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ontID	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.15 getDDO

[功能]

取得 DDO

[格式]

getDDO(ontId, public_key, node_index = None, errorcode=47001):

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ont ID	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.16 verifySignature

[功能]

验证签名

[格式]

```
verifySignature(ontId, keyNum, public_key, node_index = None, errorcode=47001):
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ontID</i>	ont ID	IN
Int	<i>keyNum</i>	密钥数	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN
Int	<i>errorcode</i>	错误代码	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.13.17 forNeo

[功能]

[格式]

```
forNeo(contract_address, functionName, params, public_key, node_index = None):
```

[参数]

类型	名称	说明	IN/OUT
Address	<i>contract_address</i>	合同地址	IN
String	<i>functionName</i>	功能名	IN
array	<i>params</i>	参数	IN
String	<i>public_key</i>	公用密钥	IN
Int	<i>node_index</i>	节点索引	IN

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	

Error Code	Content	Note
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.6.3.14 Test_restful

Test_restful not define special APIs.

4.6.3.15 Test_Rpc

Test_rpc not define special APIs.

4.6.3.16 Test_websocket

4.6.3.16.1 get_signed_data

[功能]

[格式]

```
get_signed_data()
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Error code	异常

[Error Code]

Error Code	Content	Note

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.7 Tools

For tools, test tools using those tools to support test.

4.7.1 Internal structure

```
|-tools          工具目录
  |
  |           |
  |   base58ToAddress    工具文件
  |
  |           |
  |   ontology-bft_1     工具文件
  ....
```

4.7.2 Internal data

Tools module no internal data

4.7.3 APIs

Tools module no internal APIs

4.8 utils

For utils, it will provide basic function to support test running.

4.8.1 Internal structure

```
|-utils           utils 目录
|   |
|   |   common.py      common function 封装
|   |
|   |   config.py     配置封装
|   |
|   |   connect.py    connect function 封装
|   |
|   |   error.py      错误封装
|   |
|   |   hexstring.py  转码 fucntion 封装
|   |
|   |   logger.py     log fucntion 封装
|   |
|   |   parametrized testcase.py  参数化测试用例封装
|   |
|   |   taskdata.py    任务数据 function 封装
|   |
|   |   taskrunner.py   任务执行 function 封装
|   |
|   |   taskthread.py  任务线程 function 封装
```

4.8.2 Internal data

Utils module using the data like follow:

Example:

```
ONT_ERR_CODE = {  
    0 : "SUCCESS",  
    41001 : "SESSION_EXPIRED: invalided or expired session",  
    41002 : "SERVICE_CEILING: reach service limit",  
    41003 : "ILLEGAL_DATAFORMAT: illegal dataformat",  
    41004 : "INVALID_VERSION: invalid version",  
    42001 : "INVALID_METHOD: invalid method",  
    42002 : "INVALID_PARAMS: invalid params",  
    43001 : "INVALID_TRANSACTION: invalid transaction",  
    43002 : "INVALID_ASSET: invalid asset",  
    43003 : "INVALID_BLOCK: invalid block",  
    44001 : "UNKNOWN_TRANSACTION: unknown transaction",  
    44002 : "UNKNOWN_ASSET: unknown asset",  
    44003 : "UNKNOWN_BLOCK: unknown block",  
    45001 : "INTERNAL_ERROR: internel error",  
    47001 : "SMARTCODE_ERROR: smartcode error"  
}
```

4.8.3 APIs

Utils Module will include follow APIs:

4.8.3.1 Common

4.8.3.1.1 Cmp

[功能]

比较

[格式]

```
cmp(expect_data, cmp_data)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>expect_data</i>	期望数据	IN
String	<i>cmp_data</i>	比对数据	IN

[返回值]

名称	说明
True	正常
False	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.1.2 Pause

[功能]

暂停

[格式]

pause (msg)

[参数]

类型	名称	说明	IN/OUT
String	<i>msg</i>	消息	IN

[返回值]

名称	说明
String	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.1.3 BI_reserver

[功能]

[格式]

bl_reserver(input)

[参数]

类型	名称	说明	IN/OUT
String	<i>input</i>	输入	IN

[返回值]

名称	说明
String	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.1.4 base58_to_address

[功能]

[格式]

base58_to_address(input)

[参数]

类型	名称	说明	IN/OUT
String	<i>input</i>	输入	IN

[返回值]

名称	说明
Address	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.1.5 bl_address

[功能]

[格式]

b1_address(*input*)

[参数]

类型	名称	说明	IN/OUT
String	<i>input</i>	输入	IN

[返回值]

名称	说明
String	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2 Connect

4.8.3.2.1 multithread_run

[功能]

多线程执行

[格式]

```
multithread_run(logger, cfg_request, cfg_response)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>logger</i>	Logger	IN
String	<i>cfg_request</i>	请求	IN
String	<i>cfg_response</i>	结果	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2.2 con

[功能]

连接

[格式]

con(*itype*, *ip*, *request*)

[参数]

类型	名称	说明	IN/OUT
String	<i>itype</i>	连接类型	IN
String	<i>ip</i>	Ip 地址	IN
String	<i>request</i>	请求	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	

Error Code	Content	Note
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2.3 con_cli

[功能]

连接 cli

[格式]

con_cli(ip, request)

[参数]

类型	名称	说明	IN/OUT
String	<i>ip</i>	Ip 地址	IN
String	<i>request</i>	请求	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	

Error Code	Content	Note
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2.4 con_rpc

[功能]

连接 rpc

[格式]

```
con_rpc(ip, request)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ip</i>	Ip 地址	IN
String	<i>request</i>	请求	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	

Error Code	Content	Note
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2.5 con_restful

[功能]

连接 restful

[格式]

```
con_restful(ip, api_request)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ip</i>	Ip 地址	IN
String	<i>api_request</i>	请求	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	

Error Code	Content	Note
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2.6 con_ws

[功能]

连接 websocket

[格式]

con_ws(ip, request)

[参数]

类型	名称	说明	IN/OUT
String	<i>ip</i>	Ip 地址	IN
String	<i>request</i>	请求	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	

Error Code	Content	Note
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2.7 con_test_service

[功能]

连接 test service

[格式]

```
con_test_service(ip, request)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ip</i>	Ip 地址	IN
String	<i>request</i>	请求	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2.8 on_message

[功能]

[格式]

on_message(ws, message)

[参数]

类型	名称	说明	IN/OUT
String	ws	Websocket	IN
String	message	消息	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2.9 on_error

[功能]

[格式]

```
on_error(ws, error)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>ws</i>	WebSocket	IN
String	<i>Error</i>	错误	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2.10 on_close

[功能]

[格式]

on_close(ws)

[参数]

类型	名称	说明	IN/OUT
String	ws	WebSocket	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2.11 on_open

[功能]

[格式]

on_open(ws)

[参数]

类型	名称	说明	IN/OUT
String	ws	WebSocket	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2.12 ws_heartbeat_thread

[功能]

WebSocket 心跳检测线程

[格式]

```
ws_heartbeat_thread(self, heartbeat_gap = 5)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>heartbeat_gap</i>	心跳检测间距	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.2.13 exec

[功能]

执行

[格式]

```
exec(self, heartbeat_gap = 5, message_cb = None)
```

[参数]

类型	名称	说明	IN/OUT
Int	<i>heartbeat_gap</i>	心跳检测间距	IN
Int	<i>message_cb</i>	回调函数	IN

[返回值]

名称	说明
0	正常

名称	说明
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.3 Error

Error no special public APIs

4.8.3.4 hexstring

4.8.3.4.1 FileToHex

[功能]

文件转换 16 进制

[格式]

FileToHex(path)

[参数]

类型	名称	说明	IN/OUT
String	<i>path</i>	路径	IN

[返回值]

名称	说明
String	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.4.2 ByteToHex

[功能]

byte 转换 16 进制

[格式]

ByteToHex (bytes_value)

[参数]

类型	名称	说明	IN/OUT
String	<i>bytes_value</i>	Byte 值	IN

[返回值]

名称	说明
String	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.4.3 HexToByte

[功能]

16 进制转换 byte

[格式]

HexToByte(hexStr)

[参数]

类型	名称	说明	IN/OUT
String	hexStr	16 进制值	IN

[返回值]

名称	说明
String	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.4.4 recoveryAddress

[功能]

恢复地址

[格式]

```
recoveryAddress(m, hexArr, checkMultiSig="ae")
```

[参数]

类型	名称	说明	IN/OUT
String	M		IN
Array	$hexArr$	16 进制数组	IN
String	$checkMultiSig$	检查签名	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.4.5 numSeq

[功能]

[格式]

numSeq (m)

[参数]

类型	名称	说明	IN/OUT
String	M		IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.5 Logger

4.8.3.5.1 setPath

[功能]

设置路径

[格式]

```
setPath(self, path)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>path</i>	路径	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.5.2 logPath

[功能]

log 路径

[格式]

logPath(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	

Error Code	Content	Note
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.5.3 open

[功能]

打开 log

[格式]

```
open(self, filepath, title = None)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>filepath</i>	Log 路径	IN
String	<i>title</i>	Title	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	

Error Code	Content	Note
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.5.4 print

[功能]

打印 log

[格式]

```
print(self, str)
```

[参数]

类型	名称	说明	IN/OUT
String	Str	打印内容	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	

Error Code	Content	Note
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.5.5 error

[功能]

Error log

[格式]

```
error (self, str)
```

[参数]

类型	名称	说明	IN/OUT
String	Str	打印内容	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	

Error Code	Content	Note
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.5.6 info

[功能]

info log

[格式]

info(self, str)

[参数]

类型	名称	说明	IN/OUT
String	Str	打印内容	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.5.7 close

[功能]

关闭 log

[格式]

```
close(self, result = None, msg = None)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>result</i>	结果	IN
String	<i>msg</i>	消息	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.5.8 append_record

[功能]

追加记录

[格式]

```
append_record(self, name, status, logpath)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>name</i>	名字	IN
String	<i>status</i>	状态	IN
String	<i>logpath</i>	路径	IN

[返回值]

名称	说明

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.6 parametrized testcase

4.8.3.6.1 setup

[功能]

设置

[格式]

```
setUp(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.6.2 result

[功能]

结果

[格式]

result(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.6.3 ASSERT

[功能]

ASSERT

[格式]

```
ASSERT(self, result, info = "")
```

[参数]

类型	名称	说明	IN/OUT
String	<i>result</i>	结果	IN
String	<i>info</i>	信息	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.6.4 BLOCK

[功能]

Block

[格式]

```
BLOCK(self, result, info = "")
```

[参数]

类型	名称	说明	IN/OUT
String	<i>result</i>	结果	IN
String	<i>info</i>	信息	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.7 Taskdata

4.8.3.7.1 Path

[功能]

Path

[格式]

path(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.7.2 Log_path

[功能]

Log 路径

[格式]

log_path(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	

Error Code	Content	Note
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.7.3 Dir

[功能]

Dir

[格式]

dir(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	

Error Code	Content	Note
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.7.4 set_type

[功能]

设置类型

[格式]

```
set_type(self, itype)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>itype</i>	类型	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidaded or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	

Error Code	Content	Note
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.7.5 type

[功能]

类型

[格式]

type(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	

Error Code	Content	Note
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.7.6 name

[功能]

名字

[格式]

name(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	

Error Code	Content	Note
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.7.7 data

[功能]

数据

[格式]

data(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.7.8 to_json

[功能]

To json

[格式]

```
to_json(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.7.9 request

[功能]

请求

[格式]

request(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.7.10 set_request

[功能]

设置请求

[格式]

```
set_request(self, request)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>request</i>	请求	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.7.11 node_index

[功能]

节点索引

[格式]

node_index (self)

[参数]

类型	名称	说明	IN/OUT

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.7.12 load_cfg

[功能]

读取配置文件

[格式]

```
load_cfg(self, cfg)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>cfg</i>	配置文件	IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.8 Taskrunner

4.8.3.8.1 run_single_task

[功能]

执行单一任务

[格式]

```
run_single_task(task, judge = True, process_log = True)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>task</i>	任务	IN
Bool	<i>judge</i>	判断	IN
Bool	<i>process_log</i>	Log	IN

[返回值]

名称	说明
True	正常
False	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internel error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.8.2 run_pair_task

[功能]

执行一对任务

[格式]

```
run_pair_task(task1, task2, compare_src_key = None, compare_dist_key = None)
```

[参数]

类型	名称	说明	IN/OUT
String	<i>Task1</i>	任务 1	IN
String	<i>Task2</i>	任务 2	IN
Int	<i>compare_src_key</i>		IN
Int	<i>compare_dist_key</i>		IN

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalidated or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.9 Taskthread

4.8.3.9.1 run

[功能]

执行

[格式]

run(self)

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
True	正常
False	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	

Error Code	Content	Note
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

4.8.3.9.2 get_result

[功能]

获取结果

[格式]

```
get_result(self)
```

[参数]

类型	名称	说明	IN/OUT

[返回值]

名称	说明
0	正常
Exception	异常

[Error Code]

Error Code	Content	Note
41001	SESSION_EXPIRED: invalided or expired session	
41002	SERVICE_CEILING: reach service limit	
41003	ILLEGAL_DATAFORMAT: illegal dataformat	
41004	INVALID_VERSION: invalid version	
42001	INVALID_METHOD: invalid method	
42002	INVALID_PARAMS: invalid params	
43001	INVALID_TRANSACTION: invalid transaction	
43002	INVALID_ASSET: invalid asset	
43003	INVALID_BLOCK: invalid block	

Error Code	Content	Note
44001	UNKNOWN_TRANSACTION: unknown transaction	
44002	UNKNOWN_ASSET: unknown asset,	
44003	UNKNOWN_BLOCK: unknown block	
45001	INTERNAL_ERROR: internal error	
47001	SMARTCODE_ERROR: smartcode error	

5 APPENDIX—QUESTIONS

Give a list of questions/issues listed in the document

END OF DOCUMENT