

# Welcome to glua's documentation!

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## glua编程语言

Contents:

### 简单介绍

**glua** 是一种区块链的智能合约编程语言，是一种静态强类型编程语言。

### 入门Tutorial

#### 1. 开发环境

**glua**可以用来编写智能合约放入区块链然后调用，也可以作为区块链的**event**回调脚本执行.

在开发链上合约时，可以在区块链测试链上开发，编译**glua**合约源码文件生成字节码文件，然后把字节码注册到**hshare**测试链，获取到一个合约地址，然后调用这个合约的某个**API**；

在开发本地脚本时，可以在测试链上先编译**glua**脚本源码文件生成字节码文件，然后注册字节码文件为某个合约的某个**event**的回调脚本，当区块链同步到关联的**event**时就触发执行回调脚本。

当要发布到正式链上时步骤和上面类似，测试链主要用来开发时使用。

具体编译，注册合约，调用合约，注册脚本等的说明另见相关说明文档。

你需要什么：

- 最新版本的底层钱包节点程序（内置**glua**编译器和解释器）
- 一款你喜欢的编辑器

你还需要什么：

- 需要连上区块链网络，并同步完成所有的数据块（正式链）
- 一个拥有足够代币的账户，并保持钱包打开并处于解锁状态（正式链）

#### 2. 你的第一个glua程序

```
type Person = {
  id: string default "123",
  name: string default "glua",
  age: int default 24
}

var M = Contract<Person>()

function M:init()
  let p = Person()
  pprint(p.id, p.name, p.age)
end

return M
```

#### 3. 选择一个编辑器

我们提供了一个**glua**的**IDE**供开发使用，并提供和区块链的集成可以用来开发智能合约。但是也可以用各人自己喜欢的编辑器比如**Visual Studio Code**, **Vim**等编写，没有特别要求。但是还是更推荐使用我们提供的**IDE**工具，因为是为合约的开发定制化的开发工具，集成了很多的功能，可以为你省去了很多命令行操作的繁琐动作。

#### 4. 开始用glua编写智能合约

基本语法

Contents:

类型

这一章描述glua语言的类型系统

基本类型

- 包括nil, string, boolean, number, integer, function, table, Map, Array, Stream 几种基本类型
- nil: 表示空数据
- string: 字符串，代码里字面量用双引号或者单引号或者[[和 ]]包围起来，比如"hello world", 'hello', [[hello world]]。[[和 ]]包括起来的是跨行字符串
- boolean: 布尔类型，表示真或者假，true或者false
- integer: 整数类型，比如123,45这样的，支持64bit整数，整数范围 `-9223372036854775808` 到 `9223372036854775807`
- number: 浮点数类型，表示小数，实现是64bit的double类型，值的范围是 `-2^1024` 到 `2^1024`，精度15位小数. 同时编译期integer类型可以隐式转换成number类型，number类型不能隐式转换成integer类型
- function: 函数类型，函数可以作为变量的值，可以作为参数和返回值，支持闭包，使用起来类似其他类型的值，但是可以调用
- Map<T>: 哈希表类型，T代表哈希表的值类型，是一个键值对，键的类型是string类型，每一个键值对的值类型都是T代表的类型, Map<T>类型是table类型的子类型

Map<T>类型可以通过table模块中的函数进行操作，可以通过中括号下标或者点号加属性名进行读写访问，比如a['name'], a.name等

- Array<T>: 列表类型，T代表列表的值类型，列表中每一项都是T代表的类型，Array<T>类型是table类型的子类型

Array<T>类型可以通过table模块中的函数进行操作，可以通过中括号下标进行读写访问，比如a[1]等

- Stream 二进制字节流类型，表示一个二进制比特的流

比如

```
let a = {} -- 这是一个空哈希表，a变量的类型自动推导为Map<object>
a['name'] = 'glua' -- 修改a指向的哈希表中的键值对
let b = { age: 2 } -- b变量类型是Map<int>
let c = { ['name']='China', age=5000, address: 'China' } -- c变量类型是Map<object>类型，
因为值类型有多种不同类型，所以自动推导为Map<object>
let d = [ 1, 2, 3 ] -- d变量是一个包含3个值的列表，类型是Array<int>
```

- record: 编译期的自定义数据结构，类似C语言的struct结构体，里面可以自定义属性，程序编译完成，在运行时record类型的变量表现相当于table类型

比如

```
type Person = {
  name: string,
  age: int default 24,
  age2: int = 24 -- record属性默认值既可以用default也可以用=区分
}
```

- table: Map<T>和Array<T>以及record类型的父类型，可以将其他三种类型隐式转换或者通过totable函数显式转换成table类型，也可以将table类型隐式转换成具体子类型，Map类型可以转换成record类型，其他不同子类型之间不能直接互相转换
- union: 表示在编译期可能是几种不同类型中的某一种类型，比如 let a : int | string | number 表示是int或string或number类型
- literal type: Literal Type类型是一种枚举类型，可以将多个字符串或者数字或者布尔值或者nil字面量作为枚举类型的每一项，

给枚举类型赋值时必须用兼容的枚举类型或者枚举类型中的字面量值，否则编译期报错

比如

```
type Gender = "male" | "female"
var gender: Gender
gender = "male" -- Correct
gender = "Chinese" -- Error: 编译错误
```

- **object**: 编译期类型，是所有类型的父类型，变量被声明为**object**可以被赋值给任何类型的值，并且访问**object**类型的变量的属性是在编译期允许的。

比如

```
var a: object = 1
a = "hello"
pprint(a.name)  -- 编译期通过，运行时失败
```

## 静态类型系统

- 编译期会进行变量类型，函数调用，操作符使用，函数声明，**record**结构等进行静态类型推导和分析，对于类型不正确的使用编译期会报错。
- 对于变量，会分析变量在不同代码位置的类型，进而分析在不同位置是否使用错误，比如类型是否使用正确，或者是否初始化后才使用
- 对于函数定义，会分析参数类型和返回类型，以及在函数体中进行静态类型分析
- 对于函数调用，会分析当前上下文中，是否函数类型和使用的实参类型匹配
- 对于**record**类型，会分析每个属性字段的类型
- 变量和函数参数的类型声明，以及构造函数等用到类型的地方，会检查类型的存在下，兼容性等

## 全局变量和局部变量

- 不允许创建新的全局变量，也不允许对 `_ENV`, `_G` 全局变量做修改，只允许新创建 **local** 变量，语法是类似 `local a = 123; local a,b = "name", 'age'` 这样。如果创建局部函数，可以类似 `local function abc() return "abc"; end`
- 局部变量声明可以同时声明变量类型，比如 `local a: string = "hello"`
- 局部变量的值在编译期需要和局部变量的编译期类型声明一致，比如 `local a = 1; a = "hi"` 这样会编译期报错。
- 为了安全因素，限制智能合约中的每个函数不能有超过**128**个局部变量，并且限制每个局部变量的符号长度不能超过**128**个字符(函数的参数，包括**self**，也算入局部变量的数量中)
- 变量名称、参数名、**event**名称的符号不允许使用关键字的名字，尤其注意 `do/end/then` 等容易被误用为变量名/参数名/**event**名称的关键字
- 局部变量可以用 `local`, `var`, `let` 三个关键字来声明
- `var` 关键字和 `local` 关键字等效，都是用来声明可变局部变量，可变局部变量在接下来的可见作用域代码中可以被使用和修改
- `let` 关键字用来声明不可变局部变量，声明的局部变量只能被初始化值，不能修改值，但是不可变的只是变量本身，变量指向的值如果是 **table** 或 **record** 类型依然可以改变这个 **table** 的内容

比如:

```
var a = 'hello'
local b = 'hello'
let c = 'hello'
var d: object = 'hello'
a = 'glua'  -- 正确
a = 123    -- 错误, a类型不能改变
b = 'glua'  -- 正确
b = 123    -- 错误, b类型不能改变
c = 'glua'  -- 错误
d = 123    -- 正确, d变量编译期类型的object类型, 可以用数字类型的值赋值
```

## 类型声明

声明变量和声明函数的参数时可以同时声明变量类型，函数参数如果不显示声明类型则默认是 **object** 类型

例如:

```
let a: string = "123"
var b: G1
let b: int | string | Person  -- G1是某个record类型
                                -- Person是某个record类型, 这种声明表示b是int或string或Person类型, 也就是union类型
let c ?: int                  -- 这种表示声明的变量c是int或nil类型的, 相当于 int | nil的union类型

let function add(a: number, b: number, c ?: Array<number>)
    return a + b
end
```

声明类型时也可以声明函数类型，函数的签名类型语法是 `(ArgTypeName1, ...) => RetTypeName`

例如

```
let a: (int, int, int) => string
```

还可以将变量或者函数参数的类型声明为**Function**，表示这个变量/参数的类型是函数，能接受任何函数类型的值，不论参数数量，参数类型和返回值类型。例如

```
let function add(a: number, b: number)
  return a + b
end
let add2: Function = add
let r = add2('123')    -- 这段代码编译期类型没问题，但是运行时会报类型错误
```

## record自定义类型¶

- record类型是类似C语言的struct的语法，可以自定义带有若干个属性字段的结构体，每个属性字段都有各自的类型，不同属性可以有不同类型，属性的类型也可以是其他的record类型，也就是可以嵌套使用record类型。

比如:

```
type Address = {
  province: string,
  city: string
}

type Person = {
  name: string,
  age: int default 24,
  age2: int = 24, -- record属性默认值既可以用default也可以用=区分
  address: Address,
  parent_names: Array<string>
}
```

- record的初始化和赋值可以用table来赋值，record类型的变量或者函数返回值也可以赋值给table类型的变量，不需要额外做类型转换，record的属性和属性值与table的键值一一对应。

比如:

```
type Person = {
  name: string,
  age: int default 24
}

type Address = {
  province: string,
  city: string
}

var p1: Person = {name='glua'} -- 用Map<T>值给record类型的变量赋值，会做自动类型转换
var p2: Address = p1           -- 编译报错，p1是Person类型变量，不能赋值给Address类型的变量
var p3: table = p1             -- 正确，record类型的变量或值可以赋值给table类型的变量
```

- record类型只是对变量的类型声明，但是在运行时实际还是table类型。record如果用构造函数（类型构造函数的名称和类型名称同名）创建，可以使用一个table值作为参数初始化，没有赋值的属性会使用属性默认值。如果用table类型的值比如{}进行类型转换赋值给record类型，则不涉及构造函数调用，record类型的属性默认值不起作用。

合约的storage的初始化是直接由区块链初始化的，record类型的default属性值不对它起作用

比如:

```
type Person = {
  name: string,
  age: int default 24,
  age2: int = 24 -- record属性默认值既可以用default也可以用=区分
}
let p1 = Person() -- p1值是{name: nil, age: 24, age2: 24}
let p2 = Person({name='glua'}) -- p2值是{name: 'glua', age: 24, age2: 24}
let p3 = Person({name='glua', age=100}) -- p3值是{name: 'glua', age: 100, age2: 24}
let p4: Person = {} -- p4值是{}
```

- record定义时可以带有若干个泛型参数，泛型参数在record的属性的类型中可以用来定义属性类型。带有泛型参数的record类型，需要用具体类型实例化后才能用来声明变量或者函数参数类型。

比如:

```

type Person<A> = {  -- A就是Person泛型的泛型参数，是用来代表未知类型的类型变量
    name: string,
    address: A      -- 将address属性声明为A类型，则表示address属性的类型根据Person泛型实例化时的A的具体
                    类型来确定
}
let p = Person<string>()  -- 这里先用string类型替换Person泛型的A类型变量替换产生一个新类型
                        Person<string>，然后调用这个新类型的构造函数

```

- record的成员函数的定义，不能用function <varname>.<funcname> (...) ... end的语法,只能用 function <varname>:<funcname> (...) ... end的语法

比如:

```

type Person = {
    name: string,
    age: int
}
var p1 = {}
function p1.sayHi1(self)  -- 正确
end
function p1.sayHi2()     -- 正确
end

var p2 = Person()
function p2.sayHi1(self)  -- 编译错误，p2是record类型的，不能用varname.funcName的方式定义成员函数
end
function p2.sayHi2()     -- 正确
end

p1.sayHi1()              -- 正确
p1.sayHi2()              -- 正确
p2.sayHi2()              -- 正确

```

- 没有特定说明的record的语法，和Map<object>语法一致,也可以用 varname.propertyName和 varname["propertyName"], varname["propertyName"]的方式来读取和修改record类型变量的属性
- record定义的语法是:

```

type RecordName = { PropName: PropTypeName, ... }

```

或

```

type RecordName <GenericType1, ... > = { PropName: PropTypeName, ... }

```

例如:

```

type Person = {
    name: string,
    age: int,
    mobile ? : string default ''  -- 这表示属性mobile的类型是string | nil，并且默认
                                值是空字符串
}
type G1<T1, T2, T3> = { a: T1, b: T2, c: T3, count: int }

```

- record可以用来定义其他名称的新record，同时可以有新的泛型参数（可选的）

语法如下:

```

type RecordName = RecordNameExisted < Type1, ... >

```

或

```

type RecordName = RecordNameExisted

```

或

```

type RecordName <GenericType1, ... > = RecordNameExisted < Type1, ... >

```

或

```
type RecordName <GenericType1, ... > = RecordNameExisted
```

例如:

```
type G2<T> = G1<int, T, string>
type G3 = G1<string> -- 编译报错, G1需要3个类型变量
type G4 = string
type G5 = G4
```

- **record**类型在定义后自动产生一个同名函数作为构造函数, 可以可选地接受一个`Map<T>`类型的参数, 参数`Map<T>`中有的属性覆盖`record`类型的属性默认值, 合并后的`Map<T>`当成`record`类型作为构造函数的返回值

调用类型的构造函数也可以省略括号直接传一个`map`字面量字面量作为参数

例如:

```
type Person = { name: string, age: int default 100 }
let p1 = Person() -- p1 的值是 {name: nil, age: 100}
let p2 = Person({name: "glua"}) -- p2 的值是{name: "glua", age: 100}

let p3 = Array<Person> ( [ {name: "glua"}, {name: "China", age: 10000} ] ) -- 这里括号不能省略, 因为参数是array字面量不是map字面量
let p4 = Array<Person> { name: "hello", age: 100 }
```

## Literal Type类型¶

- **Literal Type**类型是一种枚举类型, 可以将多个字符串或者数字或者布尔值或者`nil`字面量作为枚举类型的每一项,

给枚举类型赋值时必须用兼容的枚举类型或者枚举类型中的字面量值, 否则编译期报错。

- 运行期枚举类型表现出的类型和运行时具体的值的类型一致, 也就是说, 枚举类型是编译期类型, 运行期不存在枚举类型
- 枚举类型没有构造函数, 这点和`record`类型不一样
- 语法

```
type EnumTypeName = LiteralValue1 | LiteralValue2 ...
```

`LiteralValue1` 可以使用 `LiteralString` | `LiteralNumber` | `LiteralInteger` | `LiteralBool` | `nil` 其中任何一种字面量

- 例如

```
type Gender = "male" | "female"
var gender: Gender
gender = "male" -- Correct
gender = "Chinese" -- Error: 编译错误

function a1(p: true)
end

function a2(p: 'Chinese')
end

let a3: string = gender -- 枚举类型的变量可以显式降级到枚举值的类型

-- Literal Type类型也可以拼接
type Cat = "whiteCat" | "blackCat"
type Dog = "husky" | "corgi"
type Pets = Cat | Dog
-- 等效于 type Pets = "whiteCat" | "blackCat" | "husky" | "corgi"

type Falsy = "" | 0 | false | nil
```

## 泛型¶

- 支持在`record`类型定义时使用泛型来定义, 在属性的类型中当做类型来使用。
- 带有泛型的`record`类型需要用实际类型实例化后才可以用来声明变量类型
- 定义新`record`类型时支持泛型, 支持多个泛型参数

语法

```
type RecordName <GenericName1, ... > = { PropName: TypeName, ... }
```

例如:

```
type G1<T1, T2, T3> = { -- 这里T1, T2, T3是泛型的类型变量, 这里定义了一个泛型类型G1, 具体使用时可以用具体
  id: string,
  a: T1,
  b: T2,
  c: T3
}
```

- 泛型类型部分实例化和类型重定义
- 带有泛型的record类型, 可以不使用全部泛型的类型变量, 只替换其中部分类型变量产生新泛型类型

语法

```
type RecordName {<GenericName1, ... >} = RecordNameExisted { <TypeName1, ... > }
```

例如:

```
type G2<T> = G1<int, T, string> -- 定义一个有类型变量T的新泛型G2, 这个泛型是用int,T,string分别
  替代G1泛型中的三个类型变量产生的新类型
type G3 = G2<string> -- 定义一个新类型G3, 这个类型是用string替代G2泛型中的类型变量产生的新类型
```

- 泛型的实例化指用具体类型替代泛型中的类型变量, 比如G2<string>就是对G2泛型的实例化
- 泛型实例化后可以直接在变量/函数参数的类型声明中使用, 也可以直接用在构造函数中

比如:

```
type G2<T> = { name: string, info: T }
let a1: G2<string> = { name: 'glua', info: 'hello' }
let a2 = G2<int>({ name: 'glua', info: 123 })
```

Map类型

Map<T>类型是内置的一个基本类型,表示哈希表。

字面量语法是{}表示空Map<T>, 也可以用形如 { key1 = value1, key2 = value2, key3: value3, ['key4'] = value4, 'key5': value5, ... }的形式初始化一个table值。

Map<T>可以用点操作符或者中括号的方式修改和查询其中某个索引的值, 比如:

```
let a = { name='glua', age=1 } -- 因为'glua'和1的类型不一样, a变量的类型自动推导为Map<object>类型
let a1 = { name: 'glua', age: 1 } -- 这里a1和a两种初始化Map的方式等价
let a2 = { name: 'glua', address: 'China' } -- 因为'glua'和'China'的类型都是string, 所以a2变量的类型自动推导为Map<string>
let a3 = {name: 'glua', 'age': 1 } -- 这种方式和a, a1等价
a['abc'] = 'China' -- 给a插入/修改索引'abc'对应的值
a.abc = 'China' -- 效果同a['abc'] = 'China'
let b1 = a.name -- 读取a的'name'索引对应的值赋值给新变量b1
let b2 = a['name'] -- 同 let b2 = a.name
```

Map<T>类型的值的增删改查可以使用内置模块table模块来操作

例如:

```
var a = {name='glua'}
let b1 = a.name -- 获取哈希表a中的'name'这个key映射的值
let b2 = a['name'] -- 获取哈希表a中的'name'这个key映射的值的另一种方式
a.name = 'China' -- 修改或增加哈希表a中'name'这个key映射为'China'
a['name'] = 'China' -- 修改或增加哈希表a中'name'这个key映射为'China'的另一种方式
var k: string, v: string = '', ''
for k, v in pairs(a) do
  pprint(k, v) -- 遍历哈希表a, k和v分别是哈希表a的每一项的key和value
end
```

## 数组类型

- `glua`中数组类型是用动态数组实现的，长度可变
- 数组类型是可以存储若干个同类型值的数据结构，类型声明语法是`Array<T>`，其中`T`用具体某个类型替换，
- 数组字面量语法是:

```
[ value1, value2, ... ]
```

例如:

```
let a: Array<int> = [ 1, 2, 3 ]    -- 注意，这里``>``和``=``两个符号不能连接在一起
let b: int = a[1]
```

- 数组类型和数组字面量支持嵌套和保护`table`字面量

例如:

```
type Person = { name: string, age: int default 0 }

let p1 = Person({name='p1'})
let p2 = Person({name='p2', age=24})
let persons: Array<Array<Person> > = [ [p1, p2], [p2, p3], [p3] ]    -- 注意，这里``>``和``>``
不能连接在一起，否则会被识别为``>>``
```

- `Array<T>`类型的值的增删改查可以使用内置模块`table`模块来操作

例如:

```
var a = [1,2,3]
table.append(a, 4) -- 添加值到数组
a[3] = 100 -- 修改数组第3个元素
let array_length1 = table.length(a) -- 获取数组长度
let array_length2 = #a -- 另一种获取数组长度的方式
table.remove(a, 2) -- 删除a数组中第2个元素（1-based索引）

var k: int, v: int = 0, 0
for k, v in pairs(a) do
    pprint(k, v) -- 遍历数组a，k和v分别是a中每一项的索引和值，索引从1开始
end
```

## `table`,`record`,`Map<T>`,`Array<T>` 类型间的转换

- `table`作为以上三个类型的父类型, `Map<?>`类型要可以用来初始化`record`类型

两边类型完全一样肯定接受

左值类型	右值类型	是否接受
<code>table</code>	<code>record</code>	true
<code>table</code>	<code>Map&lt;T&gt;</code>	true
<code>table</code>	<code>Array&lt;T&gt;</code>	true
<code>record</code>	<code>table</code>	true
<code>record</code>	<code>Map&lt;T&gt;</code>	true
<code>record</code>	<code>Array&lt;T&gt;</code>	false
<code>record</code>	其他类型的 <code>record</code>	false
<code>Map&lt;T1&gt;</code>	<code>table</code>	true
<code>Map&lt;T1&gt;</code>	<code>record</code>	false
<code>Map&lt;T1&gt;</code>	空 <code>Map&lt;object&gt;</code>	true
<code>Map&lt;T1&gt;</code>	<code>Map&lt;T2 where T2 extends T1&gt;</code>	true
<code>Map&lt;T1&gt;</code>	<code>Map&lt;T2 where T1 extends T2&gt;</code>	false
<code>Map&lt;T1&gt;</code>	<code>Array&lt;?&gt;</code>	false
<code>Array&lt;T1&gt;</code>	<code>table</code>	true
<code>Array&lt;T1&gt;</code>	空 <code>Map&lt;object&gt;</code>	true
<code>Array&lt;T1&gt;</code>	<code>record</code>	false
<code>Array&lt;T1&gt;</code>	<code>Array&lt;T2 where T2 extends T1&gt;</code>	true
<code>Array&lt;T1&gt;</code>	<code>Array&lt;T2 where T1 extends T2&gt;</code>	false
<code>Array&lt;T1&gt;</code>	<code>Map&lt;?&gt;</code>	false

## 内置`record`类型

- `Contract<S>`类型，用于声明合约变量类型,`S`使用当前合约的`storage`类型替换

内置的`Contract`类型的代码实现如下:



```

type Contract<S> = {
  id: string,
  name: string,
  storage: S
}

```

使用例子如下：

```

type Storage = {
  author_name: string,
  age: int
}
let M: Contract<Storage> = {}
function M:init()
  self.storage.age = 100
  self.storage.author_name = 'glua'
  -- 这里self.id和self.name, self.storage.author_name是字符串类型, self.storage.age 是整数
end
return M

```

- **Stream**类型，用于作为字节流类型使用，是一个内置的**record**类型，但是**Stream**类型的对象访问其中的成员函数只能用冒号不能用点号的形式

内置的**Stream**的类型签名如下：

```

type Stream = {
  pos: () => int, -- 获取字节流中当前位置
  eof: () => bool, -- 获取字节流是否到结尾
  current: () => int, -- 获取当前字节（转成int类型），如果已经读取结束了无法读取当前字节，返回-1
  next: () => bool, -- 如果字节流还没有到结尾，pos递进1步，返回true，否则返回false
  reset_pos: () => nil, -- 重组字节流的当前读取位置到起始位置
  size: () => int, -- 获取字节流的长度
  push: (int) => nil, -- 把参数取最后一字节（转成C风格的char类型），加入字节流
  push_string: (string) => nil -- 把参数字符串中每一个字节加入字节流
}

```

使用例子如下：

```

let a1 = Stream()
a1:push(123) -- 对于Stream类型，不能使用a1.push(a1, 123)这种点号访问成员函数的方法
a1:push_string('abc')
let s1 = a1:size()
pprint("a1 size is ", s1)
pprint('a1 is ', tostring(a1), tojsonstring(a1))
pprint('a1 pos is', a1:pos())

var c = a1:pos()

var s = ''
while c < a1:size() do
  s = s .. tostring(a1:current())
  pprint("a1[" .. c, "]= ", a1:current()) -- 应该依次输出 a1[0]=123 a1[1]=97 a1[2]=98
  a1[3]=99
  c = c + 1
  a1:next()
end

```

语句

- 一句代码结尾的分号如果不会引起语法歧义，可以省略（一般省略掉）
- 函数可以返回一个值或者不返回值,比如

```

let abc = function (a: number)
  if a > 0 then
    return
  else
    return 1
  end
end

```

- `--` 两个连着的减号后面的本行内容是注释
- `--[[` 和 `]]` 中间的多行文本也是注释

关键字

glua语法中使用到的关键字不可以作为变量名，函数名，event名等使用

关键字列表如下：

```
if   else   elseif  while  until  repeat
end   function  true   false  then
return and   or    not    nil   local  offline
in   goto   for    do    break  emit
```

## 运算操作符

- `+` 加法
- `-` 减法
- `*` 乘法
- `/` 浮点数除法
- `//` 除法，但是结果向下取整
- `%` 取模运算，除法余数
- `^` 幂运算
- `~=` 不等于比较
- `=` 赋值运算
- `..` 字符串连接操作符，可以用来连接2个字符串
- `==` 相等比较
- `>` 大于
- `<` 小于
- `>=` 大于等于
- `<=` 小于等于
- `&` bit与运算
- `|` bit或运算
- `~` bit取反运算
- `>>` bit右移
- `<<` bit左移
- `and` 且，比如`true and false`, `and`或`or`操作符连接的多个表达式，如果不是单符号表达式，为了避免优先级导致的编译错误，请给`and`/或`or`两边的复杂表达式加上一对`()`，比如`(2>1) and (1>2)`
- `or` 或，比如`true or nil`
- `not` 取布尔相反运算
- `#` 取数组或字符串长度运算符，比如`#array`

## 函数

### 函数定义

可以定义匿名函数，也可以定义命名函数（但是不能定义全局函数名称），也可以创建闭包

比如

```
let abc = function(n: number)
  return n + 1
end
let function add2(n: number)
  return n+2
end

let M = {}
function M:sayHi()
  if 2 < 1 then
    return
  end
  print('Hi')
end
```

函数的代码块中可以有`return`语句，表示返回0个或一个值给调用者，也可以没有`return`语句。但是`return`语句后同条件分支后面，本函数体不能有其他语句

比如

```
let abc = function (n: number)
  return n+1
  pprint(n)          -- 这里会编译报错，return语句后不应该有其他语句
end
```

函数的参数声明可以带有参数类型声明，语法形如： `(name: string, age: int)`，不带类型声明时这个参数的编译期类型是`object`类型

更简化的函数表达式<sup>¶</sup>

以上函数定义的语法也可以定义匿名函数，但是有时候一些简单匿名函数写起来不方便，所以提供更简化的函数表达式语法

- 单表达式函数

函数体只能是单表达式，并且必须和函数参数在同一行

语法规则如下:

```
Args => Expr
```

比如:

```
let a1 = (a: number, b: number) => a + b -- a1类型是(number, number) => number
let a2 = a1(1, 2) -- result is 3
```

- 多行表达式函数

函数体可以是多个语句，并且不限制必须在同一行

语法规则如下:

```
Args => do
  Block
end
```

比如:

```
let a3 = (a: number, b: number) => do
  pprint(a + b)
  return a + b
end -- a3类型是(number, number) => number
let a4 = a3(1, 2) -- 输出3并a4设为3
```

函数调用<sup>¶</sup>

- 函数调用的语法有两种，一是函数对象或者变量后跟着(), 可以传入若干个参数，比如

```
var result = sayHi('glua', 123)
```

- 另一种函数调用语法是，如果函数调用只有一个参数并且这个参数是字符串字面量或者table字面量，则可以省略此处小括号,比如

```
var result = print 'hello'
var result2 = pprint {hello: 2}
```

- 函数调用中如果return了返回值，会返回给调用者，比如上面例子中就是把返回值赋值给result。
- 函数可能在函数体代码中的不同分支分别有return语句，运行时会根据实际运行结果返回第一个return的值。编译器会返回各return语句的值的编译期类型进行union分析出这个函数的返回类型。比如:

```
let function hello(n: number) -- 因为这个函数的函数体内的各return语句的返回值分别是int,string,int,
  所以这个函数的返回类型是 int | string
  if n > 10 then
    return n -- 这条return语句返回int类型
  elseif n > 3 then
    return 'hello' -- 这条return语句返回string类型
  else
    return 0 -- 这条return语句返回int类型
  end
end
```

- 函数定义时有个语法，比如`function M:init() print(self.name) end`，这种冒号语法，相当于用点号，但是自动加上一个`self`参数表示M对象，调用这样函数时也是类似，`M:init()`调用，运行时会自动把M对象作为`self`参数放入M.init函数的第一个参数中。但是要注意，合约的API函数定义，只支持用冒号语法。比如

```
var t1 = {name: 'glua'}
function t1:sayHello()
```

- 函数调用时需要函数定义时的参数类型和实际调用时使用的变量或者值的类型一致，否则会报错

## 控制流语法

可以使用两个减号表示-后面的当前行内容是注释，也就是不作为代码处理

### if/else

条件判断语法，后面跟着真假值，比如`nil/false`都是假值，其他的值都是真值，`else`表示不满足情况下执行的代码，是可选的语句，例如

```
var a = {}
if false then
    print('false')
elseif nil then
    print('ni')
elseif 2 > 1 then
    print('2>1')
elseif a then
    print('a')
else
    print('else')
end

或者
if a then
    print('a')
end
```

### for

循环遍历语句，

有2种for语法，第一种是`for v = e1, e2, e3 do block end`形式，其中`e1`是v的初始值，`e2`是v的结束值（v超过e2时结束循环），`e3`是每次遍历对v的增加值，`e3`可以是负数，`e3`是可选的，默认是1

比如

```
for v=1,10,2 do
    print(v)
end
```

还有一种for语法是`for var_1, ..., var_n in f, step do block end`这种形式的，`var_1`到`var_n`是若干个用来循环的变量名，每次遍历都把`step`和`var_1`到`var_n`的值作为参数传给函数f，结果赋值给`var_1,..., var_n`。一直循环直到f(step, var\_1, ..., var\_n)的返回值是nil为止，比如

```
var a

let f = function(s: number, v: number)
    if not v then
        return 1
    elseif v > 10 then
        return nil
    else
        return v + s
    end
end

for a in f, 2 do
    print(a)
end

let t1 = [1,2,3]
for k: int, v: int in pairs(t1) do -- 这里的pairs的用来遍历Map<T>, Array<T>, table的全局函数，按key排序遍历
    pprint(k, v)
end
```

### while/break

语法结构`while exp do block end`，满足exp条件就可以继续执行block的代码块，其中也可以使用break语句来跳出循环

比如

```
var a = 1
while a < 10 do
  a = a + 1
  print(a)
  if a > 8 then
    break
  end
end
```

### repeat

语法结构repeat block until exp, 重复执行block的代码块, 直到满足exp为真值, 其中也可以使用break语句来跳出循环

比如

```
local a = 1
repeat
  a = a + 1
  print(a)
until a >= 10
```

### goto

可以通过 ::labelName::的语法定义label, 然后函数中其他位置通过goto labelName进行跳转, 从而实现控制流的无条件转移.

比如

```
var i = 0
::s1::
do
  print(i)
  i = i+1
end
if i>3 then
  goto end_of_file
end

goto s1

::end_of_file::
print("this is end")
```

### and

逻辑操作符, 如果左右2个表达式都是真值, 结果才是真值, 比如true and false结果是false, true and true结果才是true

### or

逻辑操作符, 左右2个表达式有一个是真值, 结果就是真值, 比如true of false结果是真值, false or false结果是false

### not

逻辑操作符, 和右边的表达式的布尔值相反, 比如not false值为true

内置全局函数

函数名 函数类型签名 (返回类型 (参数函数列表)) 描述

print: (...) => nil 标准输出参数, 遇到table或者函数, 输出 类型名: 0000000000000000

pprint: (...) => nil 标准输出参数tojsonstring化后的结果

type: (object) => string 根据运行时参数类型输出参数的类型对应的字符串, 返回number, string, table, function, boolean, 遇到其他类型的参数, 返回前面5种中对应的字符串

比如:

```

let a1 = 1
let a2 = type(a1) -- a2值是'number', 运行时的int和number类型, type函数返回结果都是'number'
let b1: object = 1
let b2 = type(b1) -- b2值是'number', 因为使用的是运行时类型
type Person = {}
let c1 = Person()
let c2 = type(c1) -- c2值是'table', 运行时的table和record类型, type函数返回结果都是'table'

```

**require: (string) => object** 引用其他的模块, 不当成合约引用, 被引用的模块加载后**return**的结果作为**require**函数的结果

**import\_contract: (string) => table** 引用合约, 参数是合约的名称字符串, 返回合约对应的**table**

**emit: (string, string) => nil** 抛出**event**事件, 由区块链记录

**exit: (object) => object** 结束本次运行, 参数是结束码

**pairs: (table) => object** 返回**table**的迭代器, 遍历顺序是先遍历数组部分再遍历哈希表部分, 哈希表部分的数字**key**在**string**的**key**前遍历, 同样是**string**类型的**key**的, 短字符串在长字符串前, 同样长度字符串的**key**, 按ASCII字符序从小到大

**ipairs: (table) => object** 返回**table**的数组部分的迭代器

**error: (...) => object** 报错

**getmetatable: (table) => table**

**tostring: (object) => string** 把参数转成字符串, 对于**table**和函数, 返回 类型名: 0

**tojsonstring: (object) => string** 把参数转成**json**字符串, 对于函数, 返回**function: 0**, 对于**table**中的嵌套**table**, 如果有循环引用, 使用'address'替代值.**json**化时对于哈希表会按**key**的字符序先按长度从小到大再从左到右依次序比较各字符的字符序。对于空**table**, 返回"[]"

**tonumber: (object) => number** 把参数转成**number**, 遇到字符串, 从字符串中读取数字, 遇到无法解析的字符串或**table**或函数, 返回**nil**

**tointeger: (object) => int** 把参数转成整数, 遇到字符串, 从字符串中读取整数, 遇到无法解析的字符串或**table**或函数, 返回**nil**

**todouble: (object) => number** 把参数转成**number**类型, 遇到无法解析的值返回**nil**

**toboolean: (obj) => bool** 把参数**obj**转成一个布尔类型的值, **obj**如果是**false**或**nil**返回**false**, 否则返回**true**

**totable: (object) => table** 把参数当成**table**使用, 如果参数不是**table**返回**nil**, 主要用于编译期静态类型转换

**next: (...) => object** 将迭代器递进到下一步

**rawequal: (object, object) => bool** 直接比较两个值是否是同一个值 (==比较会优先使用\_\_eq\_\_元函数来比较)

**rawlen: (object) => int** 直接获取一个**table**的数组部分长度

**rawget: (object, object) => object** 直接获取一个**table**的某个属性

**rawset: (object, object, object) => nil** 直接设置一个**table**的某个属性

**select: (...) => object** 当**index**为数字将返回所有**index**大于**index**的参数: 如: **select(2, "a", "b")** 返回 "b". 当**index**为"#", 则返回参数的总个数(不包括**index**)

**setmetatable: (table, table) => nil** 设置**table**的元表

模块

可以使用**require** '模块名称'来加载模块, 比如

```
let math = require 'math' -- math变量的值是math模块的对象
```

## 合约定义

### 一个基本的合约的格式

```
type Storage = {
  -- 合约中storage的各属性定义在这里, 比如 name: string
}

var M = Contract<Storage>()

function M:init()
  -- 这里加入合约初始化逻辑
  -- 合约的storage必须在这个函数里进行初始化
end

function M:on_deposit(num: int)
  -- 可选的转账到合约的回调函数, 当用户转账到合约的时候会触发这个回调, 这个函数如果不需要可以不用写
end

function M:on_destroy()
  -- 可选的合约被销毁时触发的回调函数
end

function M:on_upgrade()
  -- 可选的合约升级到正式合约时触发的回调函数
end

function M:demoApi1(arg1: string)
  -- 这里是示例的用户自定义API函数, 一个合约可以有多个自定义API函数, demoApi1是这里的函数名, 自定义API函数自带一个self变量表示当前合约,
  -- 另外可以有0个参数或者有一个string类型的参数
end

return M -- 这里是必须的, 表示使用哪个对象代表本合约
```

### 合约全局变量

合约中可以通过`caller`和`caller_address`全局变量分别访问本次发起合约调用的用户的公钥和地址

### 合约全局方法

#### 合约API函数

- 使用全局函数`transfer_from_contract_to_address`可以从当前合约（这个函数调用代码所在的合约）转账一定数额的某种资产给某个地址，第一个参数是目标地址（字符串），第二个参数是资产名称（比如HSR），第三个参数是转账数量的10万倍（`int64`类型），要求是正数

返回值

- 0 转账成功
- 1 未知系统异常
- 2 Asset\_symbol异常
- 3 合约地址非法
- 4 目标地址非法
- 5 账户余额不足支付转账金额
- 6 转账金额为负数

- 使用全局函数`get_contract_balance_amount`可以获取某个合约带精度的余额（精度为100000），第一个参数是合约地址（支持查询其他合约的余额），第二个参数是资产名称（比如HSR），返回带精度的合约余额（`int64`类型），如果出现错误或者合约不存在返回负数

返回值

- 非负数 合约账户余额
- 1 资产id异常
- 2 合约地址异常

- 使用全局函数`get_chain_now`可以获取链上的当前时间，没有参数。

返回值

- 正数 时间戳整数
- 0 系统异常

- 使用全局函数`get_chain_random`可以获取链上的一个伪随机数字，但是同一个此链上的`operation`操作，不同节点不同时间执行返回结果都一样（实际是取操作发生的块上`prev_secret_hash`和本交易结合后的哈希）

返回值

- 随机结果

- 使用全局函数`get_header_block_num`，可以获取上一个块的块号

返回值  
当前链最新块的序号

- 使用全局函数`get_waited(num)`，表示根据未来块的数据获取伪随机数,num是未来块的块号（但是未来需要再次调用，那个时候第num块已经是过去的块了就能知道结果了）

返回值  
正整数 结果值  
-1 目标块未到  
-2 设定的目标块不大于1

- 使用全局函数`get_current_contract_address`可以获取这个函数调用出现位置的合约地址，没有参数
- 全局变量`caller`存储着调用合约的用户的公钥，全局变量`caller_address`存储着调用合约的用户的账户地址
- 在转账到合约发生的时候，如果合约中定义了`on_deposit`(参数是转账金额)这个API，那么在转账发生后调用这个API，并且保证转账和触发此API是原子性的，如果中途出现错误，整体回滚，转账失败。
- 使用语句`emit eventName(arg: string)`可以抛出事件，这里`emit`是关键字，`eventName`根据需要写入事件名称，由区块链记录下来，其他节点同步到`emit`触发的`event`时可以调用本地设置的回调
- 使用全局函数 `is_valid_address(arg: string)`可以检查一个地址字符串是否是合法的本区块链地址
- 使用全局函数`get_transaction_fee()` 可以获取一笔交易的手续费

返回值  
正整数 结果值  
-1 手续费资产id异常  
-2 系统异常

- 使用全局函数`transfer_from_contract_to_public_account(to_account_name: string, asset_type: string, amount: int)`可以从当前合约中转账到链上的账户名称，返回是否转账的状态

返回值  
0 转账成功  
-1 未知系统异常  
-2 Asset\_symbol异常  
-3 合约地址非法  
-4 目标地址非法  
-5 账户余额不足支付转账金额  
-6 转账金额为负数  
-7 不存在指定账户名

如何在合约中调用一个链上已经存在的合约🔗

可以通过`import_contract`函数引用其他的链上正式合约，返回代表这个被引用的合约的对象，从而可以通过这个返回的对象调用这个被引用的用户自定义API。

但是不能直接访问被引用合约的`init/on_deposit/on_destroy/on_upgrade`以及`storage`对象，只能通过调用API访问

比如:

```
let demo = import_contract 'demo'
demo:hello("China") -- 这里调用了名称为demo的正式合约的hello函数API，使用"China"作为参数
```

合约的内置模块的使用🔗

合约中可以直接使用内置库的模块，不需要进行`require`

table模块🔗

`table.concat(table, sep, start=1, end=table的数组部分长度)` 把数组`table`中从第`start`项到第`end`项（包括第`end`项）每一项用`sep`分隔连接成一个字符串,返回拼接后的字符串

`table.insert(table, pos, value)` 在数组`table`的第`pos`个位置插入一个值`value`，如果只传2个参数`table`和`value`，则在`table`的数组部分的最后位置之后插入`value`，无返回值

`table.append(table, value)` 在数组的最后位置之后插入`value`，无返回值



`table.length(table)` 获取数组的数组部分的长度

`table.remove(table, pos=table数组部分长度)` 函数删除并返回`table`数组部分位于`pos`位置的元素. 其后的元素会被前移. `pos`参数可选, 默认为`table`长度, 即从最后一个元素删起, 返回被删除的值

`table.sort(table)` 函数对给定的`table`进行升序排序. 参数`table`中的元素需要类型一致, 无返回值

```
> tbl = {"hsrha", "beta", "gamma", "delta"}
> table.sort(tbl)
> print(table.concat(tbl, ", "))
hsrha, beta, delta, gamma
```

全局函数`rawlen` 返回`table`中数组部分元素的个数

math模块

`math.abs(n)` 获取参数`n`的绝对值

`math.ceil(n)` 返回不小于`n`的最小整数

`math.floor(n)` 返回不超过`n`的最大整数

`math.max(n1,n2,...)` 返回参数列表中多个值的最大值, 至少需要1个参数

`math.maxinteger` 常数, 支持的最大整数

`math.min(n1,n2,...)` 返回参数列表中多个值的最小值, 至少需一个参数

`math.mininteger` 常数, 支持的最小整数

`math.pi` 常数,  $\pi$ 值, 3.1415...

`math.sqrt(n)` 获取第一个参数的平方根

`math.tointeger(n)` 把第一个参数`str`字符串转成整数, 如果`str`本身是整数, 直接转成整数, 如果无法转换, 返回`nil`

`math.type(num)` 判断第一个参数`num`是整数还是浮点数

string模块

`string.split(str, sep)` 把`str`按`sep`划分成多块, 返回一个字符串数组

`string.byte(s)` 返回字符串首字符对应的ASCII数字

`string.char(i1, i2, ...)` 把多个整数对应的ascii字符构造成字符串返回

`string.find(str, pattern, [init=1, [plain=nil]])` 在`str`字符串中查找模式字符串`pattern`, 从`str`的第`init`个字符开始查找, `plain`表示是否把`pattern`当成普通文本字符串而不是模式字符串来查找, 返回找到的第一个满足条件的子字符串的开始字符索引或者`nil`

模式字符串在可以用以下符号匹配源字符串中的一些子字符串

- `.`(点): 与任何字符配对
- `%a`: 与任何字母配对
- `%c`: 与任何控制符配对(例如`n`)
- `%d`: 与任何数字配对
- `%l`: 与任何小写字母配对
- `%p`: 与任何标点(punctuation)配对
- `%s`: 与空白字符配对
- `%u`: 与任何大写字母配对
- `%w`: 与任何字母/数字配对
- `%x`: 与任何十六进制数配对
- `%z`: 与任何代表0的字符配对
- `%x`(此处`x`是非字母非数字字符): 与字符`x`配对. 主要用来处理表达式中有功能的字符(`^$()%.[]*+-?`)的配对问题, 例如`%%`与`%`配对
- `[数个字符类]`: 与任何`[]`中包含的字符类配对. 例如`[%w_]`与任何字母/数字, 或下划线符号(`_`)配对
- `[^数个字符类]`: 与任何不包含在`[]`中的字符类配对. 例如`[^%s]`与任何非空白字符配对

例如:

```
let p1 = "%d%d:%d%d"
let s = "2016/11/11 11:11"
let a = string.find(s, p1) -- a的结果是11, 也就是子字符串"11:11"的第一个字符的索引
let b = string.sub(s, a) -- b结果是"11:11"
let c = string.find(s, p1, 3) -- c结果是12
let d = string.find(s, p1, 1, true) -- d结果是nil, 因为第四个参数是true, 所以把p1当成普通字符串进行匹配
```

string.format(formatstring, ...args) 类似C语言的sprintf

例如:

```
let a = string.format("hello, %s, the number is %d", "China", 123)
```

string.gmatch(str, pattern) 返回在str字符串中遍历模式字符串pattern的迭代器

例如:

```
t = {}
s = "from=world, to=Lua"
var k = nil
var v = nil
for k, v in string.gmatch(s,("(%w+)=(%w+)") do
    t[k] = v
end
```

string.gsub(str, pattern, replacer, [n]) 把str中满足pattern模式的子串投用replacer字符串或者函数进行替换, 如果提供了n,只进行前n个符合的字串的替换

string.len(str) 获取字符串长度

string.match(str, pattern, [init=1]) 在str找到第一个符合模式pattern的子串, 从str的第init个字符开始查找

string.rep(str, n, [sep=""]) 返回str字符串重复n次的结果, 间隔符是字符串sep

string.reverse(str) 返回字符串str的反转

string.sub(str, i, [j=-1]) 获取str字符串的子字符串, 从第i个字符开始, 到第j个字符结束(包含第i和第j个字符), i和j可以是负数, 表示从str反方向开始的第-i/-j个字符

string.upper(str) 把字符串str各字母字符转成大写后返回

time模块

time.add(timestamp, field, offset) 返回新时间戳, field是year/month/day/hour/minute/second其中某个字符串, offset是变化值, 可以是正数、负数、零

time.tostr(timestamp) 把时间戳转成时间字符串, %yy-%m-%d %H:%M:%S格式

time.difftime(timestamp1, timestamp2) 比较2个时间戳的间隔的秒数

json模块

json.dumps(任意lua值) 将lua值转成json字符串

json.loads(字符串) 将json字符串转成lua值, 如果失败, 返回nil

utf8模块

utf8.char(...) 接受参数中若干个数字, 返回对应的UTF8编码的字节序列

utf8.charpattern 常量, 能匹配UTF8字节序列的一个字符串pattern模式

utf8.codes(s) 返回变量s中所有字符的迭代器, 按utf8编码

utf8.codepoint(s, i, j) 返回字符串s在索引[i, j]范围内的utf8编码的字符

utf8.len(s, i, j) 返回字符串s在索引[i, j]范围内的按utf8编码的字符长度

utf8.offset(s, n, i) 返回s中第n个字符的从第i个字节开始的字节索引

一个合约的整个生命周期流程🔗

- 编写合约
- 编译合约
- 注册合约到区块链上成为临时合约
- 升级合约成为正式合约/销毁临时合约
- 调用合约API
- 转账到合约

合约定义的约束🔗

- 合约作为一个特殊的模块，合约中不能定义全局变量，不能修改\_ENV, \_G的值，可以通过import\_contract '合约名称'来加载合约，返回加载的合约模块信息，合约必须返回一个record类型的对象，表示合约的api，其中必须包含一个init函数。合约有id, name, storage等内置属性，注意不要用这些名字的API，否则会被覆盖掉。
- 合约代码中，合约对象作为一个record类型，必须在合约代码结尾return这个record对象,return的这个对象代表了本合约，如果合约中用到了合约的storage，因为语法有静态类型检查，所以需要给合约的storage属性声明一个类型
- 合约的id/name/storage这三个属性都是在执行时由区块链提供值的，并且这三个属性本身是只读的，但是storage属性的内容是可以改变的
- 合约的storage需要声明为record类型，storage的record类型的各属性的类型只能是int, number, bool, string, Map<int>, Map<number>, Map<bool>, Map<string>, Array<int>, Array<number>, Array<bool>, Array<string> 其中某一种
- 内置库有一个Contract<T>泛型可以作为合约类型的基类，具体使用时可以将合约要return的变量声明为Contract的实例类型（需要提供一个record类型作为合约storage的类型，作为Contract的类型变量）

比如

```
type Storage = {
    name: string,
    age: int,
    age2: int default 24,
    error_property: int | string
}

let M = Contract<Storage>()

function M:init()
M:funcName的方式，不能用function M.funcName的方式
pprint("contract init running", self.id, self.name)
self.storage.name = 'hi'
let storage = self.storage
storage.age = 100
end

function M:testSomeLogic()
let contract2 = import_contract 'contract2'
contract2.storage.name = 'glua'
self.storage.age = self.storage.age + 1
if self.storage.age < 100 then
    transfer_from_contract_to_address('这里填入目标地址', 'HSR', 10000000)
end
self.name = 'hello'
end

function M:query()
pprint('query demo')
end

return M
```

- 合约中不能直接操作引用的其他合约的storage，也不能调用合约本身或者其他合约的init,on\_deposit,on\_upgrade,on\_destroy的API，编译期会报错
- 合约代码在编译时，会加载一次合约API外的代码，所以如果合约API外代码有运行时问题也会在编译合约时报错

本地脚本

本地脚本简单介绍🔗

本地回调脚本同样适用本语言和语法，但是不需要遵循合约的格式，不需要脚本结尾返回一个table，也可以定义全局变量。

本地回调脚本执行时会按照脚本中代码顺序依次执行。

一个简单的接受合约event的脚本[🔗](#)

```
pprint("got event ", event_type, " from contract ", contract_id (emit触发代码所在的合约ID), "
param is ", param)
```

本地脚本的全局变量[🔗](#)

```
truncated: emit抛出的参数是否被截断
param: emit时抛出的字符串格式的参数
contract_id: emit触发代码所在的合约ID
event_type: 字符串格式的事件类型
```

本地脚本的模块使用[🔗](#)

本地脚本可以通过require函数引入内置库的模块，从而在脚本中使用这些模块的功能

比如

```
let http = require 'http'
http.listen('127.0.0.1', 3000) -- 在3000端口监听http请求
```

如何将本地脚本绑定到链上合约[🔗](#)

在区块链的控制台中或者界面中操作按钮操作。

使用命令"compile\_script 脚本源文件路径"来编译

使用命令"add\_script 脚本编译后的文件路径 描述字符串"来将本地脚本注册到链上

**storage**操作

storage简单介绍[🔗](#)

每个智能合约在区块链中可以存储查询一些状态数据，这个功能称作storage。

在一个合约中的API函数中，可以用self.storage获取到当前合约的storage对象，import\_contract加载的合约，禁止直接读写其storage

storage对象可以类似table操作，读取属性，写入属性，但是只能嵌套最多一层table，并且storage[某个属性名]值为某个类型的话，修改这个属性的值只能改为同类型的值，如果storage[某个属性名]值为table的话，这个table中不同属性的值的类型要一样，比如都是整数或者都是字符串。

对storage的修改操作不会立刻提交，而是在当前lua堆栈关闭的时候，如果没有发生过错误，就自动提交storage的变更（只提交变更而不是storage本身）

storage的基本类型[🔗](#)

storage中各属性的类型可以使用int, number, bool, string, Stream, Map<int>, Map<number>, Map<bool>, Map<string>, Map<Stream>, Array<int>, Array<number>, Array<bool>, Array<string>, Array<Stream>这些类型

storage操作比如：

```
self.storage.name = "hi"
self.storage.age = 123
self.storage.name = 456 -- 错误，类型不能改变
let abc = self.storage.age -- 正确，读取storage属性值
self.storage.tt = {name: "hi", age: 2} -- 错误，嵌套table的属性值的类型要一样
self.storage.tt = {name: "hi"}} -- 错误，storage中嵌套table多层不允许
self.storage.tt = {name: "hi", age: "2"} -- 正确
```

## 5. 把智能合约注册到区块链上使用

另见API说明文档

内置库

require 加载某个模块，比如local math = require 'math'

内置模块有string, table, math, time, json，使用时不需要require

另外，非合约模式下还可以使用更多内置模块os, net, io, http, jsonrpc等

## 内置全局函数

函数名 函数类型签名（返回类型 （参数函数列表）） 描述

print: (...) => nil 标准输出参数，遇到table或者函数，输出 类型名: 0000000000000000

pprint: (...) => nil 标准输出参数tojsonstring化后的结果

type: (object) => string 根据运行时参数类型输出参数的类型对应的字符串，返回number, string, table, function, boolean，遇到其他类型的参数，返回前面5种中对应的字符串

比如:

```
let a1 = 1
let a2 = type(a1) -- a2值是'number'，运行时的int和number类型，type函数返回结果都是'number'
let b1: object = 1
let b2 = type(b1) -- b2值是'number'，因为使用的是运行时类型
type Person = {}
let c1 = Person()
let c2 = type(c1) -- c2值是'table'，运行时的table和record类型，type函数返回结果都是'table'
```

require: (string) => object 引用其他的模块，不当成合约引用，被引用的模块加载后return的结果作为require函数的结果

import\_contract: (string) => table 引用合约，参数是合约的名称字符串，返回合约对应的table

emit: (string, string) => nil 抛出event事件，由区块链记录

exit: (object) => object 结束本次运行，参数是结束码

pairs: (table) => object 返回table的迭代器，遍历顺序是先遍历数组部分再遍历哈希表部分,哈希表部分的数字key在string的key前遍历，同样是string类型的key的，短字符串在长字符串前，同样长度字符串的key，按ASCII字符序从小到大

ipairs: (table) => object 返回table的数组部分的迭代器

error: (...) => object 报错

getmetatable: (table) => table

tostring: (object) => string 把参数转成字符串，对于table和函数，返回 类型名: 0

tojsonstring: (object) => string 把参数转成json字符串，对于函数，返回function: 0，对于table中的嵌套table，如果有循环引用，使用'address'替代值.json化时对于哈希表会按key的字符序先按长度从小到大再从左到右依次序比较各字符的字符序。对于空table，返回"[]"

tonumber: (object) => number 把参数转成number，遇到字符串，从字符串中读取数字，遇到无法解析的字符串或table或函数，返回nil

tointeger: (object) => int 把参数转成整数，遇到字符串，从字符串中读取整数，遇到无法解析的字符串或table或函数，返回nil

todouble: (object) => number 把参数转成number类型,遇到无法解析的值返回nil

toboolean: (obj) => bool 把参数obj转成一个布尔类型的值，obj如果是false或nil返回false，否则返回true

totable: (object) => table 把参数当成table使用，如果参数不是table返回nil，主要用于编译期静态类型转换

next: (...) => object 将迭代器递进到下一步

rawequal: (object, object) => bool 直接比较两个值是否是同一个值（==比较会优先使用\_\_eq\_\_元函数来比较）

rawlen: (object) => int 直接获取一个table的数组部分长度

rawget: (object, object) => object 直接获取一个table的某个属性

rawset: (object, object, object) => nil 直接设置一个table的某个属性

select: (...) => object 当index为数字将返回所有index大于index的参数:如: select(2,"a","b") 返回 "b".  
当index为"#", 则返回参数的总个数(不包括index)

setmetatable: (table, table) => nil 设置table的元表

## table模块

table.concat(table, sep, start=1, end=table的数组部分长度) 把数组table中从第start项到第end项  
(包括第end项) 每一项用sep分隔连接成一个字符串,返回拼接后的字符串

table.insert(table, pos, value) 在数组table的第pos个位置插入一个值value, 如果只传2个参数table和  
value, 则在table的数组部分的最后位置之后插入value, 无返回值

table.append(table, value) 在数组的最后位置之后插入value, 无返回值

table.length(table) 获取数组的数组部分的长度

table.remove(table, pos=table数组部分长度) 函数删除并返回table数组部分位于pos位置的元素. 其  
后的元素会被前移. pos参数可选, 默认为table长度, 即从最后一个元素删起, 返回被删除的值

table.sort(table) 函数对给定的table进行升序排序.参数table中的元素需要类型一致, 无返回值

```
> tbl = {"hsrha", "beta", "gamma", "delta"}  
> table.sort(tbl)  
> print(table.concat(tbl, ", "))  
hsrha, beta, delta, gamma
```

全局函数rawlen 返回table中数组部分元素的个数

## math模块

math.abs(n) 获取参数n的绝对值

math.ceil(n) 返回不小于n的最小整数

math.floor(n) 返回不超过n的最大整数

math.max(n1,n2,...) 返回参数列表中多个值的最大值, 至少需要1个参数

math.maxinteger 常数, 支持的最大整数

math.min(n1,n2,...) 返回参数列表中多个值的最小值, 至少需一个参数

math.mininteger 常数, 支持的最小整数

math.pi 常数,  $\pi$ 值, 3.1415...

math.sqrt(n) 获取第一个参数的平方根

math.tointeger(n) 把第一个参数str字符串转成整数, 如果str本身是整数, 直接转成整数, 如果无法  
转换, 返回nil

math.type(num) 判断第一个参数num是整数还是浮点数

## string模块

string.split(str, sep) 把str按sep划分成多块, 返回一个字符串数组

string.byte(s) 返回字符串首字符对应的ASCII数字

string.char(i1, i2, ...) 把多个整数对应的ascii字符构造字符串返回

`string.find(str, pattern, [init=1, [plain=nil]])` 在`str`字符串中查找模式字符串`pattern`，从`str`的第`init`个字符开始查找，`plain`表示是否把`pattern`当成普通文本字符串而不是模式字符串来查找，返回找到的第一个满足条件的子字符串的开始字符索引或者`nil`

模式字符串在可以用以下符号匹配源字符串中的一些子字符串

- `.`(点): 与任何字符配对
- `%a`: 与任何字母配对
- `%c`: 与任何控制符配对(例如`n`)
- `%d`: 与任何数字配对
- `%l`: 与任何小写字母配对
- `%p`: 与任何标点(`punctuation`)配对
- `%s`: 与空白字符配对
- `%u`: 与任何大写字母配对
- `%w`: 与任何字母/数字配对
- `%x`: 与任何十六进制数配对
- `%z`: 与任何代表`0`的字符配对
- `%x`(此处`x`是非字母非数字字符): 与字符`x`配对. 主要用来处理表达式中有功能的字符(`^$()%.[]*+-?`)的配对问题, 例如`%%`与`%`配对
- `[数个字符类]`: 与任何`[]`中包含的字符类配对. 例如`[%w_]`与任何字母/数字, 或下划线符号(`_`)配对
- `[^数个字符类]`: 与任何不包含在`[]`中的字符类配对. 例如`[^%s]`与任何非空白字符配对

例如:

```
let p1 = "%d%d:%d%d"
let s = "2016/11/11 11:11"
let a = string.find(s, p1) -- a的结果是11, 也就是子字符串"11:11"的第一个字符的索引
let b = string.sub(s, a)    -- b结果是"11:11"
let c = string.find(s, p1, 3) -- c结果是12
let d = string.find(s, p1, 1, true) -- d结果是nil, 因为第四个参数是true, 所以把p1当成普通字符串进行匹配
```

`string.format(formatstring, ...args)` 类似C语言的`sprintf`

例如:

```
let a = string.format("hello, %s, the number is %d", "China", 123)
```

`string.gmatch(str, pattern)` 返回在`str`字符串中遍历模式字符串`pattern`的迭代器

例如:

```
t = {}
s = "from=world, to=Lua"
var k = nil
var v = nil
for k, v in string.gmatch(s,("(%w+)=(%w+)") do
    t[k] = v
end
```

`string.gsub(str, pattern, replacer, [n])` 把`str`中满足`pattern`模式的子串投用`replacer`字符串或者函数进行替换, 如果提供了`n`,只进行前`n`个符合的字串的替换

`string.len(str)` 获取字符串长度

`string.match(str, pattern, [init=1])` 在`str`找到第一个符合模式`pattern`的子串, 从`str`的第`init`个字符开始查找

`string.rep(str, n, [sep=""])` 返回`str`字符串重复`n`次的结果, 间隔符是字符串`sep`

`string.reverse(str)` 返回字符串`str`的反转

`string.sub(str, i, [j=-1])` 获取`str`字符串的子字符串, 从第`i`个字符开始, 到第`j`个字符结束 (包含第`i`和第`j`个字符), `i`和`j`可以是负数, 表示从`str`反方向开始的第`-i/-j`个字符

`string.upper(str)` 把字符串`str`各字母字符转成大写后返回

## time模块

`time.add(timestamp, field, offset)` 返回新时间戳，`field`是year/month/day/hour/minute/second其中某个字符串，`offset`是变化值，可以是正数、负数、零

`time.tostr(timestamp)` 把时间戳转成时间字符串，`%yy-%m-%d %H:%M:%S`格式

`time.difftime(timestamp1, timestamp2)` 比较2个时间戳的间隔的秒数

## json模块

`json.dumps(任意lua值)` 将lua值转成json字符串

`json.loads(字符串)` 将json字符串转成lua值，如果失败，返回nil

## utf8模块

`utf8.char(...)` 接受参数中若干个数字，返回对应的UTF8编码的字节序列

`utf8.charpattern` 常量，能匹配UTF8字节序列的一个字符串pattern模式

`utf8.codes(s)` 返回变量s中所有字符的迭代器，按utf8编码

`utf8.codepoint(s, i, j)` 返回字符串s在索引[i, j]范围内的utf8编码的字符

`utf8.len(s, i, j)` 返回字符串s在索引[i, j]范围内的按utf8编码的字符长度

`utf8.offset(s, n, i)` 返回s中第n个字符的从第i个字节开始的字节索引

## os模块

`os.clock()` 返回执行该程序CPU花去的时钟秒数

`os.date(format, time)` 参数时间戳可选，如果没有给出时间用当前时间，返回格式化的字符串或table类型的时间信息

`os.difftime(t2, t1)` 返回时间戳t2-t1的差值

`os.execute(command)` 执行系统命令command

`os.exit(code, close)` 退出进程，`code`是错误码，`close`表示是否退出当前虚拟堆栈

`os.getenv(varname)` 获取环境变量

`os.remove(filename)` 删除文件或空文件夹

`os.rename(oldname, newname)` 重命名文件

`os.setlocale(locale, category)` 设置当前程序的时区，`category`可选默认值all，表示locale作用的范围

`os.time(table)` table表示时间信息的table，默认是当前时间的信息，返回时间戳

`os.tmpname()` 返回一个临时文件名称

## io模块

`io.close(file)` 关闭文件

`io.flush()` flush输出缓冲区

`io.input(file)` 读取模式打开文件

`io.lines(filename)` 读取模式打开文件并返回遍历文件内容中各行的迭代器

`io.open(filename, mode)` 按指定模式打开文件，`mode`可选值为读取模式'r'，写入模式'w'，添加模式'a'，保留旧内容更新模式'r+'，抛弃旧内容更新模式'w+'，保留旧内容并且只能在文件尾添加的更新模式'a+'，默认是'r'



`io.read(read_mode)` 读取当前打开输入文件的内容并返回, 参数`read_mode`可以有多个可选值, 不同值的作用如下:

```
"*all"    读取整个文件
"*line"   读取下一行
"*number" 读取一个数字
<num>     读取一个不超过<num>个字符的字符串
```

`io.seek(pos ? : int)` 设置或获取当前打开文件的读写位置, 如果提供`pos`参数, 就是修改当前打开文件的读写位置, 如果不提供`pos`参数, 则是返回当前打开文件的读写位置

`io.write(content: string)` 把`content`的内容写入当前打开的文件

例如:

```
let io = require 'io';
let lines = io.lines("test/in.txt") -- 读取文件内容, 每行文本内容放入lines(table类型)
let text = table.concat(lines, ',') -- 写入模式打开文件 (然后当前的打开文件是test/out.txt)
io.open("test/out.txt", "w")        -- 把text内容写入当前打开的文件 (也就是test/out.txt)
io.write(text)                      -- 当前打开文件的读写位置是cur_pos
let cur_pos = io.seek()             -- 关闭当前打开的文件
io.close()
```

## net模块

`net.listen(address, port)` TCP监听`address`地址的`port`端口, 监听所有地址的`port`端口用'0.0.0.0'; 返回TcpServer对象

`net.connect(address, port)` 发起TCP连接

`net.accept(server: TcpServer)` tcp监听端阻塞等待TCP客户端连接, 返回TcpSocket

`net.accept_async(server: TcpServer, handler: Function)` tcp异步监听TCP客户端连接, 当出现新连接时, 使用连接socket触发handler函数

`net.start_io_loop(server: TcpServer)` 启动TCP异步服务端事件循环, 如果使用`accept_async`异步TCP服务, 需要之后调用这个函数

`net.read(socket, count)` 从socket中读取count个字节

`net.read_until(socket, end: string)` 从socket读取字节流直到遇到end, 返回结果包含end

`net.write(socket, data)` 把字节流或字符串写入socket

`net.close_socket(socket)` 关闭socket连接

`net.close_server(server)` 关闭TcpServer

`net.shutdown()` 关闭整个IO事件循环

例如:

```
let server = net.listen("127.0.0.1", 3000)
while true do
  let ctx = net.accept(server)
  let data = net.read(ctx, 10)
  pprint(data)
end
```

## http模块

`http.listen(address: string, port: int)` 监听`address`地址的PORT端口的HTTP请求

`http.connect(address: string, port: int)` 连接到HTTP服务器端 (一般不需要直接用)

`http.request(method: string, url: string, body: string, headers: table)` 发送http请求, 返回http回复

`http.close(ctx)` 关闭http请求上下文

http.accept(server: HttpServer) 等待http请求，返回http请求上下文ctx

http.accept\_async(server: HttpServer, handler: Function) 异步监听http请求，当接收到新http请求时，使用HttpContext对象作为参数调用handler函数

http.start\_io\_loop(server: HttpServer) 启动http异步服务端事件循环，如果使用accept\_async异步TCP服务，需要之后调用这个函数

http.get\_req\_header(ctx, key: string) 获取http请求中的头信息中key的值

http.get\_res\_header(ctx, key: string) 获取Http回复中头信息中key的值

http.get\_req\_http\_method(ctx) 获取http请求中的HTTP方法（字符串）

http.get\_req\_path(ctx) 获取http请求中的path部分

http.get\_req\_http\_protocol 获取http请求的HTTP协议（字符串）

http.get\_req\_body(ctx) 获取http请求中的body内容

http.set\_res\_header(ctx, key: string, value: string) 设置http回复中的头信息

http.write\_res\_body(ctx, data: string) 向http回复中追加写入数据

http.set\_status(ctx, status\_code: int, status\_message: string) 设置http回复中的状态码和信息

http.get\_status(ctx) 获取http回复的状态码

http.get\_status\_message(ctx) 获取http回复中的状态信息（字符串）

http.get\_res\_body(ctx) 获取http回复中的body内容

http.finish\_res(ctx) 把http回复内容传给客户端，必须调用这个函数才会实际回复

下面给出一个最简单的阻塞式HTTP模块的使用例子（注意这只是阻塞式API的代码例子，不建议直接使用）：

```
let http = require 'http'
let net = require 'net'

let res = http.request('GET', "http://www.gov.cn/", '', {
  Accept="text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8",
  ["User-Agent"]="Mozilla/5.0 (Windows NT 10.0; WOW64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/51.0.2704.103 Safari/537.36"
})
pprint(http.get_res_header(res, "Content-Length"))
pprint(http.get_res_body(res))
http.close(res)

let server = http.listen("0.0.0.0", 3000)

pprint("listening on 0.0.0.0:3000\n")

-- async api

let function handler(ctx)
  let net = require 'net'
  pprint("got new connection", ctx)
  -- pprint('get req body', http.get_req_body(ctx), '\n')
  net.write(ctx, "HTTP/1.1 200 OK\r\nContent-Type:text/html; utf-8\r\nContent-Length:5\r\n\r\nhello")
  net.close_socket(ctx)
end

net.accept_async(server, handler)
net.start_io_loop(server)

pprint("starting sync http server")

while true do
  let ctx = http.accept(server)
  pprint('get req body', http.get_req_body(ctx), '\n')
  http.write_res_body(ctx, "hello world")
  http.set_status(ctx, 200, 'OK')
  http.set_res_header(ctx, "Content-Type", "text/html; utf-8")
  http.finish_res(ctx)
  http.close(ctx)
end
```

## jsonrpc模块

暂时没有提供

## 内置全局函数

函数名 函数类型签名（返回类型 （参数函数列表）） 描述

`print: (...) => nil` 标准输出参数，遇到`table`或者函数，输出 类型名: 0000000000000000

`pprint: (...) => nil` 标准输出参数`tojsonstring`化后的结果

`type: (object) => string` 根据运行时参数类型输出参数的类型对应的字符串，返回`number`, `string`, `table`, `function`, `boolean`，遇到其他类型的参数，返回前面5种中对应的字符串

比如:

```
let a1 = 1
let a2 = type(a1) -- a2值是'number', 运行时的int和number类型, type函数返回结果都是'number'
let b1: object = 1
let b2 = type(b1) -- b2值是'number', 因为使用的是运行时类型
type Person = {}
let c1 = Person()
let c2 = type(c1) -- c2值是'table', 运行时的table和record类型, type函数返回结果都是'table'
```

`require: (string) => object` 引用其他的模块，不当成合约引用，被引用的模块加载后`return`的结果作为`require`函数的结果

`import_contract: (string) => table` 引用合约，参数是合约的名称字符串，返回合约对应的`table`

`emit: (string, string) => nil` 抛出`event`事件，由区块链记录

`exit: (object) => object` 结束本次运行，参数是结束码

`pairs: (table) => object` 返回`table`的迭代器，遍历顺序是先遍历数组部分再遍历哈希表部分, 哈希表部分的数字`key`在`string`的`key`前遍历，同样是`string`类型的`key`的，短字符串在长字符串前，同样长度字符串的`key`，按ASCII字符序从小到大

`ipairs: (table) => object` 返回`table`的数组部分的迭代器

`error: (...) => object` 报错

`getmetatable: (table) => table`

`tostring: (object) => string` 把参数转成字符串，对于`table`和函数，返回 类型名: 0

`tojsonstring: (object) => string` 把参数转成`json`字符串，对于函数，返回`function: 0`，对于`table`中的嵌套`table`，如果有循环引用，使用`'address'`替代值.`json`化时对于哈希表会按`key`的字符序先按长度从小到大再从左到右依次序比较各字符的字符序。对于空`table`，返回`"[]"`

`tonumber: (object) => number` 把参数转成`number`，遇到字符串，从字符串中读取数字，遇到无法解析的字符串或`table`或函数，返回`nil`

`tointeger: (object) => int` 把参数转成整数，遇到字符串，从字符串中读取整数，遇到无法解析的字符串或`table`或函数，返回`nil`

`todouble: (object) => number` 把参数转成`number`类型,遇到无法解析的值返回`nil`

`toboolean: (obj) => bool` 把参数`obj`转成一个布尔类型的值，`obj`如果是`false`或`nil`返回`false`，否则返回`true`

`totable: (object) => table` 把参数当成`table`使用，如果参数不是`table`返回`nil`，主要用于编译期静态类型转换

`next: (...) => object` 将迭代器递进到下一步

`rawequal: (object, object) => bool` 直接比较两个值是否是同一个值（`==`比较会优先使用`__eq__`元函数来比较）

`rawlen: (object) => int` 直接获取一个`table`的数组部分长度

`rawget: (object, object) => object` 直接获取一个`table`的某个属性

rawset: (object, object, object) => nil 直接设置一个table的某个属性

select: (...) => object 当index为数字将返回所有index大于index的参数:如: select(2,"a","b") 返回 "b".  
当index为"#", 则返回参数的总个数(不包括index)

setmetatable: (table, table) => nil 设置table的元表

## 一些合约相关的API

### 合约API函数

- 使用全局函数transfer\_from\_contract\_to\_address可以从当前合约（这个函数调用代码所在的合约）转账一定数额的某种资产给某个地址，第一个参数是目标地址（字符串），第二个参数是资产名称（比如HSR），第三个参数是转账数量的10万倍（int64类型），要求是正数

返回值

0	转账成功
-1	未知系统异常
-2	Asset_symbol异常
-3	合约地址非法
-4	目标地址非法
-5	账户余额不足支付转账金额
-6	转账金额为负数

- 使用全局函数get\_contract\_balance\_amount可以获取某个合约带精度的余额（精度为100000），第一个参数是合约地址（支持查询其他合约的余额），第二个参数是资产名称（比如HSR），返回带精度的合约余额（int64类型），如果出现错误或者合约不存在返回负数

返回值

非负数	合约账户余额
-1	资产id异常
-2	合约地址异常

- 使用全局函数get\_chain\_now可以获取链上的当前时间，没有参数。

返回值

正数	时间戳整数
0	系统异常

- 使用全局函数get\_chain\_random可以获取链上的一个伪随机数字，但是同一个此链上的operation操作，不同节点不同时间执行返回结果都一样（实际是取操作发生的块上prev\_secret\_hash和本交易结合后的哈希）

返回值

随机结果
------

- 使用全局函数get\_header\_block\_num，可以获取上一个块的块号

返回值

当前链最新块的序号
-----------

- 使用全局函数get\_waited(num)，表示根据未来块的数据获取伪随机数,num是未来块的块号（但是未来需要再次调用，那个时候第num块已经是过去的块了就能知道结果了）

返回值

正整数	结果值
-1	目标块未到
-2	设定的目标块不大于1

- 使用全局函数get\_current\_contract\_address可以获取这个函数调用出现位置的合约地址，没有参数
- 全局变量caller存储着调用合约的用户的公钥，全局变量caller\_address存储着调用合约的用户的账户地址

- 在转账到合约发生的时候，如果合约中定义了on\_deposit(参数是转账金额)这个API，那么在转账发生后就会调用这个API，并且保证转账和触发此API是原子性的，如果中途出现错误，整体回滚，转账失败。
- 使用语句emit EventName(arg: string)可以抛出事件，这里emit是关键字，EventName根据需要写入事件名称，由区块链记录下来，其他节点同步到emit触发的event时可以调用本地设置的回调
- 使用全局函数 is\_valid\_address(arg: string)可以检查一个地址字符串是否是合法的本区块链地址
- 使用全局函数get\_transaction\_fee() 可以获取一笔交易的手续费

返回值  
正整数 结果值  
-1 手续费资产id异常  
-2 系统异常

- 使用全局函数transfer\_from\_contract\_to\_public\_account(to\_account\_name: string, asset\_type: string, amount: int)可以从当前合约中转账到链上的账户名称，返回是否转账的状态

返回值  
0 转账成功  
-1 未知系统异常  
-2 Asset\_symbol异常  
-3 合约地址非法  
-4 目标地址非法  
-5 账户余额不足支付转账金额  
-6 转账金额为负数  
-7 不存在指定账户名

## 智能合约

### Contents:

### 智能合约介绍

首先，我们所说的智能合约是在区块链(blockchain)和加密货币(cryptocurrencies)的上下文中。

智能合约(smart contract): 在blockchains和cryptocurrencies的上下文中，智能合约是

- 预先写好的代码逻辑（我们使用lua进行编写）
- 在分布式的存储平台上进行存储和调用（blockchain）
- 可以被运行在同一区块链上的节点执行
- 运行的结果会形成交易进行存储

简单点说，智能合约就是一段可执行的代码（它可以被合约编写者赋予各种各样的功能），它经过编译然后被存储在区块链上;然后根据合约的地址，区块链上的节点可以调用它实现相关的功能。

### 一个简单的互助保险合同

```

type Storage= {
    participant: Array<string>,
    amount: int,
    owner: string
}

var M: Contract<Storage> = {}

function M:init()
    self.storage.participant=[]
    self.storage.amount=0
    self.storage.owner=caller_address --记录创建者
    pprint("contract init")
    emit event("contract init")
end

function M:on_deposit(amount: int)
    local in_flag: bool = false --判断是否已经参与过合约
    for k,v in pairs(self.storage.participant) do
        if caller_address == v then
            in_flag = true
            break
        end
    end

    if in_flag == false then
        self.storage.participant[#self.storage.participant+1] = caller_address --记录参与者
    end

    self.storage.amount = tointeger(self.storage.amount+amount) --记录金额
    local deposit_info:string = tostring(caller_address).. " transfered in,amount
"..tostring(amount)..",sum "..tostring(get_contract_balance_amount()+amount)
    pprint("deposit info: ", deposit_info)
    emit event(deposit_info)
end

function M:handle(address:string)
    if self.storage.owner ~= caller_address then --只允许创建者进行理赔
        pprint("caller_address is not the contract owner")
        pprint("caller_address: " , caller_address, " contract_owner_address: ",
self.storage.owner)
        return
    end

    local in_flag: bool = false
    for k,v in pairs(self.storage.participant) do --遍历参与者列表，只对参与者列表中的地址进行理赔
        if address == v then
            in_flag = true
            local amount:int = math.floor(self.storage.amount/2)
            if amount > 10000000 then --最高赔付100HSR
                amount = 10000000
            end
            local res=transfer_from_contract_to_address(address,"HSR",amount)
            self.storage.amount =self.storage.amount-amount
            pprint("amount: ", amount)
            local pay_info = "pay to "..address.." "..tostring(amount)
            pprint("pay info: ", pay_info)
            emit event("pay to "..address.." "..tostring(amount))
        end
    end

    if in_flag == false then
        pprint("caller ", caller_address, " did not take part in this contract")
    end
end

function M:get_balance()
    pprint("contract balance: ", self.storage.amount)
end

function M:get_participator()
    pprint("contract participator:")
    for k,v in pairs(self.storage.participant) do
        pprint(v)
    end
end

return M

```

## 合约的特殊交互类型event

### 合约event简单介绍

合约中可以emit抛出事件，抛出的事件记录到区块链上，区块链网络上的节点同步到这些事件时，可以根据本地配置触发相应一些脚本。

emit中的参数对应本地回调脚本执行时的几个全局变量，truncated（emit抛出的参数是否被截断），param（emit时抛出的字符串格式的的参数），contract\_id（emit触发代码所在的合约ID），event\_type(字符串格式的事件类型)。

### 触发合约event的方法

可以使用emit关键字的语法来触发合约event，每次执行到emit语句时触发一个这种事件类型的合约event

语法是:

```
emit EventName(EventArg)
```

比如:

```
emit hello("glua") -- hello是emit抛出的事件名称, "glua"是参数
EventName最长支持49个字节长的字符串, EventArgs最长支持1024个字节, 超长截断
```

## 示例

```
-- Hello, this is a example contract

-- 这里是定义合约的storage的类型
type Storage = {
  name: string,
  age: int,
  money: number,
  is_man: bool,
  int_table: Map<int>,
  int_array: Array<int>
}

-- 声明一个合约类型的变量M
let M = Contract<Storage>()

-- 给合约定义一个初始化函数, 这里M代表合约的变量
function M:init()
  pprint('contract demo init')
  self.storage['name'] = 'zhangsan' -- 这里是给合约的storage各属性进行初始化操作, 下面代码类似
  self.storage['age'] = 16
  self.storage['money'] = 1.1345
  self.storage['is_man'] = true
  self.storage['int_table'] = {a: 1,b: 2, c: 3,d: 4}
  self.storage['int_array'] = [5,6,7,8]
end

-- 给合约定义一个名为set的API, 参数是名为name的字符串类型的参数
function M:set(name: string)
  pprint('contract demo set')
  self.storage['name'] = 'lisi'
  self.storage['age'] = 14
  self.storage['money'] = 5.3456
  self.storage['is_man'] = false
  self.storage['int_table'].a = 15
  self.storage['int_table'].f = 10
  table.remove(self.storage['int_array'], 1)
  pprint('after remove')
  self.storage['int_array'][1] = 99
  pprint('after set array by index')
  pprint(self.storage.int_array)
  self.storage.int_array[#self.storage.int_array+1] = 20
  table.insert(self.storage['int_array'], 19)
  pprint('insert value to array')
  -- 执行从合约账户转账到用户账户的操作

transfer_from_contract_to_address("HSRB3MmTLBoh8KSokqdk1pcN6zxBKxaVeUeRfffffffffffffffffffffffffffff
"HSR", 10000)
end

function M:get(arg: string)
  pprint('test3 contract demo get')
  pprint(self.storage['name']) -- 这里是读取合约的storage中属性为name的值并输出
  pprint(self.storage['age'])
  pprint(self.storage['money'])
  pprint(self.storage['is_man'])
  pprint(self.storage['int_table'])
  pprint(self.storage['int_array'])
end

return M
```

## HOWTOs

### 1. 怎么进行调试

默认情况下, 合法的合约调用会在代理节点执行, 但是普通节点也可以手动打开合约虚拟机, 验证区块链中的合约调用, 执行合约调用。

简单的调试方法可以通过pprint输出变量, 对于基本类型pprint会输出多个参数值的字符串表示, 对于函数会输出函数的内存地址, 对于table类型的值会转成json字符串输出。

之后会增加远程调试功能, 在远程代理节点上运行过程中断点调试。

### 2. 怎么使用event

合约中可以通过emit EventName(EventArgs)抛出, EventName是自定义event名称, event名称词法要求和变量名要求一样, 但是最长支持49字符, EventArgs是event的参数, 要求值是最长1024字符的字符串

调用合约的操作执行过程中抛出的event，会被记录到区块链中，区块链本地节点可以设置监控某合约的某event的回调脚本，然后在区块链同步到包含被监控的event的块时，会触发设置的脚本，回调脚本也是用lua编写。

### 3. 常见编译错误有哪些

- 变量类型和赋值不一致
- 函数调用的参数类型和实际传参类型不一致
- 函数参数类型和函数体中使用时的类型不一致，建议函数参数加上显式类型声明
- 一些代码块漏加 `end`
- 使用了没有申明过的变量
- 合约中定义了全局变量（合约中不允许定义新的全局变量只能读取，但是脚本中可以定义新全局变量）
- 对nil值进行一些不允许的操作符操作，比如加减乘除等
- 访问非table类型值的属性
- 其他

### 4. 对中文或者其他非英文的支持如何

变量名，函数名，event名称不可以使用中文，只能英文字符或者下划线开头，跟着若干个英文字符或者下划线或者数字，但是字符串中的内容可以用中文或者其他语言的文字，支持unicode。

### 5. 支持多线程吗

因为glua主要是为了在区块链的节点上运行的，考虑到区块链上的一些特性尤其是为了达成共识，不支持多线程编程

### 6. glua中怎么使用随机数

提供两种获取随机数的方式

- 全局函数get\_chain\_random() 获取链上伪随机数，这个函数返回的随机数是可被推算出来的结果，仅用于只需要返回均匀分布的数字的地方
- 全局函数get\_waited(blocknumber) 可以获取根据指定块的块号上的二进制内容产生的一个int32数字，参数可以是过去块也可以是未来块的块号要用这种方式获取随机数，可以调用全局函数get\_header\_block\_num()获取到前一个块的块号,然后用未来的某个块号（当前块号加上未来块的数量，大概10秒一个块）作为参数调用get\_waited函数，如果执行的时候当前区块链还没有到这个块号，返回-1，如果执行的时候当前区块链已经超过了这个块号，返回根据那个块上数据产生的一个int32数字。以彩票为例，设置get\_waited的参数为预计开奖时间的未来块号，然后在开奖前一段时间前允许投注，这时候get\_waited参数的块号还没有到这个块，返回类型是-1，所有人都不知道到开奖时间后这个函数调用的返回结果会是多少。当开始时间到了后，调用get\_waited的返回结果固定下来一个int32类型的正数，并且以后任何节点每次用同一个参数调用结果都是固定的，随机数被确定下来了。可以根据需要用这个返回值 (result % 10000) / 10000 来得到[0, 1)之间的精度4位小数的随机数

### 7. 怎么实现面向对象的类型继承和多态

可以使用table类型和record类型模拟对象，record类型有默认属性值，并且属性可以有默认实现的函数

比如:

```
type Person = {
  id: string default "123",
  name: string default "glua",
  age ? : int = 24, -- record属性默认值既可以用default也可以用=区分
  fn: (number, number) => number default
    function (a: number, b: number)
      return a + b
    end
}

let p = Person()
pprint(p.id, p.name, p.age)
let n = p.fn(p.age, 2016)
pprint(n)
```

如果需要实现类似面向对象语言中的类型继承和多态功能的话，可以实现一个extend函数，调用子record类型的构造函数后，用extend函数 接受子对象和父类型，在extend函数中创建新的父类型的对象，然后给把父类型对象中子类型对象没有的属性赋值给子类型对象。用这种 方法可以起到继承和多态的效果。目前没有给出标准的extend函数，给出一个示例实现:



```

let function extend(obj, parent_class)
  let parent = parent_class(obj)
  for k, v in pairs(parent) do
    obj[k] = v
  return totatable(obj)
end

type A = {
  name1: string,
  age1: int default 100
}

type B = {
  name: string,
  age: int
}

let b = B()
extend(b, A)

-- or

let c = extend(B(), A)

```

还有一种实现类型继承和多态的方法是使用`setmetatable`和元表，这以后会给出更多文档和例子

## 词法规则

- 整数：64位有符号整数，格式比如

3 345 0xff 0xBEBADA

- 浮点数：64位浮点数，格式比如

3.0 3.1416 314.16e-2 0.31416E1 34e1

0x0.1E 0xA23p-4 0X1.921FB54442D18P+1

- 变量名：字母或下划线开头，内容包括字母或下划线或者数字，并且不能是关键字符号
- 字符串：行内字符串可以用2个单引号或者2个双引号前后包围，其中可以使用反斜杠"转义一些特殊字符，跨行或者行内字符串可以用[[和]]包围。

比如：

```

a = 'alo\n123'
a = "alo\n123"
a = '\971o\10\04923'
a = [[alo
123]]
a = [=[
alo
123]=]

```

- 关键字：

<code>and</code>	<code>break</code>	<code>do</code>	<code>else</code>	<code>elseif</code>	<code>end</code>
<code>false</code>	<code>for</code>	<code>function</code>	<code>goto</code>	<code>if</code>	<code>in</code>
<code>local</code>	<code>nil</code>	<code>not</code>	<code>or</code>	<code>repeat</code>	<code>return</code>
<code>then</code>	<code>true</code>	<code>until</code>	<code>while</code>	<code>offline</code>	

- `true/false/nil`字面量
- 标点符号：

<code>+</code>	<code>-</code>	<code>*</code>	<code>/</code>	<code>%</code>	<code>^</code>	<code>#</code>
<code>&amp;</code>	<code>~</code>	<code> </code>	<code>&lt;&lt;</code>	<code>&gt;&gt;</code>	<code>//</code>	
<code>==</code>	<code>~=</code>	<code>&lt;=</code>	<code>&gt;=</code>	<code>&lt;</code>	<code>&gt;</code>	<code>=</code>
<code>(</code>	<code>)</code>	<code>{</code>	<code>}</code>	<code>[</code>	<code>]</code>	<code>::</code>
<code>;</code>	<code>:</code>	<code>,</code>	<code>.</code>	<code>..</code>	<code>...</code>	

## 语法规则

```

chunk ::= block

block ::= {stat} [retstat]

type ::= Name |
        '(' {type} [',' type] ')' '=' type

record ::= 'type' Name {'<' { Name [',' Name ] } '>'} '='
          '{' { Name ':' type [ ',' Name ':' type ] } '}'

typedef ::= 'type' Name {'<' { Name [',' Name ] } '>'} '=' Name {'<' { Name [',' Name ] }
           '>'}

stat ::= ';' |
        varlist '=' explist |
        functioncall |
        label |
        break |
        goto Name |
        record |
        typedef |
        do block end |
        while exp do block end |
        repeat block until exp |
        if exp then block {elseif exp then block} [else block] end |
        for Name '=' exp ',' exp [',' exp] do block end |
        for namelist in explist do block end |
        function funcname funcbody |
        local function Name funcbody |
        local namelist ['=' explist]

retstat ::= return [explist] [';']

label ::= ':' Name ':'

funcname ::= Name {'.' Name} [':' Name]

varlist ::= var {',' var}

var ::= Name | prefixexp '[' exp ']' | prefixexp '.' Name

name ::= Name {'.' type } || Name

namelist ::= name {',' name}

explist ::= exp {',' exp}

exp ::= nil | false | true | Numeral | LiteralString | '...' | functiondef |
        prefixexp | tableconstructor | exp binop exp | unop exp

prefixexp ::= var | functioncall | '(' exp ')'

functioncall ::= prefixexp args | prefixexp ':' Name args

args ::= '(' [explist] ')' | tableconstructor | LiteralString

functiondef ::= function funcbody

funcbody ::= '(' [parlist] ')' block end

parlist ::= namelist [',' '...'] | '...'

tableconstructor ::= '{' [fieldlist] '}'

fieldlist ::= field {fieldsep field} [fieldsep]

field ::= '[' exp ']' '=' exp | Name '=' exp | exp

fieldsep ::= ',' | ';'

binop ::= '+' | '-' | '*' | '/' | '//' | '^' | '%' |
          '&' | '~' | '|' | '>>' | '<<<' | '...' |
          '<' | '<=' | '>' | '>=' | '==' | '~=' |
          and | or

unop ::= '-' | not | '#' | '~'

```

## FAQs

- 合约的storage的初始化是直接由区块链初始化的，record类型的default属性值不对它起作用

## 使用C#编程语言开发智能合约

Contents:

### gsharpc介绍

gsharpc是一个将.Net字节码文件转换成glua字节码文件的转换器， 结合C#等.Net平台上语言的编译器将C#等源码编译成.Net字节码，就可以实现将C#等.Net平台上的编程语言编译到glua字节码，从而可以用来写智能合约和链上脚本了

### gsharpc使用指南

因为gsharpc不是直接将C#源代码编译到glua字节码，所以需要安装Visual Studio 2017(有免费的社区版)或者.Net Framework SDK来将C#源码编译到.Net字节码文件先， 然后再使用gsharpc编译.Net字节码文件dll文件转换到glua字节码，推荐安装Visual Studio 2017

可以按照以下步骤配置开发环境:

1. 请安装Visual Studio 2017 Community，安装时请确保其中的C#开发环境选中安装。
2. 新建C#类库项目(.Net Framework)，在项目的“引用”中加入gsharpc的几个.dll文件。这个项目就是用来写智能合约或者链上脚本的项目，最终我们就是要把这个项目编译到glua字节码
3. 参照demo中例子，Class1.cs是支持的主要语法的例子。DemoContract1.cs是智能合约的例子。修改新建项目的Class1.cs(建议改为其他文件名)
4. 在同一个Visual Studio解决方案下，添加创建一个新的C#控制台项目(.Net Framework)，在项目的“引用”中加入gsharpc的几个.dll文件,并在项目引用中添加刚刚创建类库项目。这个项目是用来直接在Visual Studio中调试调用智能合约/C#代码用的，将次项目设置为解决方案的启动项目
5. 在第4步创建的C#控制台项目中，可以运行项目对第2步创建的类库项目进行调试运行
6. 编译整个解决方案，在第2步创建的类库项目的bin/Debug或者bin/Release文件夹下（根据是Debug还是Release模式区分）找到“{项目名}.dll”，这就是项目产生的.dll文件
7. 执行gsharpc -gpc 第6步产生的文件路径.dll 产生“项目名.gpc”，这是目标的合约.gpc文件
8. 使用产生的.gpc文件来做注册合约，调用合约，注册脚本等后续行为
9. 如果不是要写合约上链，只是要执行代码，需要在第5步中，使用gsharpc -c 文件路径.dll 来产生“项目名.out”文件，这是glua字节码文件，然后可以用glua 文件路径.out来直接执行这个字节码文件
10. 暂时尽量不要用Release模式编译C#项目。Release模式会把一些null值优化成0，而在glua中0和glua是不一致的，目前gsharpc不支持Release模式编译产生的dll

## gsharpc支持的C#编程语言子集

gsharpc只支持使用C#编程语言的一个子集来编写智能合约，包括了大部分C#的语法和控制结构，另外提供了类似glua语言的类库的内置函数和类型。本文描述支持的C#子集的语法和类库

### C#的基本语法

参考微软官方文档 <https://docs.microsoft.com/zh-cn/dotnet/articles/csharp/programming-guide/index> 本文之后会描述哪些特性是支持的

### C#版智能合约格式

格式例如：

```

using static GluaCoreLib.GluaCoreFuncs; // 引用内置全局函数库
using GluaCoreLib; // 引用其他内置库

public class Storage // 这里定义合约的storage的类型
{
    public string Name { get; set; } // 定义storage的属性
    public int Age { get; set; }
    public string Country; // 用C#的field语法也可以定义storage属性
    public bool IsMale { get; set; }
    // 这里定义string数组类型的storage属性，因为glua的数组和C#数组用法不兼容，所以用GluaArray来代币glua中的数组类型
    public GluaArray<string> ArrayDemo { get; set; }
}

// 这是可选的，实现IGluaEventEmitter接口的类型定义了本合约中有哪些event事件需要抛出
public class MyEventEmittter : IGluaEventEmitter
{
    // "Emit"开头的静态方法，且只有一个字符串参数，返回值是void的，代表一种event事件，事件名称是方法名去掉"Emit"前缀
    public static void EmitHello(string eventArg)
    {
        // 这里抛出event事件的方法体，直接C#项目中调试的时候可以用来调试，编译到glua字节码的时候不包括这里的方法体
        Console.WriteLine("event Hello emitted, arg is " + eventArg);
    }
    public static void EmitHello2(string eventArg)
    {
        Console.WriteLine("event Hello2 emitted, arg is " + eventArg);
    }
}

// 这里是具体的合约类型，类型名自定义，需要符合C#的类型名规范，需要继承GluaContract<T>类型，其中T类型表示合约的storage类型
public class MyContract : GluaContract<Storage>
{
    // 合约的构造函数，这个函数内不要添加方法体代码，增加了在编译到glua字节码后也不会包含，只有C#项目直接运行时起效
    public MyContract() : base(new Storage())
    {
    }

    // 必须实现的init方法，合约注册的时候初始化合约的函数
    public override void init()
    {
        print("contract initing"); // 这里调用的print函数就是文件头using static引用的
        GluaCoreLib.GluaCoreFuncs中的静态方法
        this.storage.Age = 100; // 合约的storage的属性都需要在init方法中初始化，否则无法成功注册合约到链上
        this.storage.Country = "China";
        this.storage.Name = "C#";
        this.storage.IsMale = true;
        this.storage.ArrayDemo = GluaArray<string>.Create(); // 这里是创建一个空的元素类型是string类型的glua数组
        this.storage.ArrayDemo.Add("hello"); // 给glua数组中添加一个元素"hello"
        pprint(this);
        print("this is contract init api");
    }

    // 这里是定义了一个合约中的API，接受一个string类型参数，返回一个string类型对象
    public string GetAge(string arg)
    {
        print("this is contract getAge api");
        return "" + this.storage.Age; // 返回两个对象连接后的字符串，字符串和其他类型用+连接的时候，会自动调用tostring转换成字符串连接
    }

    // 定义一个返回string类型对象的offline接口，offline接口在链上通过call_contract_offline命令调用，调用操作不上链，主要用来定义查询类函数
    public string OfflineGetAge(string arg)
    {
        print("this is contract OfflineGetAge api");
        print("age is " + this.storage.Age); // 这里this.storage读取了本合约的storage对象
        return "" + this.storage.Age;
    }

    public void TestHello(string arg)
    {
        print("this is contract hello api with argument " + arg); // 这里访问了合约API的参数arg
    }
}

// 除了合约类型，storage类型外，还需要额外定义一个包含Main方法的类型，作为合约的加载入口
public class ExampleLibClass
{
    // 非静态的Main方法作为合约的加载入口，返回类型是定义的合约类型，这个方法会被调用用来加载合约，返回的合约对象就是本文件定义的合约
    public MyContract Main()
    {
        {
            print("start of demo C# contract");
            var contract = new MyContract();
            print("end main");
            return contract; // 必须返回一个合约对象
        }
    }
}

```

## 内置库

通过 `importModule(string moduleName)` 函数可以引用内置模块库，比如 `string`, `table`, `json` 模块等

内置了一些全局函数，列表如下：

```
bool and(bool a, bool b) 布尔与
bool or(bool a, bool b) 布尔或
number div(number a, number b) 浮点除法
int idiv(number a, number b) 整数除法
number neg(number a) 数值取反
bool not(bool a) 布尔取反
void print(object obj) 输出对象字符串化后结果
string tostring(object obj) 把对象转成字符串返回
string tojsonstring(object obj) 把对象转成json字符串返回
void pprint(object obj) 把对象json字符串化后的结果输出
int? tointeger(object obj) 把对象转换成整数返回, 如果转换失败, 返回null
float? tonumber(object obj) 把对象转换成浮点数返回, 如果转换失败, 返回null
T importContract<T>(string contractName) 引用其他合约, 返回合约的对象, 调用时需要制定合约的接口类型T
T importModule<T>(string moduleName) 引用内置模块, 返回模块的对象, 调用时需要制定模块的类型
void Debug() 调试用, 用来输出模拟C#的evaluate stack
string Type(object value) 返回参数的类型的字符串
void Exit(int exitCode) 用某个错误码报错退出调用
void Error(string errorMsg) 携带某个错误信息字符串退出调用
GluaMap<object> getmetatable(GluaTable table) 获取table的元表
void setmetatable(GluaTable table, GluaTable metatable) 设置table的元表
bool toboolean(object value) 把参数转换成布尔类型
GluaTable totable(object value) 把参数转换成table类型, 如果原来就是table类型, 保持不变, 否则返回null
bool rawequal(object a, object b) 比较a和b两个对象是否相等
long rawlen(object value) 获取参数的长度 (数组部分长度或字符串长度)
object rawget(object table, object key) 获取table的某个属性key
void rawset(object table, object key, object value) 设置table的某个属性key值为value
int transfer_from_contract_to_address(string address,
    string assetName, long amount) 从合约转账到地址
void set_mock_contract_balance_amount(string contractAddress,
    string assetName, long amount) 模拟设置合约的余额, 方便测试用
long get_contract_balance_amount(string contractAddress, string assetName) 获取合约的余额
long get_chain_now() 获取链上时间
long get_chain_random() 获取链上随机数
long get_header_block_num() 获取链上块号
long get_waited(long num) 获取第num个块上某个数字 (可用未来数来模拟随机数)
string get_current_contract_address() 获取当前合约地址
string caller() 当前调用者的公钥
string caller_address() 当前调用者的地址
long get_transaction_fee() 获取交易手续费, 10万精度
long transfer_from_contract_to_public_account(string to_account_name, string assertName,
    long amount) 从合约转账到账户
```

## 支持的C#语法

类型定义和使用

类型的属性和字段定义和使用

类型的成员方法, 静态方法定义和使用

函数调用, 函数参数, 函数返回值的 支持

类型继承

数值操作

字符串连接 (通过+连接的方式只支持2个对象进行字符串连接)

布尔操作

变量声明和赋值

this对象的使用

if/else if/else控制流结构

for控制流结构

glua的Map和Array类型的创建和修改

glua的Map和Array类型的遍历 (迭代器遍历)

while控制流结构

continue和break语句的支持

比较操作符

内置函数和库的调用

new 新类型

emit event

引用内置模块

引用合约

## gsharpc支持的C#语法的例子

### C#版合约例子

```

using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

using static GluaCoreLib.GluaCoreFuncs;
using GluaCoreLib;

namespace DemoContract1
{
    public class Storage
    {
        public string Name { get; set; }
        public int Age { get; set; }
        public string Country; // field test
        public bool IsMale { get; set; }
        public GluaArray<string> ArrayDemo { get; set; }
    }

    public class MyEventEmitter : IGluaEventEmitter
    {
        public static void EmitHello(string eventArg)
        {
            Console.WriteLine("event Hello emitted, arg is " + eventArg);
        }
        public static void EmitHello2(string eventArg)
        {
            Console.WriteLine("event Hello2 emitted, arg is " + eventArg);
        }
    }

    public class MyContract : GluaContract<Storage>
    {
        public MyContract() : base(new Storage())
        {
        }
        public override void init()
        {
            print("contract initing");
            this.storage.Age = 100;
            this.storage.Country = "China";
            this.storage.Name = "C#";
            this.storage.IsMale = true;
            this.storage.ArrayDemo = GluaArray<string>.Create();
            this.storage.ArrayDemo.Add("hello");
            pprint(this);
            print("this is contract init api");
        }
        public string GetAge(string arg)
        {
            print("this is contract getAge api");
            return "" + this.storage.Age;
        }
        public string OfflineGetAge(string arg)
        {
            print("this is contract OfflineGetAge api");
            print("age is " + this.storage.Age);
            return "" + this.storage.Age;
        }
        public void TestHello(string arg)
        {
            print("this is contract hello api with argument " + arg);
        }
    }

    public class ExampleLibClass
    {
        public MyContract Main()
        {
            print("start of demo C# contract");
            var contract = new MyContract();
            print("end main");
            return contract;
        }
    }
}

```

## C#中调用调试合约的例子

```

using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace GsharpDemo1
{
    class Program
    {
        static void Main(string[] args)
        {
            var contractEntry = new ExampleLibClass();
            var contract = contractEntry.Main();
            contract.storage = new Storage();
            contract.storage.Age = 25;
            contract.storage.Name = "gsharp";
            contract.storage.IsMale = true;
            contract.storage.Country = "China";
            Console.WriteLine(contract.OfflineGetAge("hello"));
        }
    }
}

```



```

using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using static GluaCoreLib.GluaCoreFuncs;
using GluaCoreLib;

namespace Demo1
{
    public class Storage
    {
        public string Name { get; set; }
        public int Age { get; set; }
        public string Country; // field test
        public bool IsMale { get; set; }
    }

    public class HelloContract
    {
        public void SayHello(string arg)
        {
            print("hello, this is hello contract api SayHello with arg " + toString(arg));
        }
    }

    public class MyEventEmitter : IGluaEventEmitter
    {
        public static void EmitHello(string eventArg)
        {
            Console.WriteLine("event Hello emitted, arg is " + eventArg);
        }
        public static void EmitHello2(string eventArg)
        {
            Console.WriteLine("event Hello2 emitted, arg is " + eventArg);
        }
    }

    public class MyContract : GluaContract<Storage>
    {
        public MyContract() : base(new Storage())
        {
        }
        public override void init()
        {
            print("contract initing");
            this.storage.Age = 100;
            this.storage.Country = "China";
            this.storage.Name = "C#";
            pprint(this);
            print("this is contract init api end");
        }
        public string GetAge(string arg)
        {
            print("this is contract getAge api");
            return "" + this.storage.Age;
        }
        public string OfflineGetAge(string arg)
        {
            print("this is contract OfflineGetAge api");
            print("age is " + this.storage.Age);
            return "" + this.storage.Age;
        }
        public void TestHello(string arg)
        {
            print("this is contract hello api with argument " + arg);
        }
    }

    public class ExampleLibClass
    {
        public int SayHi()
        {
            Console.WriteLine("hello,\tCecil");
            var a = 5;
            var b = 100;
            var sum = 3;

            if (b > 50)
            {
                Console.WriteLine("hello, this is if condition=true branch");
            }
            else if (b > 25)
            {
                Console.WriteLine("hello, this is if elseif condition branch");
            }
            else
            {
                Console.WriteLine("hello, this is if condition=false branch");
            }
            var d = "a " + sum;
            Console.WriteLine(b);
            Console.WriteLine("hello world");
            Console.WriteLine("sum is " + 123);
            Console.WriteLine("sum is " + d);
            Console.WriteLine(a + b);

            print("" + 123);

            return a + b + 1234;
        }

        public void TestIf()
        {
            Console.WriteLine("this is test if function");
            var b = 30;
            if (b > 50)
            {
                Console.WriteLine("hello, this is if condition=true branch");
            }
            else if (b > 25)
            {
                Console.WriteLine("hello, this is if elseif condition branch");
            }
        }
    }
}

```



```

else
{
    Console.WriteLine("hello, this is if condition=false branch");
}
}

public void TestFor()
{
    int sum = 0;
    for (var i = 0; i < 10; ++i)
    {
        sum += i;
        Console.WriteLine("for loop in");
    }
    Console.WriteLine("test for sum is " + sum); // sum=45
}

public void TestWhile()
{
    int sum = 0;
    int i = 0;
    while (i < 10)
    {
        sum += i;
        Console.WriteLine("while loop in");
        i++;
    }
    Console.WriteLine("test while loop sum is " + sum); // sum=45
}

public void TestCompare()
{
    var a = 5;
    Console.WriteLine("5==5 is " + ((a == 5) ? "true" : "false"));
    Console.WriteLine("4<5 is " + ((4 < a) ? "true" : "false"));

    if (a == 5)
    {
        Console.WriteLine("a==5");
    }
    else
    {
        Console.WriteLine("a!=5");
    }
}

public void TestContinue()
{
    Console.WriteLine("test continue case");
    int sum = 0;
    for (var i = 0; i < 10; ++i)
    {
        if (i == 5)
        {
            Console.WriteLine("continue when i=" + i);
            continue;
        }
        sum += i;
        Console.WriteLine("for loop in");
    }
    Console.WriteLine("test for sum with continue is " + sum); // sum=40
}

public void TestBreak()
{
    Console.WriteLine("test break case");
    int sum = 0;
    for (var i = 0; i < 10; ++i)
    {
        if (i == 5)
        {
            Console.WriteLine("break when i=" + i);
            break;
        }
        sum += i;
        Console.WriteLine("for loop in");
    }
    Console.WriteLine("test for sum with break is " + sum); // sum = 10
}

public int TestFuncArg(int a, int b, String name, bool c)
{
    Console.WriteLine(a);
    Console.WriteLine(b);
    Console.WriteLine("name=" + name); // name=C#
    Console.WriteLine("c=" + c); // c=true
    Console.WriteLine("hi " + c); // hi true
    Console.WriteLine("args a + b = " + (a + b)); // a+b=11 when a = 5, b = 6
    a = 10;
    b = 20;
    return a + b; // should be 30
}

public void TestMultiConcat()
{
    int a = 1;
    // 不支持超过2个字符串的字符串连接, 因为.net数组是0-based, glua数组是1-based
    // Console.WriteLine("TestMultiConcat " + a + " and " + a);
}

public void TestArithmeticOperators()
{
    var a = 8;
    var b = 3;
    var c = a - b;
    Console.WriteLine("8-3=" + c); // 8-3=5
    Console.WriteLine("8*3=" + (a * b)); // 8*3=24
    Console.WriteLine("8/3=" + (a / b)); // 8/3=2, 整数除法
    Console.WriteLine("8 div 3=" + div(a, b)); // 8 div 3=2.666, 浮点除法
    Console.WriteLine("8 idiv 3=" + idiv(a, b)); // 8 idiv 3=2 整数除法
    Console.WriteLine("7%3=" + (7 % b)); // 7%3=1
    // 因为0在glua中是布尔真值, 所以暂时用一个单独的函数库做布尔运算
    Console.WriteLine("true && false=" + and(true, false)); // true && false = false
    Console.WriteLine("true || false=" + or(true, false)); // true || false = true
    Console.WriteLine("9&3=" + (9 & b)); // 9&3=1
    Console.WriteLine("9|3=" + (9 | b)); // 9|3=11
}

```

```

        Console.WriteLine("9^3=" + (9 ^ b)); // 9^3=10
        Console.WriteLine("8>>3=" + (a >> b)); // 8>>3=1
        Console.WriteLine("8<<3=" + (a << 3)); // 8<<3=64
        var t = true;
        print("-8=" + (-a)); // -8=-8
        print("-8=" + neg(a)); // -8=-8
        print("!true=" + (!t)); // !true=0 这里.net字节码把布尔当0/1 int处理
        print("!true=" + not(t)); // !true=false
    }

    public void TestPlainObject()
    {
        var storage = new Storage();
        storage.Name = "C#";
        storage.Age = 100;
        storage.IsMale = true;
        storage.Country = "China";
        Console.WriteLine("storage name is " + storage.Name);
        Console.WriteLine("storage age is " + storage.Age);
        Console.WriteLine("storage isMale is " + storage.IsMale);
        print("storage country is " + storage.Country);
        pprint(storage);
        pprint(null);
    }

    public void TestArray()
    {
        var array1 = GluaArray<int?>.Create();
        array1.Add(1);
        array1.Add(2);
        array1.Add(3);
        array1.Add(4);
        pprint(array1);
        print("array 1 size is " + array1.Count()); // 4
        array1.Set(4, 2);
        print("array[4] is " + array1.Get(4)); // 2
        array1.Pop();
        print("array 1 after changed size is " + array1.Count()); // 3
        print("array[3] is " + array1.Get(3)); // 3
        for (int i = 1; i <= array1.Count(); ++i)
        {
            var item = array1.Get(i);
            print("index: " + i);
            print("value: " + item);
        }
    }

    public void TestMap()
    {
        var map1 = GluaMap<string>.Create();
        map1.Set("name", "C#");
        map1.Set("country", "China");
        Console.WriteLine("map1's name is " + map1.Get("name"));
        Console.WriteLine("map1's country is " + map1.Get("country"));

        // 遍历map的demo
        var map1PairsIter = map1.Pairs();
        pprint(map1PairsIter);
        var keyValuePair = map1PairsIter(map1, null);
        pprint(keyValuePair);
        print(keyValuePair.Key);
        print(keyValuePair.Value);
        while (keyValuePair.Key != null)
        {
            Console.WriteLine("key: " + toString(keyValuePair.Key));
            Console.WriteLine("value: " + toString(keyValuePair.Value));

            if (keyValuePair.Key == "name")
            {
                print("found key==name pair");
            }
            keyValuePair = map1PairsIter(map1, keyValuePair.Key);
        }
    }

    public void TestEmitEvent()
    {
        MyEventEmitter.EmitHello("hello");
        var a = 3;
        var b = 4;
        MyEventEmitter.EmitHello2("" + (a + b));
    }

    public void TestModules()
    {
        // 引用string模块, GluaStringModule类型是返回的模块对象的类型, 必须用合适的类型来引用合适的模块
        var strModule = importModule<GluaStringModule>("string");
        pprint("string module: " + toJsonstring(strModule));

        // 可以调用string模块的函数来获取字符串长度, 也可以用C#的字符串类型的内置Length属性来获取字符串长度
        var helloLength = "hello".Length;
        var helloLength2 = strModule.Len("hello");
        print("hello string length is: " + helloLength);
        print("hello string length2 is: " + helloLength2);

        var tableModule = importModule<GluaTableModule>("table");
        var table1 = GluaArray<string>.Create();
        table1.Add("a");
        tableModule.Append(table1, "b");
        var table1Count = tableModule.Length(table1);
        print("table1 size is: " + table1Count);

        var mathModule = importModule<GluaMathModule>("math");
        var floor1 = mathModule.Floor(3.3);
        print("floor(3.3) = " + floor1);

        var abs1 = mathModule.Abs(-4);
        print("abs(-4) = " + abs1);

        var pi = mathModule.pi;
        print("pi = " + pi);

        var timeModule = importModule<GluaTimeModule>("time");
        print("date: " + timeModule.Tostr(1494301754));
    }

```

```

var jsonModule = importModule<GluaJsonModule>("json");
print("dumps of json module is: " + jsonModule.Dumps(jsonModule));

var typeOfNumber = Type(123);
print("type(123) = " + typeOfNumber);

var array1 = GluaArray<string>.Create();
array1.Add("a");
array1.Add("b");
print("rawlen(['a', 'b'])=" + rawlen(array1));

print("caller_address = " + tostring(caller_address())); // 非合约中会返回nil

var array1Iter = array1.Ipairs();
var array1keyValuePair = array1Iter(array1, 0);
while(array1keyValuePair.Key != null)
{
    print("key: " + array1keyValuePair.Key);
    print("value: " + array1keyValuePair.Value);
    array1keyValuePair = array1Iter(array1, array1keyValuePair.Key);
}
}

public void TestImportContract()
{
    var helloContract = importContract<HelloContract>("hello");
    helloContract.SayHello("C#");
}

/**
 * 这是程序入口，必需，且必须是非static方法.如果是要定义合约，需要返回类型是一个合约类型
 */
public MyContract Main()
{
    print("start of demo C# contract \r\n another line");

    var result = SayHi();
    Console.WriteLine("SayHi result is " + result);
    TestIf();
    TestFor();
    TestWhile();
    TestContinue();
    TestCompare();
    TestBreak();
    var testFuncArgResult = TestFuncArg(5, 6, "C#", true);
    Console.WriteLine("testFuncArg result is " + testFuncArgResult);
    TestArithmeticOperators();
    TestPlainObject();
    TestArray();
    TestMap();
    TestEmitEvent();
    TestModules();

    // TestImportContract();

    var contract = new MyContract();

    contract.storage = new Storage();
    contract.init();

    pprint(contract);

    var offlineGetAgeRet = contract.OfflineGetAge("");
    print("OfflineGetAge ret is " + offlineGetAgeRet);

    print("end main");
    return contract;
}
}
}

```

## rpc接口文档

Contents:

基础接口相关

**rpc**访问钱包登录函数

调用前提：1在hshare平台数据目录下的config.json下配置好相关的rpc服务器参数 2.启动hshare 平台

Request:

```

{
  "jsonrpc": "2.0",
  "params": [
    "username",
    "password"
  ],
  "id": "1",
  "method": "login"
}

```

请求方法：login

请求参数：rpc 用户名、rpc 密码

Response Result:

```
{
  "id": "1",
  "result": true
}
```

返回参数:

无:

显示版本号以及客户端的相关信息

调用前提: 无

Request:

```
{
  "jsonrpc": 2.0,
  "params": [],
  "id": "1",
  "method": "about"
}
```

请求方法: about

请求参数: 无

Response Result:

```
{
  "id": "2",
  "result": {
    "fc_revision_age": "46 years ago",
    "blockchain_name": "HSRs",
    "hsr_revision_age": "64 weeks ago",
    "boost_version": "1.55",
    "openssl_version": "OpenSSL 1.0.1g 7 Apr 2014",
    "compile_date": "compiled on Mar 28 2016 at 11:50:01",
    "build": "win32 64-bit",
    "hsr_revision": "1.2",
    "fc_revision": "0",
    "client_version": "",
    "blockchain_description": "The Future of Banking"
  }
}
```

返回参数:

blockchain\_name: blockchain名称

blockchain\_description: blockchain描述

client\_version: 客户端版本

hsr\_revision: hshare版本

fc\_revision: fc库版本

fc\_revision\_age: fc发布时间

compile\_date: 编译日期

boost\_version: boost版本

openssl\_version: openssl 版本

build: 编译平台

获取当前链以及钱包基础信息

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "2",
  "method": "get_info"
}
```

请求方法: get\_info

请求参数: 无

Response Result:

```
{
  "id": "1",
  "result": {
    "blockchain_head_block_num": 3571,
    "blockchain_head_block_age": 13,
    "blockchain_head_block_timestamp": "2017-11-23T07:16:41",
    "blockchain_head_block_id": "87de37f1bfea41becde3352b5d43ca4f296596ae",
    "pos_count": 2398,
    "pos_prev_num": 3218,
    "pow_count": 1173,
    "pow_prev_num": 3046,
    "blockchain_confirmation_requirement": 27,
    "blockchain_share_supply": "1057136000000",
    "blockchain_random_seed": "b2c81749d4ef8139cd4d705cc3b3f3678eed043d",
    "client_data_dir": "F:/hshare/pow_production/All-SmartContractCoin-Base/x64/Debug/test2",
    "client_version": "3.1.3-testnet",
    "network_num_connections": 1,
    "network_num_connections_max": 200,
    "network_chain_downloader_running": false,
    "network_chain_downloader_blocks_remaining": null,
    "ntp_time": "2017-11-23T07:16:54",
    "ntp_time_error": "1.27470599999999990",
    "wallet_open": true,
    "wallet_unlocked": true,
    "wallet_unlocked_until": 12345677,
    "wallet_unlocked_until_timestamp": "2018-04-15T04:38:11",
    "wallet_last_scanned_block_timestamp": "2017-11-23T07:16:41",
    "wallet_scan_progress": "1.0000000000000000",
    "wallet_block_production_enabled": true
  }
}
```

}

返回参数:

blockchain\_head\_block\_num: 区块号

blockchain\_head\_block\_age: 当前最大块的产生的时长

blockchain\_head\_block\_timestamp: 当前块产生的时间

blockchain\_head\_block\_id: 当前块ID

pos\_count: pos块数量

pos\_prev\_num: 200块之前的pos块号

pow\_count: pow块数量

pow\_prev\_num: 200块之前的pow块号

blockchain\_confirmation\_requirement: 区块确认周期

blockchain\_share\_supply: HSR发行量

blockchain\_random\_seed: 当前轮出块

client\_data\_dir: 本地客户端数据存放路径

client\_version: 客户端版本

network\_num\_connections: 当前连接数

network\_num\_connections\_max: 当前客户端最大连接数

network\_chain\_downloader\_running: 当前是否高速同步模式

network\_chain\_downloader\_blocks\_remaining: 当前剩余未同步块数

ntp\_time: NTP获取时间戳

ntp\_time\_error: NTP时间修正参数

wallet\_open: 钱包是否打开

wallet\_unlocked: 钱包是否解锁

wallet\_unlocked\_until: 钱包解锁持续秒数

wallet\_unlocked\_until\_timestamp: 钱包下次锁定时间

wallet\_last\_scanned\_block\_timestamp: 钱包上一次扫描时间

wallet\_scan\_progress: 钱包扫描线程数

wallet\_block\_production\_enabled: 钱包是否产块

判断输入的公钥是否合法

调用前提：无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "public_key"
  ],
  "id": "2",
  "method": "validate_address"
}
```

请求方法：validate\_address

请求参数：输入的公钥

Response Result:

```
{
  "id": "2",
  "result": {
    "invalid": true
  }
}
```

返回参数:

invalid: 是否是正常的公钥

临时设置**rpc**的登录用户名

调用前提：需要使用rpc\_start\_server指令让这条指令生效

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "username"
  ],
  "id": "2",
  "method": "rpc_set_username"
}
```

请求方法: `rpc_set_username`

请求参数: `rpc`登录用户名

Response Result:

```
{
  "id": "2",
  "result": "null"
}
```

返回参数:

无:

临时设置**rpc**登录用户密码

调用前提: 需要使用`rpc_start_server`指令让这条指令生效

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "password"
  ],
  "id": "2",
  "method": "rpc_set_password"
}
```

请求方法: `rpc_set_password`

请求参数: `rpc`登录密码

Response Result:

```
{
  "id": "3",
  "result": "null"
}
```

返回参数:

无:

临时启动客户端**rpc**模式

调用前提: 需要断开这次**rpc**的链接, 重新进行**rpc**链接才能看出API执行效果

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "port"
  ],
  "id": "2",
  "method": "rpc_start_server"
}
```

请求方法: `rpc_start_server`

请求参数: `rpc`服务端口号

Response Result:

```
{
  "id": "4",
  "result": "null"
}
```

返回参数:

无:

更新**NTP**时间

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "2",
  "method": "ntp_update_time"
}
```

请求方法: ntp\_update\_time

请求参数: 无

Response Result:

```
{
  "id": "5",
  "result": "null"
}
```

返回参数:

无:

显示当前数据占用的硬盘空间

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "2",
  "method": "disk_usage"
}
```

请求方法: disk\_usage

请求参数: 无

Response Result:

```
{
  "id": "2",
  "result": {
    "logs": "4085001",
    "mail_client": null,
    "blockchain": "3482597",
    "wallets": {
      ".backups": "3237",
      "op": "402051"
    },
    "network_peers": "289497",
    "dac_state": "7642885",
    "mail_server": null,
    "total": "16171905"
  }
}
```

返回参数:



blockchain: chain数据占用空间

dac\_state: 本地数据占用空间

logs: 日志占用空间

mail\_client: 保留字段

mail\_server: 保留字段

network\_peers: 网络连接池占用空间

wallets: 钱包文件夹，下面的项跟你本地钱包有关系

.backups: 备份占用空间

op: 名称为op的钱包占用空间

total: 总计占用空间

获取指定区块的全部详细交易信息

调用前提：无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "block"
  ],
  "id": "2",
  "method": "blockchain_get_block_transactions"
}
```

请求方法：blockchain\_get\_block\_transactions

请求参数：要查询区块的区块id或者区块编号

Response Result:

```

{
  "id": "2",
  "result": [
    {
      "7e8b7797d42d1ed8f8b1beb3e92f77ae6842c6a3",
      {
        "withdraws": [
          [
            "0",
            "10000001000"
          ]
        ],
        "imessage_length": "0",
        "deltas": [
          [
            "0",
            [
              [
                "0",
                "-10000001000"
              ]
            ]
          ],
          [
            "1",
            [
              [
                "0",
                "10000000000"
              ]
            ]
          ]
        ],
        "required_fees": {
          "asset_id": "0",
          "amount": "0"
        },
        "alt_fees_paid": {
          "asset_id": "0",
          "amount": "0"
        },
        "deposits": [
          [
            "0",
            "10000000000"
          ]
        ],
        "yield": [],
        "trx": {
          "hsr_inport_asset": {
            "asset_id": "0",
            "amount": "10000000000"
          },
          "operations": [
            {
              "type": "withdraw_op_type",
              "data": {
                "claim_input_data": "",
                "amount": "10000001000",
                "balance_id": "HSRQJ2gaD8RiKpiWRcT3AAEj4vr5eA3pXj52"
              }
            },
            {
              "type": "deposit_op_type",
              "data": {
                "amount": "10000000000",
                "condition": {
                  "asset_id": "0",
                  "slate_id": "0",
                  "type": "withdraw_signature_type",
                  "data": {
                    "owner": "HSR6b7RN33FnT5MHPNwXqwWZBFZ17ArA3wm3"
                  }
                }
              }
            }
          ]
        },
        "signatures": [
          "2004f4f30c748da49ddf94468fcfbff02c72f9ac5784d56b9db5efc1d5470182034a8eb3866f42ca84013b218193bf4f5",
          ],
          "expiration": "2016-03-28T08:00:48",
          "hsr_account": "HSR6b7RN33FnT5MHPNwXqwWZBFZ17ArA3wm3fffffffffffffffffffffffffffffffff1"
        },
        "signed_keys": [],
        "chain_location": {
          "trx_num": "0",
          "block_num": "5533"
        },
        "delegate_vote_deltas": [],
        "balance": [
          [
            "0",
            "1000"
          ]
        ]
      }
    ]
  ]
}

```

返回参数:

在trx前的数据, 没有数据名称: 交易单号

trx: 结构体类型名

signed\_keys: 保留字段

deposits: 入账资产

withdraws: 出账资产

yield: 保留参数

deltas: 保留参数

required\_fees: 保留参数

alt\_fees\_paid: 保留参数

balance: 保留参数

delegate\_vote\_deltas: 保留参数

imessage\_length: 备注长度

chain\_location: 交易位置结构体

获取指定帐号名称或**ID**的账号详细信息

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "account"
  ],
  "id": "2",
  "method": "blockchain_get_account"
}
```

请求方法: blockchain\_get\_account

请求参数: 要查询的账户名称或者要查询的账户id、账户地址以及账户公钥

Response Result:

```
{
  "id": "2",
  "result": {
    "owner_key": "HSR8KkneVfc6iaR9grBpRij5wqhPK5XwxS7ohNhJ5tH8DEoL77j32",
    "name": "hsr1",
    "registration_date": "2015-05-31T16:00:00",
    "last_update": "2015-05-31T16:00:00",
    "delegate_info": {
      "pay_balance": "20090309",
      "total_burned": "0",
      "blocks_missed": "810",
      "pay_rate": "100",
      "votes_for": "20090309",
      "blocks_produced": "58",
      "last_block_num_produced": "5782",
      "total_paid": "20090309",
      "signing_key_history": [
        [
          "0",
          "HSR8KkneVfc6iaR9grBpRij5wqhPK5XwxS7ohNhJ5tH8DEoL77j32"
        ]
      ],
      "next_secret_hash": "7e7f255f175ffa52397084f6ca747674088f176"
    },
    "public_data": null,
    "id": "2",
    "active_key_history": [
      [
        "2015-05-31T16:00:00",
        "HSR8KkneVfc6iaR9grBpRij5wqhPK5XwxS7ohNhJ5tH8DEoL77j32"
      ]
    ]
  }
}
```

返回参数:

id: 账户ID

name: 账户名称

public\_data: 注册账户时添加的公开数据

owner\_key: 拥有者公钥

active\_key\_history: 活跃公钥历史

registration\_date: 注册时间

last\_update: 账户信息最近一次更新时间

delegate\_info: 代理信息结构体

meta\_data: 保留字段

查询**blockchain**的信息和设定参数

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "1",
  "method": "blockchain_get_info"
}
```

请求方法: blockchain\_get\_info

请求参数: 无

Response Result:

```
{
  "id": "1",
  "result": {
    "db_version": "201",
    "symbol_size_min": "3",
    "block_interval": "10",
    "max_delegate_pay_issued_per_block": "507977",
    "memo_size_max": "51",
    "symbol_size_max": "8",
    "statistics_enabled": false,
    "max_pending_queue_size": "1000",
    "genesis_timestamp": "2015-05-31T16:00:00",
    "delegate_num": "99",
    "name_size_max": "63",
    "symbol": "HSR",
    "short_symbol_asset_reg_fee": "5000000000",
    "data_size_max": "65536",
    "address_prefix": "HSR",
    "max_trx_per_second": "100",
    "asset_shares_max": "1000000000000000",
    "long_symbol_asset_reg_fee": "50000000",
    "blockchain_id": "94beaf23764844cae3e1f368273d0dddc8bc06c575c0cf6578bcb1f2012e7694",
    "name": "HSRs",
    "max_delegate_reg_fee": "122181818",
    "relay_fee": "1000"
  }
}
```

返回参数:

blockchain\_id: 创世快id号

name: blockchain的名称

symbol: 资产符号

address\_prefix: 地址前缀

db\_version: blockchain的数据版本

genesis\_timestamp: 创世快的创建时间

block\_interval: 出块时间间隔

delegate\_num: 代理总数

max\_delegate\_pay\_issued\_per\_block: 代理最大可领取HSR数量

max\_delegate\_reg\_fee: 注册为代理所需费用

name\_size\_max: 注册用户名称最大长度限制

memo\_size\_max: 备注长度限制

data\_size\_max: 用户公开数据最大长度

symbol\_size\_max: 资产符号最大长度

symbol\_size\_min: 资产符号最小长度

asset\_shares\_max: 资产发行数量最大限制

short\_symbol\_asset\_reg\_fee: 最短注册符号注册费用

long\_symbol\_asset\_reg\_fee: 最长符号注册费用

statistics\_enabled: 是否打开统计模式

relay\_fee: 所需手续费

max\_pending\_queue\_size: 区队列最大长度

max\_trx\_per\_second: 最大每秒交易数

返回当前基础资产分配的快照

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "filename"
  ],
  "id": "2",
  "method": "blockchain_generate_snapshot"
}
```

请求方法: blockchain\_generate\_snapshot

请求参数: 导出资产文档存放的位置

Response Result:

```
{
  "id": "2",
  "result": null
}
```

返回参数:

无:

传回是否本地区块链已经和网络同步的信息

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "2",
  "method": "blockchain_is_synced"
}
```

请求方法: blockchain\_is\_synced

请求参数: 无

Response Result:

```
{
  "id": "2",
  "result": true
}
```

返回参数:

**result:** 是否同步中(已经同步的区块时间在两天以内, 就不属于同步中)

查询当前总共有多少块

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "2",
  "method": "blockchain_get_block_count"
}
```

请求方法: blockchain\_get\_block\_count

请求参数: 无

Response Result:

```
{
  "id": "2",
  "result": "5534"
}
```

返回参数:

**result:** 当前区块拥有块数

获取指定的**balance\_id**下的余额记录

调用前提: **balanceid**可从转账的时候从生成的交易单的**withdraw\_op\_type**中查看

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "balance_id"
  ],
  "id": "2",
  "method": "blockchain_get_balance"
}
```

请求方法: blockchain\_get\_balance

请求参数: 要查询的余额id

Response Result:

```
{
  "id": "2",
  "result": {
    "deposit_date": "2016-06-20T05:32:35",
    "snapshot_info": {
      "original_address": "HSRL34D5qcbMU56mRRByLFVvDVVEvZe9sVn6",
      "original_balance": "100000000000"
    },
    "last_update": "2016-06-20T06:21:30",
    "meta_data": "null",
    "balance": "196009",
    "condition": {
      "asset_id": "0",
      "slate_id": "0",
      "type": "withdraw_signature_type",
      "data": {
        "owner": "HSRL34D5qcbMU56mRRByLFVvDVVEvZe9sVn6"
      }
    }
  }
}
```

返回参数:

condition: 金额信息结构体

balance: 余额数量

snapshot\_info: 创世资产结构体

deposit\_date: 余额增加时间

last\_update: 最近balance更新时间

meta\_data: 保留字段

列出被指定公钥拥有的**balance**

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "public_key"
  ],
  "id": "2",
  "method": "blockchain_list_key_balances"
}
```

请求方法: blockchain\_list\_key\_balances

请求参数: 要查询余额的公钥

Response Result:

```
{
  "id": "2",
  "result": [
    [
      "HSRXWy8jSAkuWRoxLDKU7JL7CT6k7kP7Afc",
      {
        "deposit_date": "1970-01-01T00:04:50",
        "snapshot_info": {
          "original_address": "HDCGYdWzXebgRHHyQL8Zhgkq6fHFaoBVYi",
          "original_balance": "1000000000000"
        },
        "last_update": "2016-03-28T06:58:50",
        "meta_data": null,
        "balance": "1000000200000",
        "condition": {
          "asset_id": "0",
          "slate_id": "0",
          "type": "withdraw_signature_type",
          "data": {
            "owner": "HDCGYdWzXebgRHHyQL8Zhgkq6fHFaoBVYi"
          }
        }
      }
    ]
  ]
}
```

返回参数:

在所有数据前的数据，没有数据名称的字段: balanceid

condition: 金额信息结构体

balance: 余额数量

snapshot\_info: 创世资产结构体

deposit\_date: 余额增加时间

last\_update: 最近balance更新时间

meta\_data: 保留字段

列出被指定地址拥有的**balance**

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "public_key"
  ],
  "id": "2",
  "method": "blockchain_list_address_balances"
}
```

请求方法: blockchain\_list\_address\_balances

请求参数: 要查询余额的地址

Response Result:



```

{
  "id": "2",
  "result": [
    [
      "HSRNxWy8jSAkuWRoxLDKU7JL7CT6k7kP7Afc",
      {
        "deposit_date": "1970-01-01T00:04:50",
        "snapshot_info": {
          "original_address": "HDCGYdWzXebgRHHyQL8Zhgkq6fHFaoBVYi",
          "original_balance": "1000000000000"
        },
        "last_update": "2016-03-28T06:58:50",
        "meta_data": null,
        "balance": "1000000200000",
        "condition": {
          "asset_id": "0",
          "slate_id": "0",
          "type": "withdraw_signature_type",
          "data": {
            "owner": "HDCGYdWzXebgRHHyQL8Zhgkq6fHFaoBVYi"
          }
        }
      }
    ]
  ]
}

```

返回参数:

在所有数据前的数据, 没有数据名称的字段: balanceid

condition: 金额信息结构体

balance: 余额数量

snapshot\_info: 创世资产结构体

deposit\_date: 余额增加时间

last\_update: 最近balance更新时间

meta\_data: 保留字段

传回已注册的帐号名称, 从指定的帐号名称开始, 直到所提供的数量上限结束

调用前提: 无

Request:

```

{
  "jsonrpc": "2.0",
  "params": [
    "first",
    "limit"
  ],
  "id": "2",
  "method": "blockchain_list_accounts"
}

```

请求方法: blockchain\_list\_accounts

请求参数: 其实查找首字母, 默认为"a"、 查找数量, 默认为20

Response Result:

```
{
  "id": "2",
  "result": [
    {
      "owner_key": "HSR6vBWNEsnNS5rMXSHsXLDxp3mMyBZd5M9gAgtMbvLevHQVrCgYY",
      "name": "hsr0",
      "registration_date": "2015-05-31T16:00:00",
      "last_update": "2015-05-31T16:00:00",
      "delegate_info": {
        "pay_balance": "20288476",
        "total_burned": "0",
        "blocks_missed": "804",
        "pay_rate": "100",
        "votes_for": "20288476",
        "blocks_produced": "64",
        "last_block_num_produced": "5645",
        "total_paid": "20288476",
        "signing_key_history": [
          [
            "0",
            "HSR6vBWNEsnNS5rMXSHsXLDxp3mMyBZd5M9gAgtMbvLevHQVrCgYY"
          ]
        ],
        "next_secret_hash": "4e549122f53e486cd2f5741965bcb030f6c714bc"
      },
      "public_data": null,
      "id": "1",
      "active_key_history": [
        [
          "2015-05-31T16:00:00",
          "HSR6vBWNEsnNS5rMXSHsXLDxp3mMyBZd5M9gAgtMbvLevHQVrCgYY"
        ]
      ]
    }
  ]
}
```

返回参数:

id: 账户ID

name: 账户名称

public\_data: 注册账户时添加的公开数据

owner\_key: 拥有者公钥

active\_key\_history: 活跃公钥历史

registration\_date: 注册时间

last\_update: 账户信息最近一次更新时间

delegate\_info: 代理信息结构体

meta\_data: 保留字段

传回尚未收录进区块的交易列表信息发送消息

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "2",
  "method": "blockchain_list_pending_transactions"
}
```

请求方法: blockchain\_list\_pending\_transactions

请求参数: 无

Response Result:

```

{
  "id": "2",
  "result": [
    {
      "hsr_inport_asset": {
        "asset_id": "0",
        "amount": "100000"
      },
      "operations": [
        {
          "type": "withdraw_op_type",
          "data": {
            "claim_input_data": "",
            "amount": "101000",
            "balance_id": "HSR5wSdt5BF3oDXAYXoRJdWnw6Dzr8pc9vC"
          }
        },
        {
          "type": "deposit_op_type",
          "data": {
            "amount": "100000",
            "condition": {
              "asset_id": "0",
              "slate_id": "0",
              "type": "withdraw_signature_type",
              "data": {
                "owner": "HDCGYdWzXebgRHHyQL8Zhkgkq6fHFaoBVYi"
              }
            }
          }
        }
      ],
      "signatures": [
        "205c194f49a821cc7f9884356c89117332c3867967f09d22f0920a2deccf0a64a84c5252b0dde7972dfc905d407a3c8a7"
      ],
      "expiration": "2016-03-28T08:43:34",
      "hsr_account": "HDCGYdWzXebgRHHyQL8Zhkgkq6fHFaoBVYi"
    }
  ]
}

```

返回参数:

expiration: 交易过期时间

hsr\_account: 交易入账方

hsr\_inport\_asset: 交易入账结构体

operations: 操作结构

signatures: 签名

获取一笔区块链上转帐的详细信息交易

调用前提: 无

Request:

```

{
  "jsonrpc": "2.0",
  "params": [
    "transaction_id_prefix",
    "exact"
  ],
  "id": "2",
  "method": "blockchain_get_transaction"
}

```

请求方法: blockchain\_get\_transaction

请求参数: 交易id、是否精确查找, 默认false

Response Result:

```

{
  "id": "2",
  "result": [
    "66294adf274750ba2cd312b13aa81cc0bee71ba6",
    {
      "withdraws": [
        [
          "0",
          "100000001000"
        ]
      ],
      "imessage_length": "0",
      "deltas": [
        [
          "0",
          [
            [
              "0",
              "-100000001000"
            ]
          ]
        ],
        [
          "1",
          [
            [
              "0",
              "100000000000"
            ]
          ]
        ]
      ],
      "required_fees": {
        "asset_id": "0",
        "amount": "0"
      },
      "alt_fees_paid": {
        "asset_id": "0",
        "amount": "0"
      },
      "deposits": [
        [
          "0",
          "100000000000"
        ]
      ],
      "yield": [],
      "trx": {
        "hsr_inport_asset": {
          "asset_id": "0",
          "amount": "0"
        },
        "operations": [
          {
            "type": "withdraw_op_type",
            "data": {
              "claim_input_data": "",
              "amount": "100000001000",
              "balance_id": "HSRMPUsyR4Qiomu2r6GvGNFyNxozQB7oJXfr"
            }
          },
          {
            "type": "deposit_op_type",
            "data": {
              "amount": "100000000000",
              "condition": {
                "asset_id": "0",
                "slate_id": "0",
                "type": "withdraw_signature_type",
                "data": {
                  "owner": "HSRGb4Dbh82jY8Q5JrvNmCcsjgdZcawCD5Ex"
                }
              }
            }
          }
        ]
      },
      "signatures": [
        "1f109eaf6f4e95914b6a51bb5c8cbf67992ed3b9d575da7a34ed1f63aa1b0eeea7571ce2cebf18c253d1e4208de1f30f7"
      ],
      "expiration": "2016-03-22T08:11:00",
      "hsr_account": ""
    },
    "signed_keys": [],
    "chain_location": {
      "trx_num": "0",
      "block_num": "1277"
    },
    "delegate_vote_deltas": [],
    "balance": [
      [
        "0",
        "1000"
      ]
    ]
  ]
}

```

返回参数:

trx\_id: 交易id

trx: 详细交易数据

signed\_keys: 签名

deposits: 入账资产

withdraws: 出账资产

yield: 保留参数

deltas: 保留参数

required\_fees: 保留字段

alt\_fees\_paid: 保留字段

balance: 保留字段

delegate\_vote\_deltas: 保留参数

imessage\_length: 备注长度

chain\_location: 交易位置结构体

返回指定范围区块的详细信息

调用前提：无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "max_block_num",
    "limit"
  ],
  "id": "26",
  "method": "blockchain_list_blocks"
}
```

请求方法：blockchain\_list\_blocks

请求参数：显示到这个区块号为止、返回条目数

Response Result:

```
{
  "latency": "0",
  "user_transaction_ids": [
    "f7f984386f2cee6cb806e06ab1a5e955c04273a3",
    "f7f8b372d625c99267b5e7e04c42ac004885b102",
    "f7f0d80434c1f7618a084c5423e29bbd2ce49a1e",
    "f7ee970b029dde86ca053ce0976e3bc6112a0c78",
    "f7eac3727f9c4c0d49ee9d8116cfe0e7f5092254",
    "f7eab200cdee190c92a794253318ae533ca901d0",
    "f7e547f8bce59018a8fe504fae182548d560770b",
    "f7e03864045770f8a2eca96b2680a5cd7953a0b4",
    "f7db395033d208ba338391edb9f027c9a396dd48",
    "f7db2bbe686d4eb8682ad828a8f0e7e060e3b523",
    "f7dad29228c81987496edc3b3413cfc825b409e4",
    "f7c6af7fe6f9422b137af95cbf869dff89027cce",
    "f0b3bffd483f2a243502f83b143e1baa90833013",
    "cb896307d7cc7651a3e1f3853b65d254b2958b20",
    "975f8398135d3b90c9662a516d323a2e06b82fd1",
    "876de39d1f96f493788fa946d95a86c330d40669",
    "86ce132074b4735cfa7fdc89b3440527818c7b27",
    "6c56aa35222d8fb891ab0a073a80a14ffa6360f",
    "6049c81451031be300a9eb5b928f3b9369955cec",
    "534c39ed29294e00e73262b56311cc7f715817a0",
    "48f1ef67e7806cb5d8550cc7bc94fdd9d871ba00",
    "3852885967c249ea3f52b25a71e7b62e3093ffe9",
    "127b092d5df103a3bb5a185d48269befabcb5108",
    "01628269891f5293672b038a3e9f681211650490"
  ],
  "delegate_signature":
    "206631beee6020ee31c99c93e16171db60560263acbaa38d81c2cef2a79989d4ea53a019ba35f213a81eb66f07b250c9a",
  "signee_fees_collected": "0",
  "processing_time": "0",
  "timestamp": "2016-03-11T08:32:20",
  "signee_shares_issued": "0",
  "block_num": "1020",
  "previous_secret": "f0f100f90dc73c2ef9d0bd398e9513d65b2f51a7",
  "next_secret_hash": "b37d87e09b6d112c220a9651db24edd475c9f465",
  "signee_fees_destroyed": "0",
  "transaction_digest": "bdaae5cf29f597a1ec84435377e7e30f351c44abd553f4394dc7feb6b7139ce",
  "random_seed": "0000000000000000000000000000000000000000",
  "block_size": "3886",
  "id": "699a6bd96d6df589a63bc61621ad3a82a8016081",
  "previous": "87f4ffd55d673ebb99d9d377afb957ccb35cb0ac"
}
```

返回参数:

previous: 上一区块的hash

block\_num: 当前区块的块号

timestamp: 区块发布时间

transaction\_digest: 所有块中交易ID的hash

next\_secret\_hash: 下一轮出块凭证

previous\_secret: 本轮展示出块凭证

delegate\_signature: 代理签名

user\_transaction\_ids: 区块包含所有交易的ID集合

id: 区块的ID

block\_size: 区块大小

latency: 保留字段

signee\_shares\_issued: 保留字段

signee\_fees\_collected: 保留字段

signee\_fees\_destroyed: 保留字段

random\_seed: 保留字段

processing\_time: 保留字段

添加或者删除一个节点的连接

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "node",
    "command"
  ],
  "id": "1",
  "method": "network_add_node"
}
```

请求方法: network\_add\_node

请求参数: 添加或者删除的ip和端口号、 对于该节点的操作方式

Response Result:

```
{
  "id": "1",
  "result": "null"
}
```

返回参数:

无:

获取节点当前连接数

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "1",
  "method": "network_get_connection_count"
}
```

请求方法: network\_get\_connection\_count

请求参数: 无

Response Result:

```
{
  "id": "1",
  "result": "1"
}
```

返回参数:

result冒号后的字段: 当前节点连接数

传回每一个已经连接的节点信息

调用前提: 返回的是一组数据

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "hide_firewalled_nodes"
  ],
  "id": "1",
  "method": "network_get_peer_info"
}
```

请求方法: network\_get\_peer\_info

请求参数: 是否只输出防火墙之后的节点, 默认false

Response Result:

```
{
  "id": "2",
  "result": [
    {
      "lastsend": "1466573207",
      "hshare_git_revision_sha": "1.2 (same as ours)",
      "conntime": "2016-06-22T05:22:33",
      "addrlocal": "10.23.3.161:60555",
      "hshare_git_revision_age": "1 years6 months ago (same as ours)",
      "fc_git_revision_age": "46 years ago (same as ours)",
      "current_head_block_number": "689",
      "fc_git_revision_sha": "0 (same as ours)",
      "pingwait": "",
      "current_head_block": "1dea351ba0d6fc22958ebc1e45ba9c68c7e20333",
      "addr": "119.254.161.28:60555",
      "hshare_git_revision_unix_timestamp": "2015-01-08T18:02:32",
      "lastrecv": "1466573207",
      "platform": "win32",
      "firewall_status": "firewalled",
      "pingtime": "",
      "bytesrecv": "7696",
      "bytessent": "2288",
      "startingheight": "",
      "inbound": false,
      "version": "",
      "current_head_block_time": "2016-06-22T05:26:50",
      "services": "00000001",
      "subver": "hshare_client",
      "syncnode": "",
      "fc_git_revision_unix_timestamp": "1970-01-01T00:00:00",
      "banscore": ""
    }
  ]
}
```

返回参数:

addr: 连接的节点的ip和端口号

addrlocal: 本地节点的ip和端口号

services: 保留字段

lastsend: 最后一次发送时间

lastrecv: 最后一次接收时间

bytessent: 发送字节数

bytesrecv: 接受字节数

conntime: 连接时间

pingtime: 保留字段

pingwait: 保留字段

version: 版本

subver: 保留字段

inbound: 保留字段

firewall\_status: 防火墙状态

startingheight: 保留字段

banscore: 保留字段

syncnode: 保留字段

hshare\_git\_revision\_sha: git版本



hshare\_git\_revision\_unix\_timestamp: git时间戳

hshare\_git\_revision\_age: git版本时间长度

fc\_git\_revision\_sha: fc库的版本

fc\_git\_revision\_unix\_timestamp: fc库的git时间戳

fc\_git\_revision\_age: fc库的git版本时间长度

platform: 平台

current\_head\_block\_number: 当前块的高度

current\_head\_block: 当前块的hash

current\_head\_block\_time: 当前块的时间

获取当前网络信息

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "26",
  "method": "network_get_info"
}
```

请求方法: network\_get\_info

请求参数: 无

Response Result:

```
{
  "id": "26",
  "result": {
    "listening_on": "0.0.0.0:60696",
    "node_public_key":
      "03dafc378c8a22d136b338a3913bb0acbe551f970d0af1d0955861a7103eb17252",
    "node_id": "6819fe268e09df3ce4a90ab543fb98cc42390a986e5f5037921e911b437b06b23b",
    "firewalled": "firewalled"
  }
}
```

返回参数:

listening\_on: 客户端监听的地址和端口

node\_public\_key: 节点与节点之间加密通讯使用的公钥（程序第一次启动创建）

node\_id: 每次启动客户端都会重新生成一个，为了可以多次连接同一个节点

firewalled: 是否在防火墙后面

获取潜在连接点列表

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "26",
  "method": "network_list_potential_peers"
}
```

请求方法: network\_list\_potential\_peers

请求参数: 无

Response Result:

```
{
  "id": "26",
  "result": [
    {
      "endpoint": "59.108.127.182:60666",
      "last_connection_attempt_time": "2016-06-22T02:17:47",
      "last_error": {
        "message": "unspecified",
        "code": "0",
        "name": "exception",
        "stack": [
          {
            "data": {
              "message": "????????????(3??/?????/???)????????P?"
            },
            "context": {
              "thread_name": "asio",
              "level": "error",
              "timestamp": "2016-06-21T04:16:03",
              "hostname": "",
              "file": "asio.cpp",
              "line": "60",
              "method": "fc::asio::detail::error_handler"
            },
            "format": "${message} "
          }
        ]
      },
      "number_of_failed_connection_attempts": "5",
      "last_seen_time": "2016-06-22T05:18:17",
      "last_connection_disposition": "last_connection_succeeded",
      "number_of_successful_connection_attempts": "10"
    },
    {
      "endpoint": "119.254.161.28:60666",
      "last_connection_attempt_time": "2016-06-22T02:17:49",
      "last_error": {
        "message": "unspecified",
        "code": "0",
        "name": "exception",
        "stack": [
          {
            "data": {
              "peer": "119.254.161.28:60666",
              "status": "connecting",
              "timeout": "10",
              "sent": "0",
              "received": "0"
            },
            "context": {
              "thread_name": "p2p",
              "level": "warn",
              "timestamp": "2016-06-20T06:55:21",
              "hostname": "",
              "file": "Node.cpp",
              "line": "1256",
              "method": "hshare::net::detail::NodeImpl::terminate_inactive_connections_loop"
            },
            "format": "Terminating handshaking connection due to inactivity of ${timeout} seconds. Negotiating status: ${status}, bytes sent: ${sent}, bytes received: ${received}"
          }
        ]
      },
      "number_of_failed_connection_attempts": "5",
      "last_seen_time": "2016-06-22T05:18:17",
      "last_connection_disposition": "last_connection_succeeded",
      "number_of_successful_connection_attempts": "10"
    }
  ]
}
```

返回参数:

endpoint: 潜在节点IP

last\_seen\_time: 上一次节点出现时间

last\_connection\_disposition: 上次连接的状态

last\_connection\_attempt\_time: 上次尝试连接时间

number\_of\_successful\_connection\_attempts: 成功连接的数量

number\_of\_failed\_connection\_attempts: 失败连接的数量

last\_error: 保留字段

查询UPNP基本信息

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "26",
  "method": "network_get_upnp_info"
}
```

请求方法: network\_get\_upnp\_info

请求参数: 无

Response Result:

```
{
  "id": "26",
  "result": {
    "external_ip": "0.0.0.0",
    "upnp_enabled": true,
    "mapped_port": "0"
  }
}
```

返回参数:

upnp\_enabled: 是否启动upnp

external\_ip: 本地监听IP

mapped\_port: 映射端口号

以指定名称创建钱包

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "wallet_name",
    "password",
    ""
  ],
  "id": "3",
  "method": "wallet_create"
}
```

请求方法: wallet\_create

请求参数: 创建钱包名称、 创建密码

Response Result:

```
{
  "id": "1",
  "result": "null"
}
```

返回参数:

无:

获取钱包信息

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "1",
  "method": "wallet_get_info"
}
```

请求方法: wallet\_get\_info

请求参数: 无

Response Result:

```
{
  "id": "1",
  "result": {
    "scan_progress": "1.0000000000000000",
    "data_dir": "e:/hsrtest/3/wallets",
    "name": "op",
    "unlocked": true,
    "last_scanned_block_num": null,
    "open": true,
    "transaction_expiration_secs": "3600",
    "unlocked_until_timestamp": "2016-03-28T07:29:49",
    "automatic_backups": true,
    "version": "109",
    "transaction_scanning_enabled": false,
    "transaction_fee": {
      "asset_id": "0",
      "amount": "1000"
    },
    "num_scanning_threads": "4",
    "unlocked_until": "3598",
    "last_scanned_block_timestamp": null
  }
}
```

返回参数:

data\_dir: 文件路径

num\_scanning\_threads: 扫描线程数

open: 钱包是否打开

name: 钱包名称

automatic\_backups: 是否开启自动备份

transaction\_scanning\_enabled: 交易扫描是否开启

last\_scanned\_block\_num: 上一个扫描块号

last\_scanned\_block\_timestamp: 上一个扫描块时间

transaction\_fee: 钱包默认交易手续费

transaction\_expiration\_secs: 经多少时间交易过期

unlocked: 钱包是否解锁

unlocked\_until: 钱包解锁状态所剩的秒数

unlocked\_until\_timestamp: 钱包重新锁上的时间

scan\_progress: 扫描进程

version: 钱包版本

如果目前的钱包是打开的就关闭它

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "6",
  "method": "wallet_close"
}
```

请求方法: wallet\_close

请求参数: 无

Response Result:

```
{
  "id": "6",
  "result": "null"
}
```

返回参数:

无:

打开指定名称的钱包

调用前提: 当前指定名称的钱包名称已经存在

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "wallet_name"
  ],
  "id": "2",
  "method": "wallet_open"
}
```

请求方法: wallet\_open

请求参数: 输入钱包名称

Response Result:

```
{
  "id": "6",
  "result": "null"
}
```

返回参数:

无:

解锁钱包内的私钥以启用支付操作

调用前提: 钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "timeout",
    "password"
  ],
  "id": "17",
  "method": "wallet_unlock"
}
```

请求方法: wallet\_unlock

请求参数: 解锁过期时间、 密码

Response Result:

```
{
  "id": "4",
  "result": "op"
}
```

返回参数:

无:

将私钥导入本地钱包中,并传回其所导入的真实帐号

调用前提: 钱包打开且钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "wif_key_to_import",
    "account_name",
    "create_account",
    "wallet_rescan_blockchain"
  ],
  "id": "5",
  "method": "wallet_import_private_key"
}
```

请求方法: wallet\_import\_private\_key

请求参数: 要导入的私钥、 导入账户的名称、 是否需要创建新账户、 是否重新扫描新钱包

Response Result:

```
{
  "id": "5",
  "result": "aa"
}
```

返回参数:

result冒号后的字段: 导入账户名称

将当前的钱包数据导出为一个**JSON** 文件

调用前提: 钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "filename"
  ],
  "id": "7",
  "method": "wallet_backup_create"
}
```

请求方法: wallet\_backup\_create

请求参数: 备份存储路径

Response Result:

```
{
  "id": "6",
  "result": "null"
}
```

返回参数:

无:

用备份的**JSON** 文件创建(复原)一个新的钱包

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "filepath",
    "wallet_name",
    "password"
  ],
  "id": "8",
  "method": "wallet_backup_restore"
}
```

请求方法: wallet\_backup\_restore

请求参数: 钱包备份文件的路径、 钱包名称、 备份钱包的密码

Response Result:

```
{
  "id": "8",
  "result": "null"
}
```

返回参数:

无:

设置钱包是否开启自动备份功能并返回设置后的状态

调用前提: 钱包打开, 当你创建账户时候, 自动备份如果开启, 就会自动创建一个备份

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "enabled"
  ],
  "id": "9",
  "method": "wallet_set_automatic_backups"
}
```

请求方法: wallet\_set\_automatic\_backups

请求参数: 是否开启自动备份功能

Response Result:

```
{
  "id": "9",
  "result": false
}
```

返回参数:

result冒号后的字段: 钱包当前备份是否自动开启的状态

设置交易过期时间并返回设置后的过期时间

调用前提：钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "per_sec"
  ],
  "id": "10",
  "method": "wallet_set_transaction_expiration_time"
}
```

请求方法：wallet\_set\_transaction\_expiration\_time

请求参数：超时时间以秒计数

Response Result:

```
{
  "id": "10",
  "result": "3600"
}
```

返回参数:

result冒号后的字段: 当前交易的超时时间

列出指定帐号的交易历史

调用前提：钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "account_name",
    "asset_symbol",
    "limit",
    "start_block_num",
    "end_block_num"
  ],
  "id": "11",
  "method": "wallet_account_transaction_history"
}
```

请求方法：wallet\_account\_transaction\_history

请求参数：账户名称默认值是空、资产标示默认值是空、返回的交易数量上限默认值是0，0代表没有限制、开始查询的block编号，默认值为0、结束的block编号默认值为-1，代表着返回到当前块的交易

Response Result:



```

{
  "id": "26",
  "result": [
    {
      "is_market": false,
      "fee": {
        "asset_id": "0",
        "amount": "1000"
      },
      "is_confirmed": true,
      "is_market_cancel": false,
      "timestamp": "2016-06-21T03:20:20",
      "is_virtual": false,
      "block_num": "462950",
      "ledger_entries": [
        {
          "from_account": "hsr6",
          "amount": {
            "asset_id": "0",
            "amount": "1000000000"
          },
          "running_balances": [
            [
              "sy234",
              [
                [
                  "0",
                  {
                    "asset_id": "0",
                    "amount": "1000000000"
                  }
                ]
              ]
            ]
          ],
          "memo": "",
          "to_account": "sy234"
        }
      ],
      "trx_id": "78d148258f0488e12c7ad59d02a5700cd7cf194a",
      "expiration_timestamp": "2016-06-21T04:20:06"
    }
  ]
}

```

返回参数:

is\_virtual: 保留字段

is\_confirmed: 交易是否被确认

is\_market: 保留字段

is\_market\_cancel: 保留字段

trx\_id: 交易单号

block\_num: 交易被确认的区块

ledger\_entries: 交易解析

fee: 交易支付的手续费

timestamp: 交易创建时间

expiration\_timestamp: 交易失效时间

根据出入账查询交易记录

调用前提: 钱包打开

Request:

```

{
  "jsonrpc": "2.0",
  "params": [
    "account_name",
    "asset_symbol",
    "limit",
    "transaction_type"
  ],
  "id": "26",
  "method": "wallet_transaction_history_splite"
}

```

请求方法: wallet\_transaction\_history\_splite

请求参数：用户名、资产标识、条数限制、交易类型

Response Result:

```
{
  "id": "26",
  "result": [
    {
      "is_market": false,
      "fee": {
        "asset_id": "0",
        "amount": "1000"
      },
      "is_confirmed": true,
      "is_market_cancel": false,
      "timestamp": "2016-06-21T03:20:20",
      "is_virtual": false,
      "block_num": "462950",
      "ledger_entries": [
        {
          "from_account": "hsr6",
          "amount": {
            "asset_id": "0",
            "amount": "1000000000"
          },
          "running_balances": [
            [
              "sy234",
              [
                [
                  "0",
                  {
                    "asset_id": "0",
                    "amount": "1000000000"
                  }
                ]
              ]
            ]
          ],
          "memo": "",
          "to_account": "sy234"
        }
      ],
      "trx_id": "78d148258f0488e12c7ad59d02a5700cd7cf194a",
      "expiration_timestamp": "2016-06-21T04:20:06"
    }
  ]
}
```

返回参数:

is\_virtual: 保留字段

is\_confirmed: 交易是否被确认

is\_market: 保留字段

is\_market\_cancel: 保留字段

trx\_id: 交易单号

block\_num: 交易被确认的区块

ledger\_entries: 交易解析

fee: 交易支付的手续费

timestamp: 交易创建时间

expiration\_timestamp: 交易失效时间

获取当前**pending**区所有错误记录

调用前提：钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "filepath"
  ],
  "id": "26",
  "method": "wallet_get_pending_transaction_errors"
}
```

请求方法: `wallet_get_pending_transaction_errors`

请求参数: 文件路径

Response Result:

```

{
  "id": "26",
  "result": [
    [
      "d128986f41ada51d4937171047acc33781c8f321",
      {
        "message": "expired transaction",
        "code": "31010",
        "name": "expired_transaction",
        "stack": [
          {
            "data": {
              "_current_state->now()": "2016-06-23T09:07:50",
              "trx_arg": {
                "hsr_import_asset": {
                  "asset_id": "0",
                  "amount": "0"
                },
                "operations": [
                  {
                    "type": "withdraw_op_type",
                    "data": {
                      "claim_input_data": "",
                      "amount": "101000",
                      "balance_id":
"HSR5Bf23THE4RowzQqWAKn7PkmzJdgUWHDJV"
                    }
                  },
                  {
                    "type": "deposit_op_type",
                    "data": {
                      "amount": "100000",
                      "condition": {
                        "asset_id": "0",
                        "slate_id": "0",
                        "type": "withdraw_signature_type",
                        "data": {
                          "owner":
"HSRM3rr9yc2MB5GQRdBVY2Q5baF1FRBU8gG6"
                        }
                      }
                    }
                  }
                ]
              },
              "signatures": [
                "2044d58b6e469f0f075a2faade9d806477aaa134f749a1b9bce25e3455ab8b9f6015bcaa40cf74276fdcf084c6c76dc7e"
              ],
              "expiration": "2016-06-23T09:03:43",
              "hsr_account": ""
            },
            "expired_by_sec": "247"
          },
          "context": {
            "thread_name": "th_a",
            "level": "error",
            "timestamp": "2016-06-23T09:07:51",
            "hostname": "",
            "file": "TransactionEvaluationState.cpp",
            "line": "152",
            "method":
"hshare::blockchain::TransactionEvaluationState::evaluate"
          },
          "format": ""
        ],
        {
          "data": {
            "trx_arg": {
              "hsr_import_asset": {
                "asset_id": "0",
                "amount": "0"
              },
              "operations": [
                {
                  "type": "withdraw_op_type",
                  "data": {
                    "claim_input_data": "",
                    "amount": "101000",
                    "balance_id":
"HSR5Bf23THE4RowzQqWAKn7PkmzJdgUWHDJV"
                  }
                },
                {
                  "type": "deposit_op_type",
                  "data": {
                    "amount": "100000",
                    "condition": {
                      "asset_id": "0",
                      "slate_id": "0",
                      "type": "withdraw_signature_type",
                      "data": {
                        "owner":
"HSRM3rr9yc2MB5GQRdBVY2Q5baF1FRBU8gG6"
                      }
                    }
                  }
                }
              ]
            },
            "signatures": [
              "2044d58b6e469f0f075a2faade9d806477aaa134f749a1b9bce25e3455ab8b9f6015bcaa40cf74276fdcf084c6c76dc7e"
            ],
            "expiration": "2016-06-23T09:03:43",
            "hsr_account": ""
          },
          "context": {
            "thread_name": "th_a",
            "level": "warn",
            "timestamp": "2016-06-23T09:07:51",
            "hostname": "",
            "file": "TransactionEvaluationState.cpp",
            "line": "192",

```

```

        "method":
"hsare::blockchain::TransactionEvaluationState::evaluate"
    },
    "format": ""
  }
}
],
{
  "ecc6cfb278e2f10e0d77f122fa840f2160dedcc4",
  {
    "message": "expired transaction",
    "code": "31010",
    "name": "expired_transaction",
    "stack": [
      {
        "data": {
          "_current_state->now()": "2016-06-23T09:07:50",
          "trx_arg": {
            "hsr_inport_asset": {
              "asset_id": "0",
              "amount": "0"
            },
            "operations": [
              {
                "type": "withdraw_op_type",
                "data": {
                  "claim_input_data": "",
                  "amount": "101000",
                  "balance_id":
"HSR5Bf23THE4RowzQqWAKn7PkmzJdgUWHDJV"
                }
              },
              {
                "type": "deposit_op_type",
                "data": {
                  "amount": "100000",
                  "condition": {
                    "asset_id": "0",
                    "slate_id": "0",
                    "type": "withdraw_signature_type",
                    "data": {
                      "owner":
"HSRM3rr9yc2MB5GQRdBVY2Q5baF1FRBU8gG6"
                    }
                  }
                }
              }
            ]
          },
          "signatures": [
            "1f4892d2720a119b861560422ed5bab49875e8d8a4cdca3fe40ab51e54ec9449c712fc54c34bc90976e94146975601e86"
          ],
          "expiration": "2016-06-23T09:03:34",
          "hsr_account": ""
        },
        "expired_by_sec": "256"
      },
      "context": {
        "thread_name": "th_a",
        "level": "error",
        "timestamp": "2016-06-23T09:07:51",
        "hostname": "",
        "file": "TransactionEvaluationState.cpp",
        "line": "152",
        "method":
"hsare::blockchain::TransactionEvaluationState::evaluate"
      },
      "format": ""
    },
    {
      "data": {
        "trx_arg": {
          "hsr_inport_asset": {
            "asset_id": "0",
            "amount": "0"
          },
          "operations": [
            {
              "type": "withdraw_op_type",
              "data": {
                "claim_input_data": "",
                "amount": "101000",
                "balance_id":
"HSR5Bf23THE4RowzQqWAKn7PkmzJdgUWHDJV"
              }
            },
            {
              "type": "deposit_op_type",
              "data": {
                "amount": "100000",
                "condition": {
                  "asset_id": "0",
                  "slate_id": "0",
                  "type": "withdraw_signature_type",
                  "data": {
                    "owner":
"HSRM3rr9yc2MB5GQRdBVY2Q5baF1FRBU8gG6"
                  }
                }
              }
            }
          ]
        },
        "signatures": [
          "1f4892d2720a119b861560422ed5bab49875e8d8a4cdca3fe40ab51e54ec9449c712fc54c34bc90976e94146975601e86"
        ],
        "expiration": "2016-06-23T09:03:34",
        "hsr_account": ""
      },
      "context": {
        "thread_name": "th_a",
        "level": "warn",

```

```
        "timestamp": "2016-06-23T09:07:51",
        "hostname": "",
        "file": "TransactionEvaluationState.cpp",
        "line": "192",
        "method":
"hsare::blockchain::TransactionEvaluationState::evaluate"
    },
    "format": ""
}
}
}
}
}
}
}
```

返回参数:

transactionID: 交易单号

Exception: 保留字段（交易异常）

修改密码

调用前提: 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "old_passphrase",
    "passphrase"
  ],
  "id": "26",
  "method": "wallet_change_passphrase"
}
```

请求方法: wallet\_change\_passphrase

请求参数: 钱包旧密码、钱包新密码

Response Result:

```
{
  "id": "26",
  "result": "null"
}
```

返回参数:

无:

判断密码是否正确

调用前提: 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "123456789"
  ],
  "id": "19",
  "method": "wallet_check_passphrase"
}
```

请求方法: wallet\_check\_passphrase

请求参数: 待校验密码

Response Result:

```
{
  "id": "19",
  "result": true
}
```

返回参数:

**result:** 是否为正确的密码

判断一个地址是否合法

调用前提: 无

**Request:**

```
{
  "jsonrpc": "2.0",
  "params": [
    "HDCGYdWzXebgRHHyQL8Zhgkq6fHFaoBVYi"
  ],
  "id": "20",
  "method": "wallet_check_address"
}
```

请求方法: **wallet\_check\_address**

请求参数: **address** 待校验的地址

**address\_type** 类型, 0: 地址 1:账户名 (默认为0)

**Response Result:**

```
{
  "id": "19",
  "result": true
}
```

返回参数:

**result:** 是否正确的地址

创建一个账户

调用前提: 钱包解锁

**Request:**

```
{
  "jsonrpc": "2.0",
  "params": [
    "test"
  ],
  "id": "22",
  "method": "wallet_account_create"
}
```

请求方法: **wallet\_account\_create**

请求参数: 待创建的用户名

**Response Result:**

```
{
  "id": "22",
  "result": "HDCGYdWzXebgRHHyQL8Zhgkq6fHFaoBVYi"
}
```

返回参数:

addr: 创建账户地址

设置支持账户

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "hsr0",
    "1"
  ],
  "id": "23",
  "method": "wallet_account_set_approval"
}
```

请求方法: wallet\_account\_set\_approval

请求参数: 支持账户、 是否同意

Response Result:

```
{
  "id": "3",
  "result": "1"
}
```

返回参数:

result: 是否支持

转账到某个地址

调用前提: 钱包解锁, 钱包内有账户

Request:

```
{
  "jsonrpc": 2.0,
  "params": [
    "amount_to_transfer",
    "asset_symbol",
    "from_account_name",
    "to_address",
    "memo_message"
  ],
  "id": "1",
  "method": "wallet_transfer_to_address"
}
```

请求方法: wallet\_transfer\_to\_address

请求参数: 转账金额、 转账资产类型、 取钱账户、 转账到账户的地址、 备注信息

Response Result:



```
{
  "id": "26",
  "result": {
    "index": "0",
    "is_market": false,
    "fee": {
      "asset_id": "0",
      "amount": "1000"
    },
    "is_confirmed": false,
    "ledger_entries": [
      {
        "from_account": "HSR5eLFrZG5gvc5g5xqEU6J3GELp5WcQYoqhz4JBPT7BVgTpqqxbN",
        "amount": {
          "asset_id": "0",
          "amount": "100000"
        },
        "memo": "aa"
      },
      {
        "received_time": "2016-06-01T08:32:20",
        "is_virtual": false,
        "block_num": "0",
        "trx": {
          "hsr_inport_asset": {
            "asset_id": "0",
            "amount": "0"
          },
          "operations": [
            {
              "type": "withdraw_op_type",
              "data": {
                "claim_input_data": "",
                "amount": "101000",
                "balance_id": "HSRJEk1wuT9Vix4vQRidmAafz5hCWrs48un2"
              }
            },
            {
              "type": "deposit_op_type",
              "data": {
                "amount": "100000",
                "condition": {
                  "asset_id": "0",
                  "slate_id": "0",
                  "type": "withdraw_signature_type",
                  "data": {
                    "owner": "HDCGYdWzXebgRHHyQL8Zhgkq6fHFaoBVYi"
                  }
                }
              }
            }
          ]
        },
        "type": "imessage_memo_op_type",
        "data": {
          "imessage": "aa"
        }
      },
      {
        "signatures": [
          "203abaffeea2735b4f9c79bedae77143ac5da1451c92fd7390c1ae502b53578ef47b2751afa034ff7e0232e37f8fb755f"
        ],
        "expiration": "2016-06-01T09:32:19",
        "hsr_account": ""
      },
      {
        "entry_id": "0ba68a7e9945f9119cb151a2ef5ff110e4d15925",
        "created_time": "2016-06-01T08:32:20",
        "extra_addresses": [
          "HDCGYdWzXebgRHHyQL8Zhgkq6fHFaoBVYi"
        ]
      }
    ]
  }
}
```

返回参数:

index: 保留字段

entry\_id: 交易单号

block\_num: 块号

is\_virtual: 保留字段

is\_confirmed: 是否确认

is\_market: 保留字段

trx: 结构体类型名

转账到某个地址交易构建

调用前提: 钱包解锁, 钱包内有账户

Request:

```
{
  "jsonrpc": 2.0,
  "params": [
    "amount_to_transfer",
    "asset_symbol",
    "from_account_public_key",
    "to_address",
    "memo_message"
  ],
  "id": "1",
  "method": "wallet_transfer_to_address_build"
}
```

请求方法: wallet\_transfer\_to\_address\_build

请求参数: 转账金额、转账资产类型、取钱账户公钥、转账到账户的地址、备注信息

Response Result:

```
{
  "id": "26",
  "result": {
    "index": "0",
    "is_market": false,
    "fee": {
      "asset_id": "0",
      "amount": "1000"
    },
    "is_confirmed": false,
    "ledger_entries": [
      {
        "from_account": "HSR5eLFrZG5gvc5g5xqEU6J3GELp5WcQYoqhZ4JBPT7BVgTpqqxbN",
        "amount": {
          "asset_id": "0",
          "amount": "100000"
        },
        "memo": "aa"
      }
    ],
    "received_time": "2016-06-01T08:32:20",
    "is_virtual": false,
    "block_num": "0",
    "trx": {
      "hsr_inport_asset": {
        "asset_id": "0",
        "amount": "0"
      },
      "operations": [
        {
          "type": "withdraw_op_type",
          "data": {
            "claim_input_data": "",
            "amount": "101000",
            "balance_id": "HSRJek1wuT9Vix4vQRidmAafz5hCWrs48un2"
          }
        },
        {
          "type": "deposit_op_type",
          "data": {
            "amount": "100000",
            "condition": {
              "asset_id": "0",
              "slate_id": "0",
              "type": "withdraw_signature_type",
              "data": {
                "owner": "HDCGYdWzXebgRHHyQL8Zhkgq6fHFaoBVYi"
              }
            }
          }
        }
      ],
      "type": "imessage_memo_op_type",
      "data": {
        "imessage": "aa"
      }
    },
    "signatures": [
      "HDCGYdWzXebgRHHyQL8Zhkgq6fHFaoBVYi"
    ],
    "expiration": "2016-06-01T09:32:19",
    "hsr_account": ""
  },
  "entry_id": "0ba68a7e9945f9119cb151a2ef5ff110e4d15925",
  "created_time": "2016-06-01T08:32:20",
  "extra_addresses": [
    "HDCGYdWzXebgRHHyQL8Zhkgq6fHFaoBVYi"
  ]
}
```

返回参数:

index: 保留字段

entry\_id: 交易单号

block\_num: 块号

is\_virtual: 保留字段

is\_confirmed: 是否确认

is\_market: 保留字段

trx: 结构体类型名

转账到某个账户

调用前提：钱包解锁，钱包内有账户

Request:

```
{
  "jsonrpc": 2.0,
  "params": [
    "amount_to_transfer",
    "asset_symbol",
    "from_account_name",
    "to_account_name",
    "memo_message"
  ],
  "id": "1",
  "method": "wallet_transfer_to_public_account"
}
```

请求方法：wallet\_transfer\_to\_public\_account

请求参数：转账金额、转账资产类型、取钱账户、转账目的账户、备注信息

Response Result:

```
{
  "id": "26",
  "result": {
    "index": "0",
    "is_market": false,
    "fee": {
      "asset_id": "0",
      "amount": "1000"
    },
    "is_confirmed": false,
    "ledger_entries": [
      {
        "from_account": "HSR5eLFrZG5gvc5g5xqEU6J3GELp5WcQYoqhz4JBPT7BVgTpqqxbN",
        "amount": {
          "asset_id": "0",
          "amount": "100000"
        },
        "memo": "aa"
      },
      {
        "received_time": "2016-06-01T08:32:20",
        "is_virtual": false,
        "block_num": "0",
        "trx": {
          "hsr_inport_asset": {
            "asset_id": "0",
            "amount": "0"
          },
          "operations": [
            {
              "type": "withdraw_op_type",
              "data": {
                "claim_input_data": "",
                "amount": "101000",
                "balance_id": "HSRJk1wuT9Vix4vQRidmAafz5hCWrs48un2"
              }
            },
            {
              "type": "deposit_op_type",
              "data": {
                "amount": "100000",
                "condition": {
                  "asset_id": "0",
                  "slate_id": "0",
                  "type": "withdraw_signature_type",
                  "data": {
                    "owner": "HDCGYdWzXebgRHHyQL8Zhkgq6fHFaoBVYi"
                  }
                }
              }
            }
          ],
          {
            "type": "imessage_memo_op_type",
            "data": {
              "imessage": "aa"
            }
          }
        ],
        "signatures": [
          "203abaffeea2735b4f9c79bedae77143ac5da1451c92fd7390c1ae502b53578ef47b2751afa034ff7e0232e37f8fb755f"
        ],
        "expiration": "2016-06-01T09:32:19",
        "hsr_account": ""
      },
      {
        "entry_id": "0ba68a7e9945f9119cb151a2ef5ff110e4d15925",
        "created_time": "2016-06-01T08:32:20",
        "extra_addresses": [
          "HDCGYdWzXebgRHHyQL8Zhkgq6fHFaoBVYi"
        ]
      }
    ]
  }
}
```

返回参数:

index: 保留字段

entry\_id: 交易单号

block\_num: 块号

is\_virtual: 保留字段

is\_confirmed: 是否确认

is\_market: 保留字段

trx: 结构体类型名

重新扫描区块，从中提取相关交易到钱包

调用前提：钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "29",
  "method": "wallet_rescan_blockchain"
}
```

请求方法: wallet\_rescan\_blockchain

请求参数: 无

Response Result:

```
{
  "id": "29",
  "result": "null"
}
```

返回参数:

无:

取消当前区块的扫描操作

调用前提: 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "30",
  "method": "wallet_cancel_scan"
}
```

请求方法: wallet\_cancel\_scan

请求参数: 无

Response Result:

```
{
  "id": "30",
  "result": "null"
}
```

返回参数:

无:

查询交易信息

调用前提: 钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "transaction_id_prefix"
  ],
  "id": "26",
  "method": "wallet_get_transaction"
}
```

请求方法: wallet\_get\_transaction

请求参数: 交易单号

Response Result:

```
{
  "id": "26",
  "result": {
    "index": "24",
    "is_market": false,
    "fee": {
      "asset_id": "0",
      "amount": "1000"
    },
    "is_confirmed": true,
    "ledger_entries": [
      {
        "from_account": "HSR7zZSxzHsgSzmcdcMsYV9DZqAro71WrL5HnePJH5YbdQGfJRFKy",
        "amount": {
          "asset_id": "0",
          "amount": "100000"
        },
        "memo": "To: HSR8XLL7...",
        "to_account": "HSR7VpiEMUB9LSYxk3APqJg7PPi256M8TSC9vzCEQhokjYYWHQmKx"
      }
    ],
    "received_time": "2016-06-28T01:42:26",
    "is_virtual": false,
    "block_num": "477920",
    "trx": {
      "hsr_inport_asset": {
        "asset_id": "0",
        "amount": "0"
      },
      "operations": [
        {
          "type": "withdraw_op_type",
          "data": {
            "claim_input_data": "",
            "amount": "101000",
            "balance_id": "HSR5Bf23THE4RowzQqWAKn7PkmzJdgUWHDJV"
          }
        },
        {
          "type": "deposit_op_type",
          "data": {
            "amount": "100000",
            "condition": {
              "asset_id": "0",
              "slate_id": "0",
              "type": "withdraw_signature_type",
              "data": {
                "owner": "HSR8XLL78anJzHw1qeMqzHsq5Hh447wuvYro"
              }
            }
          }
        }
      ],
      "signatures": [
        "1f34cfc2598fe247a81926b7814d0a8bb1929bd9d3278143b7422fe334677a19d851f6c4e71792d60c15c8b227f93717c"
      ],
      "expiration": "2016-06-28T01:42:28",
      "hsr_account": ""
    },
    "entry_id": "58bae775e828049429e3a26b7e625072d63da374",
    "created_time": "2016-06-28T01:42:26",
    "extra_addresses": [
      "HSR8XLL78anJzHw1qeMqzHsq5Hh447wuvYro"
    ]
  }
}
```

返回参数:

index: 保留字段

entry\_id: 交易单号

block\_num: 块号

is\_virtual: 保留字段

is\_confirmed: 是否确认

is\_market: 保留字段

trx: 结构体类型名

账号注册

调用前提: 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "account_name",
    "pay_from_account",
    "public_data",
    "delegate_pay_rate",
    "account_type"
  ],
  "id": "26",
  "method": "wallet_account_register"
}
```

请求方法: wallet\_account\_register

请求参数: 要注册的账户名、支付本次注册费用的账户、公开数据、代理受托率、账户类型(保留字段)

Response Result:

```
{
  "id": "26",
  "result": {
    "index": "0",
    "is_market": false,
    "fee": {
      "asset_id": "0",
      "amount": "1000"
    },
    "is_confirmed": false,
    "ledger_entries": [
      {
        "from_account": "HSR6e57Ms177rEGt4Db8rmjYMFveXQYVunsYjjmvma73tAg1XsHxx",
        "amount": {
          "asset_id": "0",
          "amount": "0"
        },
        "memo": "register sy234",
        "to_account": "HSR6e57Ms177rEGt4Db8rmjYMFveXQYVunsYjjmvma73tAg1XsHxx"
      }
    ],
    "received_time": "2016-06-28T02:56:56",
    "is_virtual": false,
    "block_num": "0",
    "trx": {
      "hsr_inport_asset": {
        "asset_id": "0",
        "amount": "0"
      },
      "operations": [
        {
          "type": "register_account_op_type",
          "data": {
            "owner_key": "HSR6e57Ms177rEGt4Db8rmjYMFveXQYVunsYjjmvma73tAg1XsHxx",
            "name": "sy234",
            "active_key": "HSR7zZSxzHsgSzmcdcMsYV9DZqAro71WrLSHnePJH5YbdQGfJRFKy",
            "meta_data": {
              "type": "titan_account",
              "data": ""
            },
            "public_data": "",
            "delegate_pay_rate": "255"
          }
        },
        {
          "type": "withdraw_op_type",
          "data": {
            "claim_input_data": "",
            "amount": "1000",
            "balance_id": "HSR5BF23THE4RoWzQqWAKn7PkmzJdgUWHDJV"
          }
        }
      ],
      "signatures": [
        "204f4cb30eef8da006f74eb81a3991a45882117a63d9847b21cd992c82543f0a60647a0a2b4269c4baac2eb8c41d14d01"
      ],
      "expiration": "2016-06-28T02:56:58",
      "hsr_account": ""
    },
    "entry_id": "d29cee8715b8c53001a7f0b4b1f30eea781090ca",
    "created_time": "2016-06-28T02:56:56",
    "extra_addresses": []
  }
}
```

返回参数:

index: 保留字段

entry\_id: 交易单号

block\_num: 块号

is\_virtual: 保留字段

is\_confirmed: 是否确认

is\_market: 保留字段

trx: 结构体类型名

查询钱包内所有相关账户信息

调用前提：钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "26",
  "method": "wallet_list_accounts"
}
```

请求方法：wallet\_list\_accounts

请求参数：无

Response Result:



```

{
  "id": "26",
  "result": [
    {
      "index": "25",
      "owner_key": "HSR6pZUWPujhRUEPaoSBuKgWPVY3Ay3VYwFLZ33EnSreCLWRHyZ6M",
      "name": "hsr1",
      "block_production_enabled": false,
      "registration_date": "2015-05-31T16:00:00",
      "last_update": "2015-05-31T16:00:00",
      "private_data": null,
      "delegate_info": {
        "pay_balance": "71063974",
        "total_burned": "0",
        "blocks_missed": "4481",
        "pay_rate": "100",
        "votes_for": "1136147884",
        "blocks_produced": "5045",
        "last_block_num_produced": "479440",
        "total_paid": "571302974",
        "signing_key_history": [
          [
            "0",
            "HSR6pZUWPujhRUEPaoSBuKgWPVY3Ay3VYwFLZ33EnSreCLWRHyZ6M"
          ]
        ],
        "next_secret_hash": "abe20661166e5e00a583d2dccc23a25a706b190"
      },
      "last_used_gen_sequence": "0",
      "is_favorite": false,
      "public_data": null,
      "id": "2",
      "is_my_account": false,
      "approved": "1",
      "active_key_history": [
        [
          "2015-05-31T16:00:00",
          "HSR6pZUWPujhRUEPaoSBuKgWPVY3Ay3VYwFLZ33EnSreCLWRHyZ6M"
        ]
      ]
    },
    {
      "index": "27",
      "owner_key": "HSR7d6PWo9bJWbGkv1naudu9CCm8jvvpCVNevE8nXS4QmrnHTCRbn",
      "name": "hsr2",
      "block_production_enabled": false,
      "registration_date": "2015-05-31T16:00:00",
      "last_update": "2015-05-31T16:00:00",
      "private_data": null,
      "delegate_info": {
        "pay_balance": "539997745",
        "total_burned": "0",
        "blocks_missed": "4499",
        "pay_rate": "100",
        "votes_for": "1436524291",
        "blocks_produced": "5029",
        "last_block_num_produced": "479448",
        "total_paid": "569642745",
        "signing_key_history": [
          [
            "0",
            "HSR7d6PWo9bJWbGkv1naudu9CCm8jvvpCVNevE8nXS4QmrnHTCRbn"
          ]
        ],
        "next_secret_hash": "b1b022fb4831605311d5a96275332ef023f8f7fc"
      },
      "last_used_gen_sequence": "0",
      "is_favorite": false,
      "public_data": null,
      "id": "3",
      "is_my_account": false,
      "approved": "1",
      "active_key_history": [
        [
          "2015-05-31T16:00:00",
          "HSR7d6PWo9bJWbGkv1naudu9CCm8jvvpCVNevE8nXS4QmrnHTCRbn"
        ]
      ]
    },
    {
      "index": "14",
      "owner_key": "HSR6e57Ms177rEGt4Db8rmjYMFveXQYVunsYjjmvma73tAg1XsHxx",
      "name": "sy234",
      "block_production_enabled": false,
      "registration_date": "2016-06-28T02:56:50",
      "meta_data": {
        "type": "titan_account",
        "data": ""
      },
      "last_update": "2016-06-28T02:56:50",
      "private_data": null,
      "last_used_gen_sequence": "0",
      "is_favorite": false,
      "public_data": "",
      "id": "177",
      "is_my_account": true,
      "approved": "0",
      "active_key_history": [
        [
          "2016-06-28T02:56:50",
          "HSR7zZSxzHsgSzmcDcMsYV9DZqAro71WrL5HnePJH5YbdQGfJRFKy"
        ]
      ]
    },
    {
      "index": "33",
      "owner_key": "HSR5aRA9JVFD1R8TvLJpKzjXrJUCG8Wg6BWKLnHpSYpGH9qPicPMd",
      "name": "sy345",
      "block_production_enabled": false,
      "registration_date": "2016-06-28T03:59:40",
      "meta_data": {
        "type": "titan_account",
        "data": ""
      },
      "last_update": "2016-06-28T03:59:40",
    }
  ]
}

```

◀ ▶

last\_used\_gen\_sequence: 保留字段

private\_data: 保留字段

查询钱包内所有未注册的账户

调用前提：钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "26",
  "method": "wallet_list_unregistered_accounts"
}
```

请求方法: wallet\_list\_unregistered\_accounts

请求参数: 无

Response Result:

```
{
  "id": "26",
  "result": [
    {
      "index": "38",
      "owner_key": "HSR6uC6kdWehzhJV7eMkowZvw8V2tjT5GU9CKoVrsb3REp7oT4s8",
      "name": "sy678",
      "block_production_enabled": false,
      "registration_date": "1970-01-01T00:00:00",
      "last_update": "2016-06-28T06:07:18",
      "private_data": null,
      "last_used_gen_sequence": "0",
      "is_favorite": false,
      "public_data": null,
      "id": "0",
      "is_my_account": true,
      "approved": "0",
      "active_key_history": [
        [
          "2016-06-28T06:07:18",
          "HSR5R7s2UhnG97xrtKEmFpx2iq6VxV3aDpNvJn3DvtYB9tQmFzfXr"
        ]
      ]
    },
    {
      "index": "41",
      "owner_key": "HSR5YWupJFNhc6SAw33UGvBwK4cKtqC5UbZC18dwXLL1WSRimHY1s",
      "name": "sy6789",
      "block_production_enabled": false,
      "registration_date": "1970-01-01T00:00:00",
      "last_update": "2016-06-28T06:08:32",
      "private_data": null,
      "last_used_gen_sequence": "0",
      "is_favorite": false,
      "public_data": null,
      "id": "0",
      "is_my_account": true,
      "approved": "0",
      "active_key_history": [
        [
          "2016-06-28T06:08:32",
          "HSR6V7YdCqxvS4cRWzQ2YSzGwN6A15ZaNfHoZHB9AALxZB13riWrw"
        ]
      ]
    }
  ]
}
```

返回参数:

index: 钱包数据库条目ID

id: 账户ID

name: 账户名称

public\_data: 注册账户时添加的公开数据

owner\_key: 拥有者公钥

active\_key\_history: 活跃公钥历史

registration\_date: 注册时间

last\_update: 账户信息最近一次更新时间

is\_my\_account: 是否拥有私钥

approved: 是否支持该账户

is\_favorite: 保留字段

block\_production\_enabled: 是否开启产块功能

last\_used\_gen\_sequence: 保留字段

private\_data: 保留字段

列出钱包内拥有私钥的所有帐号

调用前提：钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [],
  "id": "40",
  "method": "wallet_list_my_accounts"
}
```

请求方法: wallet\_list\_my\_accounts

请求参数: 无

Response Result:

```
{
  "id": "17",
  "result": [
    {
      "index": "11",
      "owner_key": "HSR5VoZWa93vxBF9DudYMhtdDdDjJvcqpk9WJpczFAMLCJ6H7mp8a",
      "name": "hsrhzk1",
      "block_production_enabled": false,
      "registration_date": "1970-01-01T00:00:00",
      "last_update": "2016-06-28T02:20:11",
      "private_data": "null",
      "last_used_gen_sequence": "0",
      "is_favorite": false,
      "public_data": "null",
      "id": "0",
      "is_my_account": true,
      "approved": "0",
      "active_key_history": [
        [
          "2016-06-28T02:20:11",
          "HSR5VoZWa93vxBF9DudYMhtdDdDjJvcqpk9WJpczFAMLCJ6H7mp8a"
        ]
      ]
    }
  ]
}
```

返回参数:

index: 钱包数据库条目ID

id: 账户ID

name: 账户名称

public\_data: 注册账户时添加的公开数据

owner\_key: 拥有者公钥

active\_key\_history: 活跃公钥历史

registration\_date: 注册时间

last\_update: 账户信息最近一次更新时间

delegate\_info: 代理信息结构体

is\_my\_account: 是否拥有私钥

approved: 是否支持该账户

is\_favorite: 保留字段

block\_production\_enabled: 是否开启产块功能

last\_used\_gen\_sequence: 保留字段

private\_data: 保留字段

获取账户的所有类型公钥地址

调用前提: 钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": ["test"],
  "id": "40",
  "method": "wallet_account_list_public_keys"
}
```

请求方法: wallet\_list\_my\_accounts

请求参数: 账户名

Response Result:

```
{
  "id": "45",
  "result": [
    {
      "hex":
"02ab4cccd23cd77f0da3cc89ae1b224c024e73e7332e5b66a8d0c35653404fb25a",
      "native_pubkey": "H6BvyY8SSAmwjkwvHg1f6hCuKW7Wwfja49zuPtUwRuubfkWNuA",
      "native_address": "HDCGYdwzXebgRHHyQL8Zhgkq6fHFaoBVYi",
      "pts_normal_address": "Paobvu3VMiqubhXuLBkvazrJAuDdrosBHC",
      "pts_compressed_address": "PebvJNHbtY1hWDXMo3TfTh7RAjQLvjHkqB",
      "btc_normal_address": "13spnpMMbctqoRj3xh75RycEvenp4m9FfB",
      "btc_compressed_address": "17g9AHbU8S4dhwIwRYopJfsMvUyX4a3ew8"
    }
  ]
}
```

返回参数:

hex: 十六进制公钥串

native\_pubkey: 公钥

native\_address : 账户地址

pts\_normal\_address: pts非压缩地址

pts\_compressed\_address: pts压缩地址

btc\_normal\_address: btc非压缩地址

btc\_compressed\_address: btc压缩地址

获取本地钱包中或者注册到链上一个账户的地址

调用前提: 钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "account"
  ],
  "id": "43",
  "method": "wallet_get_account_public_address"
}
```

请求方法: wallet\_get\_account\_public\_address

请求参数: 账户名

Response Result:

```
{
  "id": "43",
  "result": "HSRFuj3UjtwSxMxZsebUjb6kGFLYWT43GQwkyffffffffffffffffffffffffffffffff"
}
```

返回参数:

addr: 账户地址

重命名一个未注册的账户

调用前提: 钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "currentaccount",
    "newaccount"
  ],
  "id": "45",
  "method": "wallet_account_rename"
}
```

请求方法: wallet\_account\_rename

请求参数: 当前账户名、新的账户名

Response Result:

```
{
  "id": "29",
  "result": "null"
}
```

返回参数:

无:

获取指定账户余额

调用前提: 钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "account"
  ],
  "id": "49",
  "method": "wallet_account_balance"
}
```

请求方法: wallet\_account\_balance

请求参数: 账户名

Response Result:

```
{
  "id": "49",
  "result": [
    {
      "hsr0": [
        [
          [
            "0",
            "9999999696000"
          ]
        ]
      ]
    }
  ]
}
```

返回参数:

account: 账户

asset\_id: 资产类型

balance: 当前余额

列出指定帐号的所有的余额记录**ID**

调用前提: 钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "account_name"
  ],
  "id": "50",
  "method": "wallet_account_balance_ids"
}
```

请求方法: wallet\_account\_balance\_ids

请求参数: 查询账户的用户名

Response Result:

```
{
  "id": "50",
  "result": [
    {
      "hsr0": [
        [
          "HSR6P1pnNuJR4SW7mbiAy1ibfmJwZSZLZWC",
          "HSRG7NGwoYicogH7bpZ5MDghBaTAUGzwd53Z"
        ]
      ]
    }
  ]
}
```

返回参数:

不带HSR的字段: 账户名称

账户名称后"[]"内数据: 隶属于该账户的balanceid

删除本地钱包账户

调用前提: 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "account_name"
  ],
  "id": "36",
  "method": "wallet_account_delete"
}
```

请求方法: wallet\_account\_delete

请求参数: 要删除的账户名

Response Result:

```
{
  "id": "36",
  "result": true
}
```

返回参数:

result冒号后的字段: 固定返回true

设置本地转账手续费

调用前提: 钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "fee"
  ],
  "id": "36",
  "method": "wallet_set_transaction_fee"
}
```

请求方法: wallet\_set\_transaction\_fee

请求参数: 要设置的手续费

Response Result:

```
{
  "id": "36",
  "result": {
    "asset_id": "0",
    "amount": "100"
  }
}
```

返回参数:

Asset: 当前手续费

获取当前本地转账手续费

调用前提: 钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "symbol"
  ],
  "id": "36",
  "method": "wallet_get_transaction_fee"
}
```



请求方法: `wallet_get_transaction_fee`

请求参数: 要查询的资产标识

Response Result:

```
{
  "id": "36",
  "result": {
    "asset_id": "0",
    "amount": "100"
  }
}
```

返回参数:

Asset: 当前手续费

设置本地钱包是否启用扫描

调用前提: 钱包打开

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "enable"
  ],
  "id": "36",
  "method": "wallet_set_transaction_scanning"
}
```

请求方法: `wallet_set_transaction_scanning`

请求参数: 是否启动扫描

Response Result:

```
{
  "id": "36",
  "result": true
}
```

返回参数:

result冒号后的字段: 返回当前的状态

根据本地拥有的账户的地址或者公钥获取私钥

调用前提: 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "addr"
  ],
  "id": "61",
  "method": "wallet_dump_private_key"
}
```

请求方法: `wallet_dump_private_key`

请求参数: 地址/公钥

Response Result:

```
{
  "id": "61",
  "result": "5JfeSoRUiosgA9kzcPTwmUZs6rEnYPz4iSqGHc9uKcscdjC96g9"
}
```

返回参数:

private\_key: 地址

获取本地钱包指定账户私钥

调用前提: 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "account",
    "key_type"
  ],
  "id": "62",
  "method": "wallet_dump_account_private_key"
}
```

请求方法: wallet\_dump\_account\_private\_key

请求参数: 账户名、私钥类型

Response Result:

```
{
  "id": "61",
  "result": "5JfeSoRUiosgA9kzcPTwmUZs6rEnYPz4iSqGHc9uKcscdjC96g9"
}
```

返回参数:

private\_key: 地址

借由区块数或**ID** 来指定区块并获取其区块头 (**header**)信息

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    "blocknum"
  ],
  "id": "2",
  "method": "blockchain_get_block"
}
```

请求方法: blockchain\_get\_block

请求参数: 块号

Response Result:

```
{
  "id": "2",
  "result": {
    "latency": "0",
    "user_transaction_ids": [],
    "delegate_signature":
      "2002db1a3aa58e3768c794fd5295aa4a58691a294b650f6956c4edbea299df72bc282e54d762a6374765287bf7fad734c
      "signee_fees_collected": "0",
      "processing_time": "0",
      "timestamp": "2016-03-21T05:16:40",
      "signee_shares_issued": "0",
      "block_num": "1000",
      "previous_secret": "7976c83635b5bc21cac6d4d762b789f97797681d",
      "next_secret_hash": "64159580b455cd4b95a4d22670745454f3693c1d",
      "signee_fees_destroyed": "0",
      "transaction_digest":
        "c8cf12fe3180ed901a58a0697a522f1217de72d04529bd255627a4ad6164f0f0",
        "random_seed": "000000000000000000000000000000000000000000000000",
        "block_size": "166",
        "id": "2df402a360d9956d51749428815ed671cc40ea5c",
        "previous": "5071675dc378fe85a9e4e76cb90651471bb47380"
      }
  }
}
```

返回参数:

previous: 上一块hash

block\_num: 块号

timestamp: 块创建时间

transaction\_digest: 所有交易签名

next\_secret\_hash: 所有交易签名

previous\_secret: 下一轮出块凭证

delegate\_signature: 代理签名

user\_transaction\_ids: 包含所有的交易id

id: 块id

block\_size: 块大小

latency: 产块和本地同步到块时间差

signee\_shares\_issued: 保留参数

signee\_fees\_collected: 块中统计的手续费

signee\_fees\_destroyed: 块中销毁的手续费

random\_seed: 随机种子

processing\_time: 本地处理时间

获取挖矿相关信息

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
  ],
  "id": "2",
  "method": "get_mining_info"
}
```

请求方法: get\_mining\_info

请求参数: 无

Response Result:

```
{
  "id": "1",
  "result": {
    "blocks": 208,
    "currentblocksize": 175,
    "currentblocktx": 0,
    "proof_of_work": "0.00477836420759559",
    "proof_of_stake": "242.18963623046875000",
    "errors": "",
    "genproclimit": 0,
    "networkhashps": "0.000000000000000000",
    "pooledtx": 0,
    "chain": "main",
    "generate": false,
    "hashespersec": "0.000000000000000000"
  }
}
```

返回参数: blocks: 当前块高度

currentblocksize: 当前块大小

currentblocktx: 当前块中的交易

proof\_of\_work: pow的全网难度

proof\_of\_stake: pos的全网难度

errors: 保留字段

genproclimit: 当前产块线程数

networkhashps: 当前节点挖矿速度

pooledtx: 缓存中交易数量

chain: 链种类

generate: 是否挖矿

hashespersec: 本程序挖矿速率

获取当前全网难度

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
  ],
  "id": "2",
  "method": "get_difficulty"
}
```

请求方法: get\_difficulty

请求参数: 无

Response Result:

```
{
  "id": "1",
  "result": {
    "proof_of_work": "0.00342694343999028",
    "proof_of_stake": "284.94445800781250000"
  }
}
```

}

返回参数: proof\_of\_work: pow的全网难度

proof\_of\_stake: pos的全网难度

设置是否挖矿

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [true,1],
  "id": "2",
  "method": "set_generate"
}
```

请求方法: set\_generate

请求参数: is\_generate: 是否进行挖矿

procNum: 挖矿线程数（默认-1 所有线程数）

Response Result:

```
{
  "id": "1",
  "result": true
}
```

返回参数:

无:

获取**POW**工作包

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
  ],
  "id": "2",
  "method": "get_work"
}
```

请求方法: get\_work

请求参数: 无

Response Result:

```
{
  "id": "1",
  "result": {
    "hashnoNonce": "141a0988a31d29adc5759b8468e6455eefc050ff892942a21196c56194f1be6e",
    "data":
      "dd6127f3a54c1e82d9df88653c00ad4ccac9cc8ee4000000a180025ac8cf12fe3180ed901a58a0697a522f1217de72d04",
    "target": "0000011218000000000000000000000000000000000000000000000000000000"
  }
}
```

返回参数: hashnoNonce: 不包含nonce计算出的hash值

data: 块的hash数据，最后16位是nonce的16进制数据

target: 块的目标hash值

提交**pow**工作结果

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [ "hashnoNonce", 25655, 0 ],
  "id": "2",
  "method": "submit_block"
}
```

请求方法: submit\_block

请求参数: hashnoNonce: 需要提交POW工作包的hashNoNonce

Nonce: 满足结果的nonce

Extra\_Nonce: 满足结果的Nonce

Response Result:

```
{
  "id": "1",
  "result": true
}
```

返回参数: is\_success: 是否成功提交

提交**pow**工作结果

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [ "32a673590ff9f87750415bd7c2b4e7d5c9277bcf630b0000c8cf12fe3180ed901a58a0697a522f1217de72d04529bd25" ],
  "id": "2",
  "method": "submit_blockex"
}
```

请求方法: submit\_blockex

请求参数: data: 需要提交的POW数据流

```
{
  "id": "1",
  "result": true
}
```

返回参数: is\_success: 是否成功提交

设置挖矿收款人

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": ["test"],
  "id": "2",
  "method": "set_coinbase"
}
```

请求方法: set\_coinbase

请求参数: account\_name: 账户名或者地址

Response Result:

```
{
  "id": "1",
  "result": true
}
```

返回参数: is\_success: 是否设置成功

获取**pos**相关信息

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
  ],
  "id": "2",
  "method": "get_staking_info"
}
```

请求方法: get\_staking\_info

请求参数: 无

Response Result:

```
{
  "id": "1",
  "result": {
    "enabled": true,
    "currentblocksize": 175,
    "currentblocktx": 0,
    "difficulty": "541.02917480468750000",
    "weight": "34560000000",
    "netstakeweight": 0,
    "nExpectedTime": 0
  }
}
```

返回参数: enabled: 是否开启pos

currentblocksize: 当前块大小

currentblocktx: 当前块交易数量

difficulty: 当前pos难度

weight: 当前账户权重

netstakeweight: 当前网络权重

nExpectedTime: 挖到块预计需要时间

签名交易构建结构体

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    {
      "index": 0,
      "entry_id": "0000000000000000000000000000000000000000",
      "block_num": 0,
      "is_virtual": false,
      "is_confirmed": false,
      "is_market": false,
      "trx": {
        "expiration": "2017-11-16T09:50:13",
        "hsr_account": "",
        "hsr_inport_asset": {
          "amount": 0,
          "asset_id": 0
        },
        "operations": [
          {
            "type": "withdraw_op_type",
            "data": {
              "balance_id": "HG4j1GsDvd21hrnRRFobZUfUL5KkoScyTF",
              "amount": 1000000001,
              "claim_input_data": ""
            }
          },
          {
            "type": "deposit_op_type",
            "data": {
              "amount": 1000000000,
              "condition": {
                "asset_id": 0,
                "slate_id": 0,
                "type": "withdraw_signature_type",
                "balance_type": "withdraw_common_type",
                "data": {
                  "owner": "HDCGYdWzXebgRHHyQL8Zhgkq6fHFaoBVYi"
                }
              }
            }
          }
        ]
      },
      "result_trx_type": "origin_transaction",
      "result_trx_id": "0000000000000000000000000000000000000000",
      "signatures": []
    },
    {
      "ledger_entries": [
        {
          "from_account": "H6Bvyy8SSAmwjkkwvHg1f6hCuKw7Wwfja49zuPtUwRuubfkWNuA",
          "to_account": "H6Bvyy8SSAmwjkkwvHg1f6hCuKw7Wwfja49zuPtUwRuubfkWNuA",
          "amount": {
            "amount": 1000000000,
            "asset_id": 0
          },
          "memo": "To: HDCGYdWz..."
        }
      ]
    },
    {
      "fee": {
        "amount": 1,
        "asset_id": 0
      }
    },
    {
      "created_time": "1970-01-01T00:00:00",
      "received_time": "1970-01-01T00:00:00",
      "extra_addresses": [
        "HDCGYdWzXebgRHHyQL8Zhgkq6fHFaoBVYi"
      ]
    }
  ]
},
{
  "id": "45",
  "method": "sign_build_transaction"
}
```

请求方法: sign\_build\_transaction

请求参数: 交易结构体

Response Result:



```

{
  "id": "45",
  "result": {
    "index": 0,
    "entry_id": "00000000000000000000000000000000",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2017-11-16T09:50:13",
      "hsr_account": "",
      "hsr_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "withdraw_op_type",
          "data": {
            "balance_id": "HG4j1GsDvd21hrnRRFobZuFUL5KkoScyTF",
            "amount": 100000001,
            "claim_input_data": ""
          }
        },
        {
          "type": "deposit_op_type",
          "data": {
            "amount": 100000000,
            "condition": {
              "asset_id": 0,
              "slate_id": 0,
              "type": "withdraw_signature_type",
              "balance_type": "withdraw_common_type",
              "data": {
                "owner": "HDCGYdWzXebgRHHyQL8Zhkgq6fHFaoBVYi"
              }
            }
          }
        }
      ]
    },
    "result_trx_type": "origin_transaction",
    "result_trx_id": "00000000000000000000000000000000",
    "signatures": [
      "1f00a23a9558de4a22738689b82af6bdf9dd6d1828ac85d38ff74d0e12373fa58500fa1ff4083520cfc16747010d6da9c"
    ]
  },
  "ledger_entries": [
    {
      "from_account": "H6Bvyy8SSAmwjkwvHg1f6hCuKW7Wwfja49zuPtUwRuubfkWNuA",
      "to_account": "H6Bvyy8SSAmwjkwvHg1f6hCuKW7Wwfja49zuPtUwRuubfkWNuA",
      "amount": {
        "amount": 100000000,
        "asset_id": 0
      },
      "memo": "To: HDCGYdWz..."
    }
  ],
  "fee": {
    "amount": 1,
    "asset_id": 0
  },
  "created_time": "1970-01-01T00:00:00",
  "received_time": "1970-01-01T00:00:00",
  "extra_addresses": [
    "HDCGYdWzXebgRHHyQL8Zhkgq6fHFaoBVYi"
  ]
}

```

}

## 广播签名后的交易结构体

Request:

```
    { "jsonrpc": "2.0",
      "params": [ {
        "index": 0,
        "entry_id": "00000000000000000000000000000000",
        "block_num": 0,
        "is_virtual": false,
        "is_confirmed": false,
        "is_market": false,
        "trx": {
          "expiration": "2017-11-16T09:50:13",
          "hsr_account": "",
          "hsr_inport_asset": {
            "amount": 0,
            "asset_id": 0
          },
          "operations": [
            {
              "type": "withdraw_op_type",
              "data": {
                "balance_id": "HG4j1GsDvd21hrnRRFobZUfUL5KkoScyTF",
                "amount": 1000000001,
                "claim_input_data": ""
              }
            },
            {
              "type": "deposit_op_type",
              "data": {
                "amount": 1000000000,
                "condition": {
                  "asset_id": 0,
                  "slate_id": 0,
                  "type": "withdraw_signature_type",
                  "balance_type": "withdraw_common_type",
                  "data": {
                    "owner": "HDCGYdWzXebgRHHyQL8Zhgkq6fHFaoBVYi"
                  }
                }
              }
            }
          ]
        },
        "result_trx_type": "origin_transaction",
        "result_trx_id": "00000000000000000000000000000000",
        "signatures": [
          "1f00a23a9558de4a22738689b82af6bdf9dd6d1828ac85d38ff74d0e12373fa58500fa1ff4083520cfc16747010d6da9c"
        ]
      }
    ],
    "ledger_entries": [
      {
        "from_account": "H6Bvyy8SSAmwjkkwvHg1f6hCuKW7Wwfja49zuPtUwRuubfkWNuA",
        "to_account": "H6Bvyy8SSAmwjkkwvHg1f6hCuKW7Wwfja49zuPtUwRuubfkWNuA",
        "amount": {
          "amount": 1000000000,
          "asset_id": 0
        },
        "memo": "To: HDCGYdWz..."
      }
    ],
    "fee": {
      "amount": 1,
      "asset_id": 0
    },
    "created_time": "1970-01-01T00:00:00",
    "received_time": "1970-01-01T00:00:00",
    "extra_addresses": [
      "HDCGYdWzXebgRHHyQL8Zhgkq6fHFaoBVYi"
    ]
  }
},
{
  "id": "45",
  "method": "broadcast_building_transaction"
}
```

请求方法: broadcast\_building\_transaction

请求参数: 无

Response Result:

```
{
  "id": "45",
  "result": true
}
```

返回参数: 是否广播成功

开启**POS**挖矿

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
  ],
  "id": "2",
  "method": "set_pos_generate"
}
```

请求方法: set\_pos\_generate

请求参数: 无

Response Result:

```
{
  "id": "45",
  "result": true
}
```

返回参数: true 调用成功

创建**multisig**账户并对它进行转账

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [ "1", "HSR", "test", "2",
    [ "HDpDyUAWsAarcVuSoP52C1u6Rk394GUXAM", "HBciJNgEoEZGMyEzaRZ2nwQhsB36SUUPoZ", "HNP24kJzatj451waqx86py" ],
    "id": "2",
    "method": "wallet_create_multisig_account"
  ]
}
```

请求方法: wallet\_create\_multisig\_account

请求参数: amount 金额 asset\_symbol 货币种类 (HSR) from\_account 出账用户 (本地账户名)  
m 有效签名数 addresses 多签拥有者地址列表 memo\_message 备注消息

Response Result:



```
{
  "jsonrpc": "2.0",
  "params": [ "1", "HSR", "test", "MWcakeEYaucUiJ5fCb15cmKt4A75d8fbWrG", "memo" ],
  "id": "2",
  "method": "wallet_multisig_deposit"
}
```

请求方法: `wallet_multisig_deposit`

请求参数: `amount` 金额 `asset_symbol` 货币种类 (HSR) `from_account` 出账用户 (本地账户名)  
`to_address` 多签账户地址 `memo_message` 备注消息

Response Result:

::{

```
"id": "45", "result": {
```

```

    "index": 0, "entry_id": "2a9af91fdcb684d71230951e99525f24ca50be24", "block_num": 0,
    "is_virtual": false, "is_confirmed": false, "is_market": false, "trx": {

      "expiration": "2017-11-29T07:23:24", "hsr_account": "", "hsr_inport_asset": {

        "amount": 0, "asset_id": 0

      }, "operations": [

        {

          "type": "deposit_op_type", "data": {

            "amount": 100000000, "condition": {

              "asset_id": 0, "slate_id": 0, "type": "withdraw_multisig_type", "balance_type":
              "withdraw_common_type", "data": {

                "required": 2, "owners": [

                  "HBciJNgEoEZGMyEzaRZ2nwQhsB36SUUPoZ",
                  "HDpDyUAwsAarcVuSoP52C1u6Rk394GUXAM",
                  "HEbey45BfuH8o4xRddoL8J5XvZUARzT2Jb",
                  "HNP24kJzatj451waqx86pyh57TyUyWRDPx"

                ]

              }

            }

          }

        }, {

          "type": "withdraw_op_type", "data": {

            "balance_id": "HDuoActVwPnxqorzsrWJlJMVU4A5GGuYU", "amount":
            100000002, "claim_input_data": ""

          }

        }, {

          "type": "imessage_memo_op_type", "data": {

            "imessage": "memo"

          }

        }

      ], "result_trx_type": "origin_transaction", "result_trx_id":
      "0000000000000000000000000000000000000000", "signatures": [

        "20765466f45bfa028c894155b156c97f854cb9ff7314066102c9cccafffe528b4e02fbedf1090d56714d200a9cec3da0

      ]

    }, "ledger_entries": [

      {

        "from_account":

        "H5xgXe1taNAt8A98wG1WYZgjjKXQt7thvVfbQMWX4cXrZ6rxFCh", "amount": {

          "amount": 100000000, "asset_id": 0

        }, "memo": ""

      }

    ]
  }
}
```

```
    ], "fee": {  
  
        "amount": 1, "asset_id": 0  
  
    }, "created_time": "2017-11-29T06:23:24", "received_time": "2017-11-29T06:23:24",  
    "extra_addresses": [], "trx_data": ""  
  
    }  
  
}
```

返回参数: 交易结构体

导入多签账户至钱包

调用前提: 无

Request:

```
{  
  "jsonrpc": "2.0",  
  "params": [ "MWcakEYaucU1J5fCb15cmKt4A7Sd8fbWrG"  
  ],  
  "id": "2",  
  "method": "wallet_import_multisig_account"  
}
```

请求方法: wallet\_import\_multisig\_account

请求参数: multisig\_address 多签账户地址

Response Result:

```
::  
{  
  "id": "2", "result": {  
  
    "result": true, "reason": "", "requires": 2, "owners": [  
  
      "HBciJNgEoEZGMyEzaRZ2nwQhsB36SUUPoZ",  
      "HDpDyUAwsAarcVuSoP52C1u6Rk394GUXAM",  
      "HEbey45BfuH8o4xRddoL8J5XvZUARzT2Jb",  
      "HNP24kJzatj451waqx86pyh57TyUyWRDPx"  
  
    ]  
  
  }  
  
}
```

返回参数: result 导入是否成功 reason 具体原因 requires 转账需要的最小签名数 owners 多签账户的拥有者

通过详情导入多签账户至钱包

调用前提: 无

Request:

```
{  
  "jsonrpc": "2.0",  
  "params": [ "HSR", 2,  
  [ "HDpDyUAwsAarcVuSoP52C1u6Rk394GUXAM", "HBciJNgEoEZGMyEzaRZ2nwQhsB36SUUPoZ", "HNP24kJzatj451waqx86py"  
  ],  
  "id": "2",  
  "method": "wallet_import_multisig_account_by_detail"  
}
```

请求方法: wallet\_import\_multisig\_account\_by\_detail



请求参数: symbol 资产类型 requires 最小需求签名数量 addresses 多签拥有者列表

Response Result:

```
::  
  {  
  
    "id": "2", "result": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG"  
  
  }  

```

返回参数: address 多签账户地址

通过详情导入多签账户至钱包

调用前提: 无

Request:

```
{  
  "jsonrpc": "2.0",  
  "params": [  
    "0.5", "HSR", "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG", "HDpDyUAwsAarcVuSoP52C1u6Rk394GUXAM", "memo", "e:/",  
  ],  
  "id": "2",  
  "method": "wallet_multisig_withdraw_start"  
}
```

请求方法: wallet\_multisig\_withdraw\_start

请求参数: amount 金额 symbol 资产类型 from\_address 出账多签账户地址 to\_account 入账普通用户地址 memo 账户备注 builder\_path 多签出账结构体保存的文件路径

Response Result:

```
::  
  {  
  
    "id": "2", "result": {  
  
    }  
  
  }  

```

```

“transaction_entry”: {
  “index”: 0, “entry_id”: “0000000000000000000000000000000000”, “block_num”:
  0, “is_virtual”: false, “is_confirmed”: false, “is_market”: false, “trx”: {

    “expiration”: “1970-01-01T00:00:00”, “hsr_account”: “”, “hsr_inport_asset”: {

      “amount”: 0, “asset_id”: 0

    }, “operations”: [

      {

        “type”: “withdraw_op_type”, “data”: {

          “balance_id”: “MWcakEYaucUij5fCb15cmKt4A7Sd8fbWrG”, “amount”:
          50000001, “claim_input_data”: “”

        }

      }, {

        “type”: “deposit_op_type”, “data”: {

          “amount”: 50000000, “condition”: {

            “asset_id”: 0, “slate_id”: 0, “type”: “withdraw_signature_type”,
            “balance_type”: “withdraw_common_type”, “data”: {

              “owner”: “HDpDyUAwsArcVuSoP52C1u6Rk394GUXAM”

            }

          }

        }

      }

    ]

  }, “result_trx_type”: “origin_transaction”, “result_trx_id”:
  “0000000000000000000000000000000000”, “signatures”: []

}, “ledger_entries”: [], “fee”: {

  “amount”: 0, “asset_id”: 0

}, “created_time”: “1970-01-01T00:00:00”, “received_time”: “1970-01-01T00:00:00”,
“extra_addresses”: [], “trx_data”: “”

}, “required_signatures”: [

  “HBciJNgEoEZGMyEzaRZ2nwQhsB36SUUPoZ”,
  “HDpDyUAwsArcVuSoP52C1u6Rk394GUXAM”,
  “HEbey45BfuH8o4xRddoL8J5XvZUARzT2Jb”,
  “HNP24kJzatj451waqx86pyh57TyUyWRDPx”

], “outstanding_balances”: [], “memo_message”: “”

}

}

```

返回参数: transaction\_builder 多签出账结构体

根据多签**builder**结构体获取当前多签状态

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [
    {
      "transaction_entry": {
        "index": 0,
        "entry_id": "342e8d9d654f4c2c87e75a88ac32a48fbf30560b",
        "block_num": 0,
        "is_virtual": false,
        "is_confirmed": false,
        "is_market": false,
        "trx": {
          "expiration": "2017-11-29T04:22:50",
          "hsr_account": "",
          "hsr_inport_asset": {
            "amount": 0,
            "asset_id": 0
          },
          "operations": [
            {
              "type": "withdraw_op_type",
              "data": {
                "balance_id": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWnG",
                "amount": 50000001,
                "claim_input_data": ""
              }
            },
            {
              "type": "deposit_op_type",
              "data": {
                "amount": 50000000,
                "condition": {
                  "asset_id": 0,
                  "slate_id": 0,
                  "type": "withdraw_signature_type",
                  "balance_type": "withdraw_common_type",
                  "data": {
                    "owner": "HDpDyUAwsAarcVuSoP52C1u6Rk394GUXAM"
                  }
                }
              }
            }
          ]
        },
        "result_trx_type": "origin_transaction",
        "result_trx_id": "0000000000000000000000000000000000000000",
        "signatures": [
          "1f75757cb6aa10326a681bf386e09c5b48bbe308526106fe919eb77e96b3ee41007a0c1490fe7ba6497250d18e11ac81",
          "1f3fa41ede8bd2311672e1e9dba28019614c187b69649bd227e583dbc38b9da0d0423a5ca2d4dff88c13a31d49b34d354",
          "1f2a2c21affbe63db71e91d2351eb84c07f50ccbabf4bd775f8d0f835d792d8e2f4ad3fe26c0f8cbca51b338f71a0b8a4",
          "1f31fb75234f99316b5c0077e39673f447c7ad7cd5b1a2282c28382a0e2462f36b61c3b7bfda579a7ac8f775cd328a2bf"
        ]
      },
      "ledger_entries": [],
      "fee": {
        "amount": 0,
        "asset_id": 0
      },
      "created_time": "2017-11-29T03:22:50",
      "received_time": "2017-11-29T03:22:50",
      "extra_addresses": [],
      "trx_data": ""
    },
    {
      "required_signatures": [
        "HBciJNgEoEZGMyEzaRZ2nwQhsB36SUUPoZ",
        "HDpDyUAwsAarcVuSoP52C1u6Rk394GUXAM",
        "HEbey45BfuH8o4xRddoL8J5XvZUARzT2Jb",
        "HNP24kJzatj451waqx86pyh57TyUyWRDPx"
      ],
      "outstanding_balances": [],
      "memo_message": ""
    }
  ]
},
{
  "id": "45",
  "method": "wallet_builder_get_multisig_detail"
}
```

请求方法: wallet\_builder\_get\_multisig\_detail

请求参数: transaction\_builder 多签转账结构体

Response Result:

```
::
{
  "id": "45", "result": {
```

```

        "from_address": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG", "to_address":
        "HDpDyUAWsAarcVuSoP52C1u6Rk394GUXAM", "required": 2, "addresses": [

            "HBciJNgEoEZGMyEzaRZ2nwQhsB36SUUPoZ",
            "HDpDyUAWsAarcVuSoP52C1u6Rk394GUXAM",
            "HEbey45BfuH8o4xRddoL8J5XvZUARzT2Jb",
            "HNP24kJzatj451waqx86pyh57TyUyWRDPx"

        ], "signed_addresses": [

            "HBciJNgEoEZGMyEzaRZ2nwQhsB36SUUPoZ",
            "HDpDyUAWsAarcVuSoP52C1u6Rk394GUXAM",
            "HEbey45BfuH8o4xRddoL8J5XvZUARzT2Jb",
            "HNP24kJzatj451waqx86pyh57TyUyWRDPx"

        ]

    }

}

```

返回参数: from\_address 多签出账账户 to\_address 收钱账户 required 最小需要签名数 addresses 多签出账有效地址集 signed\_addresses 已经签名地址集

根据多签**builder**结构体文件获取当前多签状态

调用前提: 无

Request:

```

{ "jsonrpc": "2.0",
  "params": [ "e:/builder.json" ]
,
  "id": "45",
  "method": "wallet_builder_file_get_multisig_detail"
}

```

请求方法: wallet\_builder\_file\_get\_multisig\_detail

请求参数: builder\_path 多签转账结构体存储位置

Response Result:

```

::

{

    "id": "45", "result": {

        "from_address": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG", "to_address":
        "HDpDyUAWsAarcVuSoP52C1u6Rk394GUXAM", "required": 2, "addresses": [

            "HBciJNgEoEZGMyEzaRZ2nwQhsB36SUUPoZ",
            "HDpDyUAWsAarcVuSoP52C1u6Rk394GUXAM",
            "HEbey45BfuH8o4xRddoL8J5XvZUARzT2Jb",
            "HNP24kJzatj451waqx86pyh57TyUyWRDPx"

        ], "signed_addresses": [

            "HBciJNgEoEZGMyEzaRZ2nwQhsB36SUUPoZ",
            "HDpDyUAWsAarcVuSoP52C1u6Rk394GUXAM",
            "HEbey45BfuH8o4xRddoL8J5XvZUARzT2Jb",
            "HNP24kJzatj451waqx86pyh57TyUyWRDPx"

        ]

    }

}

```

返回参数: from\_address 多签出账账户 to\_address 收钱账户 required 最小需要签名数 addresses 多签出账有效地址集 signed\_addresses 已经签名地址集

对多签交易结构体进行签名

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [{
    "transaction_entry": {
      "index": 0,
      "entry_id": "0000000000000000000000000000000000000000000000000000000000000000",
      "block_num": 0,
      "is_virtual": false,
      "is_confirmed": false,
      "is_market": false,
      "trx": {
        "expiration": "1970-01-01T00:00:00",
        "hsr_account": "",
        "hsr_inport_asset": {
          "amount": 0,
          "asset_id": 0
        },
        "operations": [{
          "type": "withdraw_op_type",
          "data": {
            "balance_id": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
            "amount": 50000001,
            "claim_input_data": ""
          }
        }, {
          "type": "deposit_op_type",
          "data": {
            "amount": 50000000,
            "condition": {
              "asset_id": 0,
              "slate_id": 0,
              "type": "withdraw_signature_type",
              "balance_type": "withdraw_common_type",
              "data": {
                "owner": "HDpDyUAwsAarcVuSoP52C1u6Rk394GUXAM"
              }
            }
          }
        }
      ]
    },
    "result_trx_type": "origin_transaction",
    "result_trx_id": "0000000000000000000000000000000000000000000000000000000000000000",
    "signatures": []
  }],
  "ledger_entries": [],
  "fee": {
    "amount": 0,
    "asset_id": 0
  },
  "created_time": "1970-01-01T00:00:00",
  "received_time": "1970-01-01T00:00:00",
  "extra_addresses": [],
  "trx_data": ""
},
{
  "required_signatures": [
    "HBciJNgFoEZGMyEzaRZ2nwQhsB36SUUPoZ",
    "HDpDyUAwsAarcVuSoP52C1u6Rk394GUXAM",
    "HEbey45BfuH8o4xRddoL8J5XvZUARzT2Jb",
    "HNP24kJzatj451waqx86pyh57TyUyWRDPx"
  ]
},
{
  "outstanding_balances": [],
  "memo_message": ""
}
]
```

```
},false]
, "id": "45", "method": "wallet_builder_add_signature" }
```

请求方法: wallet\_builder\_add\_signature

请求参数: transaction\_builder 多签转账结构体 broadcast 签名结束后是否进行广播

Response Result:

```
::
{
  "id": "45", "result": {
```

```

“transaction_entry”: {
  “index”: 0, “entry_id”: “fc4bf228080adaea78380654946e2defa7021cae”, “block_num”: 0,
  “is_virtual”: false, “is_confirmed”: false, “is_market”: false, “trx”: {

    “expiration”: “2017-11-29T07:36:19”, “hsr_account”: “”, “hsr_inport_asset”: {

      “amount”: 0, “asset_id”: 0

    }, “operations”: [

      {

        “type”: “withdraw_op_type”, “data”: {

          “balance_id”: “MWcakEYaucUij5fCb15cmKt4A7Sd8fbWrG”, “amount”:
          50000001, “claim_input_data”: “”

        }

      }, {

        “type”: “deposit_op_type”, “data”: {

          “amount”: 50000000, “condition”: {

            “asset_id”: 0, “slate_id”: 0, “type”: “withdraw_signature_type”,
            “balance_type”: “withdraw_common_type”, “data”: {

              “owner”: “HDpDyUAwsArcVuSoP52C1u6Rk394GUXAM”

            }

          }

        }

      }

    ]

  }, “result_trx_type”: “origin_transaction”, “result_trx_id”:
  “0000000000000000000000000000000000000000”, “signatures”: [

    “1f68203bd4aefe811ed4f5937cfbcb3ffb154e2a7a3f5d172823a49db86b1198d371005cb2eac9e3dee45e4b8ea0”,
    “1f7cf572adbdb4905ee9da438a5adbef400838feb5848ccefe7f1ea1a3570fc5514390862b53b0a598f6cdd24fc3d”,
    “1f16ad454907df7168acb09ce47ad80e421da3b8cbe84161c5921aa5947ad5d54d58beacf1a2a933799044d65a4”,
    “2075b2c4ed9be6225cdce17942f240b6bfb014c0b35e1431fb7efce2e8c78cc62e49ad63c8e4e0ffdc33884243ec4”

  ]

}, “ledger_entries”: [], “fee”: {

  “amount”: 0, “asset_id”: 0

}, “created_time”: “2017-11-29T06:36:19”, “received_time”: “2017-11-29T06:36:19”,
“extra_addresses”: [], “trx_data”: “”

}, “required_signatures”: [

  “HBciJNgEoEZGMyEzaRZ2nwQhsB36SUUPoZ”,
  “HDpDyUAwsArcVuSoP52C1u6Rk394GUXAM”,
  “HEbey45BfuH8o4xRddoL8J5XvZUARzT2Jb”,
  “HNP24kJzatj451waqx86pyh57TyUyWRDPx”

], “outstanding_balances”: [], “memo_message”: “”

}

}

```

返回参数: transaction\_builder 多签交易结构体

对多签交易结构体文件进行签名并将结果写入到（文件+时间）命名的文件中

调用前提: 无

Request:

```
{ "jsonrpc": "2.0",  
  "params": [ "e:/builder.json", false ]  
,  
  "id": "45",  
  "method": "wallet_builder_file_add_signature"  
}
```

请求方法: wallet\_builder\_file\_add\_signature

请求参数: builder\_path 多签转账结构体文件存储位置 broadcast 是否进行广播

Response Result:

```
::  
  
  {  
  
    "id": "45", "result": {
```

```

“transaction_entry”: {
  “index”: 0, “entry_id”: “e1d46f8327f43e03b12ccc1e87bf2430748afacd”, “block_num”: 0,
  “is_virtual”: false, “is_confirmed”: false, “is_market”: false, “trx”: {

    “expiration”: “2017-11-29T07:39:42”, “hsr_account”: “”, “hsr_inport_asset”: {

      “amount”: 0, “asset_id”: 0

    }, “operations”: [

      {

        “type”: “withdraw_op_type”, “data”: {

          “balance_id”: “MWcakEYaucUij5fCb15cmKt4A7Sd8fbWrG”, “amount”:
          50000001, “claim_input_data”: “”

        }

      }, {

        “type”: “deposit_op_type”, “data”: {

          “amount”: 50000000, “condition”: {

            “asset_id”: 0, “slate_id”: 0, “type”: “withdraw_signature_type”,
            “balance_type”: “withdraw_common_type”, “data”: {

              “owner”: “HDpDyUAwsArcVuSoP52C1u6Rk394GUXAM”

            }

          }

        }

      }

    ]

  }, “result_trx_type”: “origin_transaction”, “result_trx_id”:
  “0000000000000000000000000000000000000000”, “signatures”: [

    “1f0844de0100205be6cb9f7ccd96705fc94984f6a0a52e869274fabd0f53190d9773a1cd4fd922bf7e846dbce43cd!”,
    “2075c6ca4a6d53e381ca314901c61d11c584755d4e2115de47d73f25a87e89281856e07499e5bc69f5316970d8!”,
    “2048140bfd247afb983c89651e2f161fd8c830748fbf99adcf2d4b50d74cda4d5d7e81470ea3d6be26faf6be2b7ee!”,
    “207e221e23a16d83d02a29372cad2a29623c0582883678521631dd39e4aba617ac17d20acb8b8388660be936e!”,

  ]

}, “ledger_entries”: [], “fee”: {

  “amount”: 0, “asset_id”: 0

}, “created_time”: “2017-11-29T06:39:42”, “received_time”: “2017-11-29T06:39:42”,
“extra_addresses”: [], “trx_data”: “”

}, “required_signatures”: [

  “HBciJNgEoEZGMyEzaRZ2nwQhsB36SUUPoZ”,
  “HDpDyUAwsArcVuSoP52C1u6Rk394GUXAM”,
  “HEbey45BfuH8o4xRddoL8J5XvZUARzT2Jb”,
  “HNP24kJzatj451waqx86pyh57TyUyWRDPx”

], “outstanding_balances”: [], “memo_message”: “”

}

}

```

返回参数: transaction\_builder 多签交易结构体

查询多签账户交易历史记录

调用前提: 无



Request:

```
{ "jsonrpc": "2.0",  
  "params": [ "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG", "HSR", "100", "0", "10000" ]  
,  
  "id": "45",  
  "method": "wallet_multisig_account_history"  
}
```

请求方法: wallet\_multisig\_account\_history

请求参数: account\_address 多签账户地址 asset\_symbol 资产标识 (可选) limit 返回条数 (可选) start\_block\_num 起始块号 (可选) end\_block\_num 结束块号 (可选)

Response Result:

```

{
  "id": "45",
  "result": [
    {
      "is_virtual": false,
      "is_confirmed": true,
      "is_market": false,
      "is_market_cancel": false,
      "trx_id": "868049895a6c21681e65d0c33331d78d2a486f20",
      "Confirms": 1853,
      "block_num": 343,
      "block_position": 0,
      "trx_type": 0,
      "ledger_entries": [
        {
          "from_account": "test",
          "from_account_name": "",
          "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
          "to_account_name": "",
          "amount": {
            "amount": 100000002,
            "asset_id": 0
          },
          "memo": "",
          "running_balances": []
        },
        {
          "from_account": "test",
          "from_account_name": "",
          "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
          "to_account_name": "",
          "amount": {
            "amount": 100000000,
            "asset_id": 0
          },
          "memo": "depoist to multisig address:MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
          "running_balances": []
        }
      ],
      "fee": {
        "amount": 0,
        "asset_id": 0
      },
      "timestamp": "2017-11-28T13:46:55",
      "expiration_timestamp": "2017-11-28T14:46:55"
    },
    {
      "is_virtual": false,
      "is_confirmed": true,
      "is_market": false,
      "is_market_cancel": false,
      "trx_id": "a6ea1364f217a3c5b36948db0757468c4a68a6aa",
      "Confirms": 329,
      "block_num": 1867,
      "block_position": 0,
      "trx_type": 0,
      "ledger_entries": [
        {
          "from_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
          "from_account_name": "",
          "to_account": "HDpDyUawsAarcVuSoP52C1u6Rk394GUXAM",
          "to_account_name": "",
          "amount": {
            "amount": 50000001,
            "asset_id": 0
          },
          "memo": "",
          "running_balances": []
        },
        {
          "from_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
          "from_account_name": "",
          "to_account": "test0",
          "to_account_name": "",
          "amount": {
            "amount": 50000000,
            "asset_id": 0
          },
          "memo": "depoist toHDpDyUawsAarcVuSoP52C1u6Rk394GUXAM",
          "running_balances": []
        }
      ],
      "fee": {
        "amount": 1,
        "asset_id": 0
      },
      "timestamp": "2017-11-29T03:12:25",
      "expiration_timestamp": "2017-11-29T04:11:24"
    },
    {
      "is_virtual": false,
      "is_confirmed": true,
      "is_market": false,
      "is_market_cancel": false,
      "trx_id": "8de029b8907239c68f950d10d199d41d093def",
      "Confirms": 323,
      "block_num": 1873,
      "block_position": 0,
      "trx_type": 0,
      "ledger_entries": [
        {
          "from_account": "test",
          "from_account_name": "",
          "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
          "to_account_name": "",
          "amount": {
            "amount": 1000000002,
            "asset_id": 0
          },
          "memo": "1",
          "running_balances": []
        },
        {
          "from_account": "test",
          "from_account_name": "",

```

```

        "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
        "to_account_name": "",
        "amount": {
            "amount": 100000000,
            "asset_id": 0
        },
        "memo": "1",
        "running_balances": []
    },
    },
    "fee": {
        "amount": 0,
        "asset_id": 0
    },
    },
    "timestamp": "2017-11-29T03:14:44",
    "expiration_timestamp": "2017-11-29T04:14:44"
},
{
    "is_virtual": false,
    "is_confirmed": true,
    "is_market": false,
    "is_market_cancel": false,
    "trx_id": "ff8d9e7806008cfd21a32c2439885ed6e27da0f4",
    "Confirms": 313,
    "block_num": 1883,
    "block_position": 0,
    "trx_type": 0,
    "ledger_entries": [
        {
            "from_account": "test",
            "from_account_name": "",
            "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
            "to_account_name": "",
            "amount": {
                "amount": 1000000002,
                "asset_id": 0
            },
            "memo": "1",
            "running_balances": []
        },
        {
            "from_account": "test",
            "from_account_name": "",
            "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
            "to_account_name": "",
            "amount": {
                "amount": 1000000000,
                "asset_id": 0
            },
            "memo": "1",
            "running_balances": []
        }
    ],
    "fee": {
        "amount": 0,
        "asset_id": 0
    },
    },
    "timestamp": "2017-11-29T03:19:20",
    "expiration_timestamp": "2017-11-29T04:19:20"
},
{
    "is_virtual": true,
    "is_confirmed": true,
    "is_market": false,
    "is_market_cancel": false,
    "trx_id": "bb248830abf2b77f5c04e5900fd4afb7b8b6728f",
    "Confirms": 279,
    "block_num": 1917,
    "block_position": 0,
    "trx_type": 0,
    "ledger_entries": [
        {
            "from_account": "NETMING",
            "from_account_name": "",
            "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
            "to_account_name": "",
            "amount": {
                "amount": 160000000,
                "asset_id": 0
            },
            "memo": "pay pos reward from 1917to multisig
accountMWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
            "running_balances": []
        }
    ],
    "fee": {
        "amount": 0,
        "asset_id": 0
    },
    },
    "timestamp": "2017-11-29T03:40:33",
    "expiration_timestamp": "1970-01-01T00:00:00"
},
{
    "is_virtual": true,
    "is_confirmed": true,
    "is_market": false,
    "is_market_cancel": false,
    "trx_id": "93bd29dc2fa7608d97779315d9544f1986dd8543",
    "Confirms": 247,
    "block_num": 1949,
    "block_position": 0,
    "trx_type": 0,
    "ledger_entries": [
        {
            "from_account": "NETMING",
            "from_account_name": "",
            "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
            "to_account_name": "",
            "amount": {
                "amount": 160000000,
                "asset_id": 0
            },
            "memo": "pay pos reward from 1949to multisig
accountMWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
            "running_balances": []
        }
    ]
}

```

```

    },
    "fee": {
      "amount": 0,
      "asset_id": 0
    },
    "timestamp": "2017-11-29T03:49:22",
    "expiration_timestamp": "1970-01-01T00:00:00"
  },
  {
    "is_virtual": true,
    "is_confirmed": true,
    "is_market": false,
    "is_market_cancel": false,
    "trx_id": "dcc64f4982e82c1789668483bd8e3d4264145ba6",
    "Confirms": 212,
    "block_num": 1984,
    "block_position": 0,
    "trx_type": 0,
    "ledger_entries": [
      {
        "from_account": "NETMING",
        "from_account_name": "",
        "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
        "to_account_name": "",
        "amount": {
          "amount": 160000000,
          "asset_id": 0
        },
        "memo": "pay pos reward from 1984to multisig
accountMWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
        "running_balances": []
      }
    ],
    "fee": {
      "amount": 0,
      "asset_id": 0
    },
    "timestamp": "2017-11-29T03:58:07",
    "expiration_timestamp": "1970-01-01T00:00:00"
  },
  {
    "is_virtual": true,
    "is_confirmed": true,
    "is_market": false,
    "is_market_cancel": false,
    "trx_id": "4273c177d9cdc77f2b6d04ff2496e9cd8a7fed0d",
    "Confirms": 169,
    "block_num": 2027,
    "block_position": 0,
    "trx_type": 0,
    "ledger_entries": [
      {
        "from_account": "NETMING",
        "from_account_name": "",
        "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
        "to_account_name": "",
        "amount": {
          "amount": 160000000,
          "asset_id": 0
        },
        "memo": "pay pos reward from 2027to multisig
accountMWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
        "running_balances": []
      }
    ],
    "fee": {
      "amount": 0,
      "asset_id": 0
    },
    "timestamp": "2017-11-29T06:03:30",
    "expiration_timestamp": "1970-01-01T00:00:00"
  },
  {
    "is_virtual": false,
    "is_confirmed": true,
    "is_market": false,
    "is_market_cancel": false,
    "trx_id": "4805882dab16aeb1b5bccce47c03d40f90024056",
    "Confirms": 162,
    "block_num": 2034,
    "block_position": 0,
    "trx_type": 0,
    "ledger_entries": [
      {
        "from_account": "test",
        "from_account_name": "",
        "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
        "to_account_name": "",
        "amount": {
          "amount": 100000002,
          "asset_id": 0
        },
        "memo": "memo",
        "running_balances": []
      },
      {
        "from_account": "test",
        "from_account_name": "",
        "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
        "to_account_name": "",
        "amount": {
          "amount": 100000000,
          "asset_id": 0
        },
        "memo": "memo",
        "running_balances": []
      }
    ],
    "fee": {
      "amount": 0,
      "asset_id": 0
    },
    "timestamp": "2017-11-29T06:04:39",
    "expiration_timestamp": "2017-11-29T07:04:39"
  },
  {

```

```

        "is_virtual": true,
        "is_confirmed": true,
        "is_market": false,
        "is_market_cancel": false,
        "trx_id": "15227b5e078b7e772992a0b400ab10083c6f23e6",
        "Confirms": 135,
        "block_num": 2061,
        "block_position": 0,
        "trx_type": 0,
        "ledger_entries": [
            {
                "from_account": "NETMING",
                "from_account_name": "",
                "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
                "to_account_name": "",
                "amount": {
                    "amount": 160000000,
                    "asset_id": 0
                },
                "memo": "pay pos reward from 2061to multisig
accountMWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
                "running_balances": []
            },
            {
                "fee": {
                    "amount": 0,
                    "asset_id": 0
                },
                "timestamp": "2017-11-29T06:09:56",
                "expiration_timestamp": "1970-01-01T00:00:00"
            },
            {
                "is_virtual": false,
                "is_confirmed": true,
                "is_market": false,
                "is_market_cancel": false,
                "trx_id": "2a9af91fdbcb684d71230951e99525f24ca50be24",
                "Confirms": 123,
                "block_num": 2073,
                "block_position": 0,
                "trx_type": 0,
                "ledger_entries": [
                    {
                        "from_account": "test",
                        "from_account_name": "",
                        "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
                        "to_account_name": "",
                        "amount": {
                            "amount": 100000002,
                            "asset_id": 0
                        },
                        "memo": "memo",
                        "running_balances": []
                    },
                    {
                        "from_account": "test",
                        "from_account_name": "",
                        "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
                        "to_account_name": "",
                        "amount": {
                            "amount": 100000000,
                            "asset_id": 0
                        },
                        "memo": "memo",
                        "running_balances": []
                    }
                ],
                "fee": {
                    "amount": 0,
                    "asset_id": 0
                },
                "timestamp": "2017-11-29T06:23:24",
                "expiration_timestamp": "2017-11-29T07:23:24"
            },
            {
                "is_virtual": false,
                "is_confirmed": true,
                "is_market": false,
                "is_market_cancel": false,
                "trx_id": "a91628fdab09e67002de22d37485d1e629a238ef",
                "Confirms": 123,
                "block_num": 2073,
                "block_position": 0,
                "trx_type": 0,
                "ledger_entries": [
                    {
                        "from_account": "test",
                        "from_account_name": "",
                        "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
                        "to_account_name": "",
                        "amount": {
                            "amount": 100000002,
                            "asset_id": 0
                        },
                        "memo": "memo",
                        "running_balances": []
                    },
                    {
                        "from_account": "test",
                        "from_account_name": "",
                        "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
                        "to_account_name": "",
                        "amount": {
                            "amount": 100000000,
                            "asset_id": 0
                        },
                        "memo": "memo",
                        "running_balances": []
                    }
                ],
                "fee": {
                    "amount": 0,
                    "asset_id": 0
                },
                "timestamp": "2017-11-29T06:23:40",
                "expiration_timestamp": "2017-11-29T07:23:40"
            }
        ]
    }
}

```

```

    },
    {
      "is_virtual": true,
      "is_confirmed": true,
      "is_market": false,
      "is_market_cancel": false,
      "trx_id": "b29155e6e096fc85b3a260df0dc244fda60c542e",
      "Confirms": 84,
      "block_num": 2112,
      "block_position": 0,
      "trx_type": 0,
      "ledger_entries": [
        {
          "from_account": "NETMING",
          "from_account_name": "",
          "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
          "to_account_name": "",
          "amount": {
            "amount": 160000000,
            "asset_id": 0
          },
          "memo": "pay pos reward from 2112to multisig
accountMWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
          "running_balances": []
        }
      ],
      "fee": {
        "amount": 0,
        "asset_id": 0
      },
      "timestamp": "2017-11-29T06:30:36",
      "expiration_timestamp": "1970-01-01T00:00:00"
    },
    {
      "is_virtual": true,
      "is_confirmed": true,
      "is_market": false,
      "is_market_cancel": false,
      "trx_id": "d9a4241447bc76a7301cf31e08edcda2ccb2cb15",
      "Confirms": 46,
      "block_num": 2150,
      "block_position": 0,
      "trx_type": 0,
      "ledger_entries": [
        {
          "from_account": "NETMING",
          "from_account_name": "",
          "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
          "to_account_name": "",
          "amount": {
            "amount": 160000000,
            "asset_id": 0
          },
          "memo": "pay pos reward from 2150to multisig
accountMWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
          "running_balances": []
        }
      ],
      "fee": {
        "amount": 0,
        "asset_id": 0
      },
      "timestamp": "2017-11-29T06:37:21",
      "expiration_timestamp": "1970-01-01T00:00:00"
    },
    {
      "is_virtual": true,
      "is_confirmed": true,
      "is_market": false,
      "is_market_cancel": false,
      "trx_id": "18132aeaf312adda04b36747f2d36acf6ef847a1",
      "Confirms": 9,
      "block_num": 2187,
      "block_position": 0,
      "trx_type": 0,
      "ledger_entries": [
        {
          "from_account": "NETMING",
          "from_account_name": "",
          "to_account": "MWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
          "to_account_name": "",
          "amount": {
            "amount": 160000000,
            "asset_id": 0
          },
          "memo": "pay pos reward from 2187to multisig
accountMWcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
          "running_balances": []
        }
      ],
      "fee": {
        "amount": 0,
        "asset_id": 0
      },
      "timestamp": "2017-11-29T06:43:44",
      "expiration_timestamp": "1970-01-01T00:00:00"
    }
  ]
}

```

}

返回参数: transactions 交易结构体

查询多签账户余额

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "params": [ "MwcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG" ],
  "id": "2",
  "method": "wallet_multisig_account_balance"
}
```

请求方法: wallet\_multisig\_account\_balance

请求参数: multisig\_address 多签账户地址

Response Result:

```
{
  "id": "45",
  "result": [
    [
      "MwcakEYaucUiJ5fCb15cmKt4A7Sd8fbWrG",
      [
        [
          0,
          3629999999
        ]
      ]
    ]
  ]
}
```

返回参数: address: 多签账户地址

asset\_id: 资产ID

balance: 账户余额

合约相关

编译合约

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "compile_contract",
  "params": [
    "C:/Users/hasee/Desktop/test.lua"
  ]
}
```

请求方法: compile\_contract

请求参数: 合约源码路径

Response Result:

```
{
  "id": "1",
  "result": "C:/Users/hasee/Desktop/test.gpc"
}
```

返回参数: 编译生成的合约字节码文件路径

注册合约（链上）

调用前提: RPC登录认证成功，钱包打开，钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "register_contract",
  "params": [
    "test01",
    "C:/Users/hasee/Desktop/test1.gpc",
    "HSR",
    "0.1"
  ]
}
```

请求方法: register\_contract

请求参数: 注册人, 字节码文件路径, 资产标识, 执行花费上限

Response Result:

```
{
  "id": "1",
  "result": "CONJuXHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
}
```

返回参数: 合约id

注册合约交易构建（链上）

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "register_contract_build",
  "params": [
    "H6JyU8R4tA8irXuXhQQLtJwZH5TfNigZB7XHJXAWc9fsw9yUK3U",
    "C:/Users/hasee/Desktop/test1.gpc",
    "HSR",
    "0.1"
  ]
}
```

请求方法: register\_contract\_build

请求参数: 注册人公钥, 字节码文件路径, 资产标识, 执行花费上限

Response Result:



```

{
  "id": "1",
  "result": {
    "index": 0,
    "entry_id": "1a6f38c365c7b14d4d24a263c74c9d80f0296394",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-09-28T06:44:46",
      "alp_account": "",
      "alp_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "upgrade_contract_op_type",
          "data": {
            "id": "HSRJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
            "name": "my_contract_1",
            "desc": "this is my first contract",
            "balances": [
              [
                "HSRPe9u4ZmBj38D5GzPPSz9LLe8J3LpM89o8",
                1000
              ]
            ]
          }
        }
      ],
      "signatures": [
      ]
    },
    "ledger_entries": [
      {
        "amount": {
          "amount": 0,
          "asset_id": 0
        },
        "memo": ""
      }
    ],
    "fee": {
      "amount": 10001000,
      "asset_id": 0
    },
    "created_time": "2016-09-28T05:44:46",
    "received_time": "2016-09-28T05:44:46",
    "extra_addresses": [
      "HSRJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
    ]
  }
}

```

返回参数：没有签名的交易结构体

注册合约（**testing**）

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```

{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "register_contract_testing",
  "params": [
    "test01",
    "C:/Users/hasee/Desktop/test1.gpc"
  ]
}

```

请求方法：register\_contract\_testing

请求参数：注册人，合约字节码文件

Response Result:

```
{
  "id": "1",
  "result": [
    {
      "amount": 1000,
      "asset_id": 0
    },
    {
      "amount": 10000000,
      "asset_id": 0
    },
    {
      "amount": 473,
      "asset_id": 0
    },
    {
      "amount": 100,
      "asset_id": 0
    }
  ]
}
```

返回参数：交易手续费，合约保证金，执行花费，字节码花费，注册执行花费

升级合约（链上）

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "upgrade_contract",
  "params": [
    "CONJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
    "test01",
    "my_contract_1",
    "this is my first contract"
    "HSR"
    "10"
  ]
}
```

请求方法：upgrade\_contract

请求参数：合约id，升级发起人，合约新名称，合约描述，资产符号，执行花费上限

Response Result:

```

{
  "id": "1",
  "result": {
    "index": 0,
    "entry_id": "1a6f38c365c7b14d4d24a263c74c9d80f0296394",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-09-28T06:44:46",
      "alp_account": "",
      "alp_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "upgrade_contract_op_type",
          "data": {
            "id": "HSRJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
            "name": "my_contract_1",
            "desc": "this is my first contract",
            "balances": [
              [
                "HSRPe9u4ZmBj38D5GzPPSz9LLe8J3LpM89o8",
                1000
              ]
            ]
          }
        }
      ],
      "signatures": [
        "2027fbcf936eeb898593fade96c26bef189462d60b1e60a8fb95f73cbfd0e6632423346678f5691a9f7f5e20681656b7c"
      ]
    },
    "ledger_entries": [
      {
        "amount": {
          "amount": 0,
          "asset_id": 0
        },
        "memo": ""
      },
      {
        "fee": {
          "amount": 10001000,
          "asset_id": 0
        },
        "created_time": "2016-09-28T05:44:46",
        "received_time": "2016-09-28T05:44:46",
        "extra_addresses": [
          "HSRJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
        ]
      }
    ]
  }
}

```

返回参数：交易记录

升级合约交易构建（链上）

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```

{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "upgrade_contract_build",
  "params": [
    "CONJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
    "H6JyU8R4tA8irXuXhQQLtJwZH5TfNigZB7XHJXAWc9fsw9yUK3U",
    "my_contract_1",
    "this is my first contract"
  ],
  "HSR": "10"
}

```

请求方法：upgrade\_contract\_build

请求参数：合约id，升级发起人公钥，合约新名称，合约描述，资产符号，执行花费上限

Response Result:

```

{
  "id": "1",
  "result": {
    "index": 0,
    "entry_id": "1a6f38c365c7b14d4d24a263c74c9d80f0296394",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-09-28T06:44:46",
      "alp_account": "",
      "alp_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "upgrade_contract_op_type",
          "data": {
            "id": "HSRJuxHfW5Go51cGbD3dXVpQs8B5v7MrFZcE",
            "name": "my_contract_1",
            "desc": "this is my first contract",
            "balances": [
              [
                "HSRPe9u4ZmBj38D5GzPPSz9LLe8J3LpM89o8",
                1000
              ]
            ]
          }
        }
      ],
      "signatures": [
      ]
    },
    "ledger_entries": [
      {
        "amount": {
          "amount": 0,
          "asset_id": 0
        },
        "memo": ""
      }
    ],
    "fee": {
      "amount": 10001000,
      "asset_id": 0
    },
    "created_time": "2016-09-28T05:44:46",
    "received_time": "2016-09-28T05:44:46",
    "extra_addresses": [
      "HSRJuxHfW5Go51cGbD3dXVpQs8B5v7MrFZcE"
    ]
  }
}

```

返回参数：不含签名的交易记录

升级合约（**testing**）

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```

{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "upgrade_contract_testing",
  "params": [
    "CONJuxHfW5Go51cGbD3dXVpQs8B5v7MrFZcE",
    "test01",
    "my_contract_1",
    "this is my first contract"
  ]
}

```

请求方法：upgrade\_contract\_testing

请求参数：合约id，升级发起人，合约新名称，合约描述

Response Result:

```
{
  "id": "1",
  "result": [
    {
      "amount": 1000,
      "asset_id": 0
    },
    {
      "amount": 16,
      "asset_id": 0
    },
    {
      "amount": 1000000,
      "asset_id": 0
    }
  ]
}
```

返回参数: 交易手续费, 执行花费, 保证金

删除合约 (链上)

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "destroy_contract",
  "params": [
    "CONPZdkAuyDthiftdDzp8Hg7PqyK9MiTnL2q",
    "test01"
    "HSR"
    "10"
  ]
}
```

请求方法: destroy\_contract

请求参数: 合约id, 删除发起人, 资产id, 执行费用上限

Response Result:

```

{
  "id": "1",
  "result": {
    "index": 0,
    "entry_id": "111eae250a783bba4d9f5e8bee56af762b447dfe",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-09-28T07:02:06",
      "alp_account": "",
      "alp_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "destroy_contract_op_type",
          "data": {
            "id": "HSRPZdkAuyDthiftdDzp8Hg7PqyK9MiTnL2q",
            "balances": [
              [
                "HSRPe9u4ZmBj38D5GzPPSz9LLe8J3LpM89o8",
                1000
              ]
            ]
          }
        }
      ],
      "signatures": [
        "1f4d9614000a6000940b98186d28f1e28faa0326f912b234ed31822c10140889b72183551449b0b18da4c9f4c355b3453"
      ]
    },
    "ledger_entries": [
      {
        "amount": {
          "amount": 0,
          "asset_id": 0
        },
        "memo": ""
      },
      {
        "fee": {
          "amount": 1000,
          "asset_id": 0
        },
        "created_time": "2016-09-28T06:02:06",
        "received_time": "2016-09-28T06:02:06",
        "extra_addresses": [
          "HSRPZdkAuyDthiftdDzp8Hg7PqyK9MiTnL2q"
        ]
      }
    ]
  }
}

```

返回参数：交易记录

删除合约交易构建（链上）

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```

{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "destroy_contract_build",
  "params": [
    "CONPZdkAuyDthiftdDzp8Hg7PqyK9MiTnL2q",
    "H6JyU8R4tA8irXuXhQQLtJwZH5TfNigZB7XHJXAWc9fsw9yUK3U"
    "HSR"
    "10"
  ]
}

```

请求方法：destroy\_contract\_build

请求参数: 合约id, 删除发起人公钥, 资产id, 执行费用上限

Response Result:

```

{
  "id": "1",
  "result": {
    "index": 0,
    "entry_id": "111eae250a783bba4d9f5e8bee56af762b447dfe",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-09-28T07:02:06",
      "alp_account": "",
      "alp_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "destroy_contract_op_type",
          "data": {
            "id": "HSRPZdkAuyDthiftdDzp8Hg7PqyK9MiTnL2q",
            "balances": [
              [
                "HSRPe9u4ZmBj38D5GzPPSz9LLe8J3LpM89o8",
                1000
              ]
            ]
          }
        }
      ],
      "signatures": [
        ]
    },
    "ledger_entries": [
      {
        "amount": {
          "amount": 0,
          "asset_id": 0
        },
        "memo": ""
      }
    ],
    "fee": {
      "amount": 1000,
      "asset_id": 0
    },
    "created_time": "2016-09-28T06:02:06",
    "received_time": "2016-09-28T06:02:06",
    "extra_addresses": [
      "HSRPZdkAuyDthiftdDzp8Hg7PqyK9MiTnL2q"
    ]
  }
}

```

返回参数：交易记录

删除合约（**testing**）

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```

{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "destroy_contract_testing",
  "params": [
    "CONPZdkAuyDthiftdDzp8Hg7PqyK9MiTnL2q",
    "test01"
  ]
}

```

请求方法：destroy\_contract\_testing

请求参数：合约id，删除发起人

Response Result:

```

{
  "id": "1",
  "result": [
    {
      "amount": 1000,
      "asset_id": 0
    },
    {
      "amount": 16,
      "asset_id": 0
    }
  ]
}

```

返回参数：交易手续费，执行花费

调用合约（链上）

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "0",
  "method": "call_contract",
  "params": [
    "CONMR24hkhmuJ8X6eiEhdT2vqV1FvCcS5vDf",
    "alp0",
    "print",
    "",
    "HSR",
    "1"
  ]
}
```

请求方法：call\_contract

请求参数：合约id，调用发起人，调用方法，调用参数，资产符号，执行花费上限

Response Result:

```
{
  "id": "0",
  "result": {
    "index": 0,
    "entry_id": "d57f3b339a40eb1d9a72359d1a3c9d9e67434673",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-11-21T06:53:19",
      "alp_account": "",
      "alp_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "call_contract_op_type",
          "data": {
            "caller": "HSR8CqTJMSBzgqFxudU5TWzQyVDgmqrqax3ApNDGDwEZV7uXKTND2",
            "balances": [
              [
                "HSRJqWqjsVdAXCK99knVmeCE7EpAuFdTmFux",
                101000
              ]
            ],
            "contract": "HSRMR24hkhmuJ8X6eiEhdT2vqV1FvCcS5vDf",
            "costlimit": {
              "amount": 100000,
              "asset_id": 0
            },
            "method": "print",
            "args": ""
          }
        }
      ],
      "signatures": [
        "2030cd70eadf10532a4b27613252c3c2c5bd61ccd5f22911c18727676625cae9411ffed0f6383efdd48568ed9559d9819"
      ]
    },
    "ledger_entries": [],
    "fee": {
      "amount": 1000,
      "asset_id": 0
    },
    "created_time": "2016-11-21T05:53:19",
    "received_time": "2016-11-21T05:53:19",
    "extra_addresses": []
  }
}
```

返回参数：交易记录

调用合约交易构建（链上）

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:



```
{
  "jsonrpc": "2.0",
  "id": "0",
  "method": "call_contract_build",
  "params": [
    "CONMR24hkhmuJ8X6eiEhdT2vqV1FvCcS5vDf",
    "H6JyU8R4tA8irXuXhQQLtJwZH5TfNigZB7XHJXAwc9fsw9yUK3U",
    "print",
    "",
    "HSR",
    "1"
  ]
}
```

请求方法: call\_contract\_build

请求参数: 合约id, 调用发起人公钥, 调用方法, 调用参数, 资产符号, 执行花费上限

Response Result:

```
{
  "id": "0",
  "result": {
    "index": 0,
    "entry_id": "d57f3b339a40eb1d9a72359d1a3c9d9e67434673",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-11-21T06:53:19",
      "alp_account": "",
      "alp_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "call_contract_op_type",
          "data": {
            "caller": "HSR8CqTJMSBzgqFxdU5TWzQyVDgmqrqax3ApNDGDwEZV7uXKTND2",
            "balances": [
              [
                "HSRJqWqjsVdAXCK99knVmeCE7EpAuFdTmFux",
                101000
              ]
            ],
            "contract": "HSRMR24hkhmuJ8X6eiEhdT2vqV1FvCcS5vDf",
            "costlimit": {
              "amount": 100000,
              "asset_id": 0
            },
            "method": "print",
            "args": ""
          }
        }
      ],
      "signatures": [
        ]
    },
    "ledger_entries": [],
    "fee": {
      "amount": 1000,
      "asset_id": 0
    },
    "created_time": "2016-11-21T05:53:19",
    "received_time": "2016-11-21T05:53:19",
    "extra_addresses": []
  }
}
```

返回参数: 交易记录

调用合约 (**testing**)

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "call_contract_testing",
  "params": [
    "CONJuXHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
    "test01",
    "function_not_exist",
    ""
  ]
}
```

请求方法: call\_contract\_testing

请求参数: 合约id, 调用发起人, 调用方法, 调用参数

Response Result:

```
{
  "id": "1",
  "result": [
    {
      "amount": 1000,
      "asset_id": 0
    },
    {
      "amount": 103,
      "asset_id": 0
    }
  ]
}
```

返回参数: 交易手续费, 执行花费

向合约转账（链上）

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "wallet_transfer_to_contract",
  "params": [
    "10",
    "HSR",
    "test01",
    "CONJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
    "1"
  ]
}
```

请求方法: wallet\_transfer\_to\_contract

请求参数: 转账金额, 资产标识, 转出账户, 合约id, 执行花费上限

Response Result:

```

{
  "id": "1",
  "result": {
    "index": 0,
    "entry_id": "1003bfb6f006509eadaa0567152b995aca63db1b",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-09-28T07:34:09",
      "alp_account": "",
      "alp_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "transfer_contract_op_type",
          "data": {
            "from": "HSR785tCDTiTNu2FxDkzKazkTvFbVeJ4bAo9A1VuJV7yBdB7J7Ub8",
            "costlimit": {
              "amount": 100000,
              "asset_id": 0
            },
            "transfer_amount": {
              "amount": 1000000,
              "asset_id": 0
            },
            "balances": [
              [
                "HSRPe9u4ZmBj38D5GzPPSsz9LLe8J3LpM89o8",
                1101000
              ]
            ],
            "contract_id": "HSRJUXHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
          }
        }
      ],
      "signatures": [
        "1f0acb0ab2c3338e478157e02bcd770e22a832b85ace93bb58cc7e9c3f241b59e7029f1c7a029417d3753dc508712e93"
      ]
    },
    "ledger_entries": [
      {
        "from_account": "HSR785tCDTiTNu2FxDkzKazkTvFbVeJ4bAo9A1VuJV7yBdB7J7Ub8",
        "amount": {
          "amount": 1000000,
          "asset_id": 0
        },
        "memo": ""
      }
    ],
    "fee": {
      "amount": 1000,
      "asset_id": 0
    },
    "created_time": "2016-09-28T06:34:09",
    "received_time": "2016-09-28T06:34:09",
    "extra_addresses": [
      "HSRJUXHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
    ]
  }
}

```

返回参数：交易记录

向合约转账交易构建（链上）

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```

{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "wallet_transfer_to_contract_build",
  "params": [
    "10",
    "HSR",
    "H6JyU8R4tA8irXuXhQQLtJwZH5TfNigZB7XHJXAWc9fsw9yUK3U",
    "CONJUXHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
    "1"
  ]
}

```

请求方法：wallet\_transfer\_to\_contract\_build

请求参数：转账金额，资产标识，转出账户公钥，合约id，执行花费上限

Response Result:

```
{
  "id": "1",
  "result": {
    "index": 0,
    "entry_id": "1003bfb6f006509eadaa0567152b995aca63db1b",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-09-28T07:34:09",
      "alp_account": "",
      "alp_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "transfer_contract_op_type",
          "data": {
            "from": "HSR785tCDTiTNu2FxDkzKazkTvFbVeJ4bAo9A1VuJV7yBdB7J7Ub8",
            "costlimit": {
              "amount": 100000,
              "asset_id": 0
            },
            "transfer_amount": {
              "amount": 1000000,
              "asset_id": 0
            },
            "balances": [
              [
                "HSRPe9u4ZmBj38D5GzPPSz9LLe8J3LpM89o8",
                1101000
              ]
            ],
            "contract_id": "HSRJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
          }
        }
      ],
      "signatures": [
        ]
    },
    "ledger_entries": [
      {
        "from_account": "HSR785tCDTiTNu2FxDkzKazkTvFbVeJ4bAo9A1VuJV7yBdB7J7Ub8",
        "amount": {
          "amount": 1000000,
          "asset_id": 0
        },
        "memo": ""
      }
    ],
    "fee": {
      "amount": 1000,
      "asset_id": 0
    },
    "created_time": "2016-09-28T06:34:09",
    "received_time": "2016-09-28T06:34:09",
    "extra_addresses": [
      "HSRJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
    ]
  }
}
```

返回参数：交易记录

向合约转账（**testing**）

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "wallet_transfer_to_contract_testing",
  "params": [
    "10000",
    "HSR",
    "test01",
    "CONJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
  ]
}
```

请求方法：wallet\_transfer\_to\_contract\_testing

请求参数：转账金额，资产标识，转出账户，合约id

Response Result:

```
{
  "id": "1",
  "result": [
    {
      "amount": 1000,
      "asset_id": 0
    },
    {
      "amount": 1000000000,
      "asset_id": 0
    },
    {
      "amount": 0,
      "asset_id": 0
    }
  ]
}
```

返回参数：交易手续费，转账金额，执行花费

### 查询合约信息

调用前提：无

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "get_contract_info",
  "params": [
    "CONJuxHfWSGo51cGbD3dXvpQs8B5v7MrFZcE"
  ]
}
```

请求方法: `sandbox_get_contract_info`

请求参数：合约id

Response Result:

```
{  
  "id": "1",  
  "result": {  
    "contract_name": "my_contract_1",  
    "id": "CONJuXHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",  
    "level": "forever",  
    "owner": "HSR785tCDTiNu2FxDkzKazkTvfbVeJ4bAo9A1VuJV7yBd87J7UbB",  
    "owner_address": "HSRLMSC5rhePQeVgLQrjqVMdC9pmB97451CG",  
    "owner_name": "",  
    "state": "valid",  
    "description": "this is my first contract",  
    "code_printable": {  
      "abi": [  
        "init",  
        "start"  
      ],  
      "offline_abi": [],  
      "events": [],  
      "printable_storage_properties": [],  
      "printable_code": "  
1b4c7561530019930d0a1a0a0408040808785600000000000000000000000000287740012140453a5c476f6f70616c332e305  
"  
      "code_hash": "df6d3e2343718599ac6343ba2bd3d4e7cc7e7347"  
    },  
    "trx_id": "ccb13cdadfb6a0883863d5b2c9605cd3ba9ab99"  
  }  
}
```

返回参数:

contract\_name: 合约名

id: 合约Id

level: 临时合约还是永久合约

owner: 合约注册人

state: 启用状态

description:合约描述

code\_printable: 字节码信息

trx\_id:合约被注册的交易id

查询合约余额

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "get_contract_balance",
  "params": [
    "CONJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
  ]
}
```

请求方法: sandbox\_get\_contract\_balance

请求参数: 合约id

Response Result:

```
{
  "id": "1",
  "result": [
    {
      "condition": {
        "asset_id": 0,
        "slate_id": 0,
        "type": "withdraw_signature_type",
        "data": {
          "owner": "HSRJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
        }
      },
      "balance": 1000000,
      "deposit_date": "2016-09-28T06:34:00",
      "last_update": "2016-09-28T06:34:00",
      "meta_data": null
    },
    {
      "condition": {
        "asset_id": 0,
        "slate_id": 0,
        "type": "withdraw_signature_type",
        "data": {
          "owner": "HSRJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
        }
      },
      "balance": 0,
      "deposit_date": "2016-09-26T09:08:40",
      "last_update": "2016-09-28T05:44:40",
      "meta_data": null
    }
  ]
}
```

返回参数: 合约保证金balance信息, 合约余额balance信息

打开/关闭本地解释器验证开关

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "blockchain_set_node_vm_enabled",
  "params": [
    "true"
  ]
}
```

请求方法: blockchain\_set\_node\_vm\_enabled

请求参数: true/false,是否启动vm

Response Result:

```
{
  "id": "1",
  "result": null
}
```

返回参数:无

获取是否打开本地解释器验证开关

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "blockchain_get_node_vm_enabled",
  "params": [
  ]
}
```

请求方法: blockchain\_get\_node\_vm\_enabled

请求参数: 无

Response Result:

```
{
  "id": "1",
  "result": true
}
```

返回参数: vm启用状态

导出合约到文件

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "load_contract_to_file",
  "params": [
    "CONJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
    "D:/contract_to_export.gpc"
  ]
}
```

请求方法: load\_contract\_to\_file

请求参数: 合约id, 导出的文件的路径

Response Result:





调用前提：无

Request:

```
{
  "jsonrpc": "2.0",
  "id": "0",
  "method": "get_contract_registered_in_transaction",
  "params": [
    "8bfce6f1d70f6b61a98d62910c18c25b2b8a8154"
  ]
}
```

请求方法：get\_contract\_registered\_in\_transaction

请求参数：合约id

Response Result:

```
{
  "id": "0",
  "result": "CON8wiH4jjovUC9c6FG7B15kwD6eqaVLVBjw"
}
```

返回参数：合约id

根据合约地址获取创建此合约的原始交易**hash**

调用前提：无

Request:

```
{
  "jsonrpc": "2.0",
  "id": "0",
  "method": "get_transaction_id_contract_registered",
  "params": [
    "CONWYvc7YvfGxs74aMuGY4cb4bX9RyxTjWw"
  ]
}
```

请求方法：get\_transaction\_id\_contract\_registered

请求参数：合约id

Response Result:

```
{
  "id": "0",
  "result": "10c14b782d5574b4d0e4a70eeff788eb07dd7a3f"
}
```

返回参数：交易id

获取链上的所有合约信息

调用前提：无

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "blockchain_get_all_contracts",
  "params": [ ]
}
```

请求方法：blockchain\_get\_all\_contracts

请求参数：无

Response Result:

```
{
  "id":1,
  "result":
  [ "CON9dAKb5nDttSvH3T9oEuTdu3WeScKt8vcv", "CONCs5JotmSyYK696nafFcYAX6iPZh7Xbh2u" ]
}
```

返回参数: 合约地址数组

获取链上的所有永久合约信息

调用前提: 无

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "blockchain_get_forever_contracts",
  "params": [ ]
}
```

请求方法: blockchain\_get\_forever\_contracts

请求参数: 无 Response Result:

```
{
  "id":1,
  "result":[["HSR9dAKb5nDttSvH3T9oEuTdu3WeScKt8vcv", "wens"]]
}
```

返回参数: 合约名数组

获取钱包下账户的合约信息

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "wallet_get_contracts",
  "params": [ "account_name" ] (如果不填参数默认是获取钱包下所有账户的合约信息)
}
```

请求方法: wallet\_get\_contracts

请求参数: 账户名

Response Result:

```
{
  "id":1,
  "result":[ "CON9dAKb5nDttSvH3T9oEuTdu3WeScKt8vcv", "CONCs5JotmSyYK696nafFcYAX6iPZh7Xbh2u" ]
}
```

请求参数:合约id数组

扫描更新钱包下所有账户的合约信息

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "wallet_scan_contracts",
  "params": [""]
}
```

请求方法: wallet\_scan\_contracts

请求参数: 无

Response Result:

```
{
  "id": 1,
  "result": null
}
```

返回参数: 无

沙箱相关

打开沙箱

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_open",
  "params": [
  ]
}
```

请求方法: sandbox\_open

请求参数: 无

Response Result:

```
{
  "id": "1",
  "result": null
}
```

返回参数: 无

关闭沙箱

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁, 沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_close",
  "params": [
  ]
}
```

请求方法: sandbox\_close

请求参数: 无

Response Result:

```
{
  "id": "1",
  "result": null
}
```

返回参数: 无

## 沙箱中编译合约

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁, 沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_compile_contract",
  "params": [
    "C:/Users/hasee/Desktop/test.glua"
  ]
}
```

请求方法: sandbox\_compile\_contract

请求参数: 合约源码路径

Response Result:

```
{
  "id": "1",
  "result": "C:/Users/hasee/Desktop/test.gpc"
}
```

返回参数: 编译生成的合约字节码文件路径

## 沙箱中注册合约（沙箱）

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁, 沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_register_contract",
  "params": [
    "test01",
    "C:/Users/hasee/Desktop/test1.gpc",
    "HSR",
    "0.1"
  ]
}
```

请求方法: sandbox\_register\_contract

请求参数: 注册人, 字节码文件路径, 资产标识, 执行花费上限

Response Result:

```
{
  "id": "1",
  "result": "CONJuXHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
}
```

返回参数: 合约id

## 沙箱中注册合约（沙箱testing）

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁, 沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_register_contract_testing",
  "params": [
    "test01",
    "C:/Users/hasee/Desktop/test1.gpc"
  ]
}
```

请求方法: sandbox\_register\_contract\_testing

请求参数: 注册人, 合约字节码文件

Response Result:

```
{
  "id": "1",
  "result": [
    {
      "amount": 1000,
      "asset_id": 0
    },
    {
      "amount": 10000000,
      "asset_id": 0
    },
    {
      "amount": 473,
      "asset_id": 0
    },
    {
      "amount": 100,
      "asset_id": 0
    }
  ]
}
```

返回参数: 交易手续费, 合约保证金, 执行花费, 字节码花费, 注册执行花费

沙箱中调用合约（沙箱）

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁, 沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "0",
  "method": "sandbox_call_contract",
  "params": [
    "CONMR24hkhmuJ8X6eiEhdT2vqV1FvCcS5vDf",
    "hsr0",
    "print",
    "",
    "HSR",
    "1"
  ]
}
```

请求方法: sandbox\_call\_contract

请求参数: 合约id, 调用发起人, 调用方法, 调用参数, 资产符号, 执行花费上限

Response Result:

```

{
  "id": "0",
  "result": {
    "index": 0,
    "entry_id": "d57f3b339a40eb1d9a72359d1a3c9d9e67434673",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-11-21T06:53:19",
      "HSR_account": "",
      "HSR_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "call_contract_op_type",
          "data": {
            "caller": "HSR8CqTJMSBzggFxudU5TWzQyVDgmqrqax3ApNDGDwEZV7uXKTND2",
            "balances": [
              [
                "HSRJqWqjsVdAXCK99knVmeCE7EpAuFdTmFux",
                101000
              ]
            ],
            "contract": "HSRMR24hkhmuJ8X6eiEhdT2vqV1FvCcS5vDf",
            "costlimit": {
              "amount": 100000,
              "asset_id": 0
            },
            "method": "print",
            "args": ""
          }
        }
      ],
      "signatures": [
        "2030cd70eadf10532a4b27613252c3c2c5bd61ccd5f22911c18727676625cae9411ffed0f6383efdd48568ed95559d9815"
      ]
    },
    "ledger_entries": [],
    "fee": {
      "amount": 1000,
      "asset_id": 0
    },
    "created_time": "2016-11-21T05:53:19",
    "received_time": "2016-11-21T05:53:19",
    "extra_addresses": []
  }
}

```

返回参数: 交易记录

沙箱中调用合约（沙箱**testing**）

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁, 沙箱打开

Request:

```

{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_call_contract_testing",
  "params": [
    "CONJuXHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
    "test01",
    "function_not_exist",
    ""
  ]
}

```

请求方法: sandbox\_call\_contract\_testing

请求参数: 合约id, 调用发起人, 调用方法, 调用参数

Response Result:

```

{
  "id": "1",
  "result": [
    {
      "amount": 1000,
      "asset_id": 0
    },
    {
      "amount": 103,
      "asset_id": 0
    }
  ]
}

```

返回参数：交易手续费，执行花费

沙箱中升级合约（沙箱）

调用前提：RPC登录认证成功，钱包打开，钱包解锁，沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_upgrade_contract",
  "params": [
    "CONJuXHfW5Go51cGbD3dXVpQs8B5v7MrFZcE",
    "test01",
    "my_contract_1",
    "this is my first contract"
    "HSR"
    "10"
  ]
}
```

请求方法：sandbox\_upgrade\_contract

请求参数：合约id，升级发起人，合约新名称，合约描述，资产符号，执行花费上限

Response Result:

```
{
  "id": "1",
  "result": {
    "index": 0,
    "entry_id": "1a6f38c365c7b14d4d24a263c74c9d80f0296394",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-09-28T06:44:46",
      "HSR_account": "",
      "HSR_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "upgrade_contract_op_type",
          "data": {
            "id": "HSRJuxHfW5Go51cGbD3dXVpQs8B5v7MrFZcE",
            "name": "my_contract_1",
            "desc": "this is my first contract",
            "balances": [
              [
                "HSRPe9u4ZmBj38D5GzPPSsz9LLe8J3LpM89o8",
                1000
              ]
            ]
          }
        }
      ],
      "signatures": [
        "2027fbcf936eeb898593fade96c26bef189462d60b1e60a8fb95f73cbfd0e6632423346678f5691a9f7f5e20681656b7c"
      ]
    },
    "ledger_entries": [
      {
        "amount": {
          "amount": 0,
          "asset_id": 0
        },
        "memo": ""
      }
    ],
    "fee": {
      "amount": 10001000,
      "asset_id": 0
    },
    "created_time": "2016-09-28T05:44:46",
    "received_time": "2016-09-28T05:44:46",
    "extra_addresses": [
      "HSRJuxHfW5Go51cGbD3dXVpQs8B5v7MrFZcE"
    ]
  }
}
```

返回参数：交易记录

沙箱中升级合约（沙箱testing）

调用前提：RPC登录认证成功，钱包打开，钱包解锁，沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_upgrade_contract_testing",
  "params": [
    "CONJuXHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
    "test01",
    "my_contract_1",
    "this is my first contract"
  ]
}
```

请求方法: sandbox\_upgrade\_contract\_testing

请求参数: 合约id, 升级发起人, 合约新名称, 合约描述

Response Result:

```
{
  "id": "1",
  "result": [
    {
      "amount": 1000,
      "asset_id": 0
    },
    {
      "amount": 16,
      "asset_id": 0
    },
    {
      "amount": 1000000,
      "asset_id": 0
    }
  ]
}
```

返回参数: 交易手续费, 执行花费, 保证金

沙箱中删除合约（沙箱）

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁, 沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_destroy_contract",
  "params": [
    "CONPZdkAuyDthftdDzp8Hg7PqyK9MiTnL2q",
    "test01",
    "HSR",
    "10"
  ]
}
```

请求方法: sandbox\_destroy\_contract

请求参数: 合约id, 删除发起人, 资产id, 执行费用上限

Response Result:



```

{
  "id": "1",
  "result": {
    "index": 0,
    "entry_id": "111eae250a783bba4d9f5e8bee56af762b447dfe",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-09-28T07:02:06",
      "HSR_account": "",
      "HSR_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "destroy_contract_op_type",
          "data": {
            "id": "HSRPZdkAuyDthiftdDzp8Hg7PqyK9MiTnL2q",
            "balances": [
              [
                "HSRPe9u4ZmBj38D5GzPPSz9LLe8J3LpM89o8",
                1000
              ]
            ]
          }
        }
      ],
      "signatures": [
        "1f4d9614000a6000940b98186d28f1e28faa0326f912b234ed31822c10140889b72183551449b0b18da4c9f4c355b3453"
      ]
    },
    "ledger_entries": [
      {
        "amount": {
          "amount": 0,
          "asset_id": 0
        },
        "memo": ""
      },
      {
        "fee": {
          "amount": 1000,
          "asset_id": 0
        },
        "created_time": "2016-09-28T06:02:06",
        "received_time": "2016-09-28T06:02:06",
        "extra_addresses": [
          "HSRPZdkAuyDthiftdDzp8Hg7PqyK9MiTnL2q"
        ]
      }
    ]
  }
}

```

返回参数：交易记录

沙箱中删除合约（沙箱**testing**）

调用前提：RPC登录认证成功，钱包打开，钱包解锁，沙箱打开

Request:

```

{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_destroy_contract_testing",
  "params": [
    "CONPZdkAuyDthiftdDzp8Hg7PqyK9MiTnL2q",
    "test01"
  ]
}

```

请求方法：sandbox\_destroy\_contract\_testing

请求参数：合约id，删除发起人

Response Result:

```

{
  "id": "1",
  "result": [
    {
      "amount": 1000,
      "asset_id": 0
    },
    {
      "amount": 16,
      "asset_id": 0
    }
  ]
}

```

返回参数：交易手续费，执行花费

沙箱中转账到合约（沙箱）

调用前提：RPC登录认证成功，钱包打开，钱包解锁，沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_transfer_to_contract",
  "params": [
    "10",
    "HSR",
    "test01",
    "CONJuxHfW5Go51cGbD3dXVpQs8B5v7MrFZcE",
    "1"
  ]
}
```

请求方法：sandbox\_transfer\_to\_contract

请求参数：转账金额，资产标识，转出账户，合约id，执行花费上限

Response Result:

```
{
  "id": "1",
  "result": {
    "index": 0,
    "entry_id": "1003bfb6f006509eadaa0567152b995aca63db1b",
    "block_num": 0,
    "is_virtual": false,
    "is_confirmed": false,
    "is_market": false,
    "trx": {
      "expiration": "2016-09-28T07:34:09",
      "HSR_account": "",
      "HSR_inport_asset": {
        "amount": 0,
        "asset_id": 0
      },
      "operations": [
        {
          "type": "transfer_contract_op_type",
          "data": {
            "from": "HSR785tCDTiTNu2FxKzKazkTvFbVeJ4bAo9A1VuJV7yBd87J7Ub8",
            "costlimit": {
              "amount": 100000,
              "asset_id": 0
            },
            "transfer_amount": {
              "amount": 1000000,
              "asset_id": 0
            },
            "balances": [
              [
                "HSRPe9u4ZmBj38D5GzPPSz9LLe8J3LpM89o8",
                1101000
              ]
            ],
            "contract_id": "HSRJuxHfW5Go51cGbD3dXVpQs8B5v7MrFZcE"
          }
        }
      ],
      "signatures": [
        "1f0acb0ab2c3338e478157e02bcd770e22a832b85ace93bb58cc7e9c3f241b59e7029f1c7a029417d3753dc508712e93"
      ]
    },
    "ledger_entries": [
      {
        "from_account": "HSR785tCDTiTNu2FxKzKazkTvFbVeJ4bAo9A1VuJV7yBd87J7Ub8",
        "amount": {
          "amount": 1000000,
          "asset_id": 0
        },
        "memo": ""
      }
    ],
    "fee": {
      "amount": 1000,
      "asset_id": 0
    },
    "created_time": "2016-09-28T06:34:09",
    "received_time": "2016-09-28T06:34:09",
    "extra_addresses": [
      "HSRJuxHfW5Go51cGbD3dXVpQs8B5v7MrFZcE"
    ]
  }
}
```

返回参数: 交易记录

## 沙箱中向合约转账（沙箱**testing**）

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁, 沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_transfer_to_contract_testing",
  "params": [
    "10000",
    "HSR",
    "test01",
    "CONJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
  ]
}
```

请求方法: sandbox\_transfer\_to\_contract\_testing

请求参数: 转账金额, 资产标识, 转出账户, 合约id

Response Result:

```
{
  "id": "1",
  "result": [
    {
      "amount": 1000,
      "asset_id": 0
    },
    {
      "amount": 1000000000,
      "asset_id": 0
    },
    {
      "amount": 0,
      "asset_id": 0
    }
  ]
}
```

返回参数: 交易手续费, 转账金额, 执行花费

## 沙箱中查询合约信息

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁, 沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_get_contract_info",
  "params": [
    "CONJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
  ]
}
```

请求方法: sandbox\_get\_contract\_info

请求参数: 合约id

Response Result:

```
{
  "id": "1",
  "result": {
    "contract_name": "my_contract_1",
    "id": "CONJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
    "level": "forever",
    "owner": "HSR785tCDTiTNu2FxDkzKazkTvFbVeJ4bAo9A1VuJV7yBd8J7UbB",
    "state": "valid",
    "description": "this is my first contract",
    "code_printable": {
      "abi": [
        "init",
        "start"
      ],
      "offline_abi": [],
      "events": [],
      "printable_code":
"1b4c7561530019930d0a1a0a0408040808785600000000000000000000000000287740012140453a5c476f6f70616c332e305"
      "code_hash": "df6d3e2343718599ac6343ba2bd3d4e7cc7e7347"
    },
    "trx_id": "ccb1c3cdadfb6a0883863d5b2c9605cd3ba9ab99"
  }
}
```

返回参数:

contract\_name: 合约名

id: 合约Id

level: 临时合约还是永久合约

owner: 合约注册人

state: 启用状态

description: 合约描述

code\_printable: 字节码信息

trx\_id: 合约被注册的交易id

沙箱中查询合约余额

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁, 沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_get_contract_balance",
  "params": [
    "CONJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE"
  ]
}
```

请求方法: sandbox\_get\_contract\_balance

请求参数: 合约id

Response Result:

```
{
  "id": "1",
  "result": [
    {
      "condition": {
        "asset_id": 0,
        "slate_id": 0,
        "type": "withdraw_signature_type",
        "data": {
          "owner": "HSRJuxHfW5Go51cGbD3dXVpQs8B5v7MrFZcE"
        }
      },
      "balance": 1000000,
      "deposit_date": "2016-09-28T06:34:00",
      "last_update": "2016-09-28T06:34:00",
      "meta_data": null
    },
    {
      "condition": {
        "asset_id": 0,
        "slate_id": 0,
        "type": "withdraw_signature_type",
        "data": {
          "owner": "HSRJuxHfW5Go51cGbD3dXVpQs8B5v7MrFZcE"
        }
      },
      "balance": 0,
      "deposit_date": "2016-09-26T09:08:40",
      "last_update": "2016-09-28T05:44:40",
      "meta_data": null
    }
  ]
}
```

返回参数：合约保证金**balance**信息，合约余额**balance**信息

沙箱中查询账户余额

调用前提：RPC登录认证成功，钱包打开，钱包解锁，沙箱打开

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "sandbox_account_balance",
  "params": [
    "test01"
  ]
}
```

请求方法：sandbox\_account\_balance

请求参数：账户名

Response Result:

```
{
  "id": "1",
  "result": [
    [
      "test01",
      [
        [
          0,
          28981277
        ]
      ]
    ]
  ]
}
```

返回参数：用户名，balance记录数组

本地脚本相关

编译本地脚本

调用前提：无

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "compile_script",
  "params": [
    "C:/Users/hasee/Desktop/test.lua"
  ]
}
```

请求方法: compile\_script

请求参数：脚本全路径

Response Result:

```
{
  "id": "1",
  "result": "C:/Users/hasee/Desktop/test.script"
}
```

返回参数:

编译生成的字节码文件全路径

查询本地指定脚本信息

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "get_script_info",
  "params": [
    "SCRARHqLKbP7Sigme6X5cjHUjxBh9UKFQd8"
  ]
}
```

请求方法: `get_script_info`

请求参数：脚本id

Response Result:

[illegible]

返回参数:

id:脚本id

enable:启用状态

code\_printable:字节码信息

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "list_scripts",
  "params": [
  ]
}
```

请求方法: list\_scripts

请求参数：无

Response Result:

[illegible]

返回参数：脚本信息数组

## 添加新的本地脚本

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "add_script",
  "params": [
    "C:/Users/hasee/Desktop/test.script",
    "this is my first script"
  ]
}
```

请求方法: add\_script

请求参数：脚本全路径，脚本描述

Response Result:

```
{
  "id": "1",
  "result": "SCRARHqLKbP7Sigkme6X5cjHUjxBh9UKFQd8"
}
```

返回参数：脚本id

删除本地脚本

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "remove_script",
  "params": [
    "SCRARHqLKbP7Sigkme6X5cjHUjxBh9UKFQd8"
  ]
}
```

请求方法：remove\_script

请求参数：脚本id

Response Result:

```
{
  "id": "1",
  "result": null
}
```

返回参数：无

禁用一个本地脚本

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "disable_script",
  "params": [
    "SCRARHqLKbP7Sigkme6X5cjHUjxBh9UKFQd8"
  ]
}
```

请求方法：disable\_script

请求参数：脚本id

Response Result:

```
{
  "id": "1",
  "result": null
}
```

返回参数：无

启用一个本地脚本

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:



```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "enable_script",
  "params": [
    "SCRARHqLkbP7Sigkme6X5cjHUjxBh9UKFQd8"
  ]
}
```

请求方法: enable\_script

请求参数: 脚本id

Response Result:

```
{
  "id": "1",
  "result": null
}
```

返回参数: 无

查询与合约中的**Event**相关的本地脚本

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "list_event_handler",
  "params": [
    "CONJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
    "event_type1"
  ]
}
```

请求方法: list\_event\_handler

请求参数: 合约id, 事件类型

Response Result:

```
{
  "id": "1",
  "result": [
    "SCRARHqLkbP7Sigkme6X5cjHUjxBh9UKFQd8"
  ]
}
```

返回参数: 脚本id数组

向合约中的**Event**添加一个相关的本地脚本

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "add_event_handler",
  "params": [
    "CONJuxHfWSGo51cGbD3dXVpQs8B5v7MrFZcE",
    "event_type1",
    "SCRARHqLkbP7Sigkme6X5cjHUjxBh9UKFQd8",
    "0"
  ]
}
```

请求方法: add\_event\_handler

请求参数: 合约id, 事件类型, 脚本id, 脚本触发顺序位置

Response Result:

```
{
  "id": "1",
  "result": null
}
```

返回参数: 无

从合约中的**Event**删除一个相关的本地脚本

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "delete_event_handler",
  "params": [
    "CONJuXHfWSGo51cGbD3dXvpQs8B5v7MrFZcE",
    "event_type1",
    "SCRARHqLKbP7SigmE6X5cjHUjxBh9UKFQd8"
  ]
}
```

请求方法: delete\_event\_handler

请求参数: 合约id,事件类型, 脚本id

Response Result:

```
{
  "id": "1",
  "result": null
}
```

返回参数: 无

导出本地脚本库以及与**Event**的关系库

调用前提: RPC登录认证成功, 钱包打开, 钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "export_script_db",
  "params": [
    "F:/script_db"
  ]
}
```

请求方法: export\_script\_db

请求参数: 导出到的位置

Response Result:

```
{
  "id": "1",
  "result": null
}
```

返回参数: 无

导入本地脚本库以及与**Event**的关系库

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "import_script_db",
  "params": [
    "F:/script_db"
  ]
}
```

请求方法：import\_script\_db

请求参数：导入源数据位置

Response Result:

```
{
  "id": "1",
  "result": null
}
```

返回参数：无

根据脚本**id**查询在脚本绑定的合约以及事件

调用前提：RPC登录认证成功，钱包打开，钱包解锁

Request:

```
{
  "jsonrpc": "2.0",
  "id": "1",
  "method": "get_events_bound ",
  "params": ["SCRARHqLKbP7Sigkne6X5cjHUjxBh9UKFQd8"]
}
```

请求方法：get\_events\_bound

请求参数：脚本id

Response Result:

```
{
  "id": 1,
  "result": [
    {"CON5KWRaxfL7iF7CCnrYviUSKkXKr7Um7QGc,printt"},
    {"CON5KWRaxfL7iF7CCnrYviUSKkXKr7Um7QGc,testevent"}
  ]
}
```

返回参数：元素为{合约id，事件类型}的数组

## RPC Tutorial

### JsonRpc的支持

支持两种JsonRpc模式

- Tcp-JsonRpc模式
- Http-JsonRpc模式

如何启动**RPC**服务端监听

- 启动Tcp-JsonRpc模式

```
hsrcore --rpcuser RPC用户名 --rpcpassword RPC密码 --rpcport 监听端口 --server --data-dir 数据目录
```

示例:

```
hsrcore --rpcuser admin --rpcpassword 123456 --rpcport 10086 --server --data-dir chain_data
```

- 启动Http-JsonRpc模式

```
hsrcore --rpcuser RPC用户名 --rpcpassword RPC密码 --httpdendpoint 监听Endpoint --server --data-dir 数据目录
```

示例:

```
hsrcore --rpcuser admin --rpcpassword 123456 --httpdendpoint 127.0.0.1:8080 --server --data-dir chain_data
```

如何进行一次有效的**RPC**交互

- 在Tcp-JsonRpc模式下
  1. 发起一个TCP连接
  2. 将RPC请求做为数据流, 发送登录(login)的RPC请求, 并接收到正确的RPC返回
  3. 进行RPC交互
  4. 连接断开
- 在Http-JsonRpc模式下
  1. 新增一个http header, key为Authorization, value为随机6个字节 + base64(rpcuser:rpcpassword)
  2. 将RPC请求做为HTTP包的包体, 发起一个HTTP POST请求
  3. 获取HTTP返回, 包体内容就是RPC的返回

简单**DEMO**示例

Python 2.7简单示例

- 在Tcp-JsonRpc模式下

SimpleTcpJsonRpc.py

```
#!/usr/bin/env python
# encoding: utf-8

import socket

def is_receive_complete(data):
    if data is None or data == '':
        return False
    json_start = False
    json_tag_count = 0
    for c in data:
        if c == '{':
            if not json_start:
                json_start = True
                json_tag_count += 1
            elif c == '}':
                json_tag_count -= 1
            if json_start and json_tag_count == 0:
                return True
    return False

def recv_until_json_complete(sd):
    left_data = ""
    while not is_receive_complete(left_data):
        data = sd.recv(4096)
        left_data += data
    return left_data

login_payload = ''' { "jsonrpc": "2.0", "params": [ "admin", "123456" ], "id": "1", "method":
"login" } '''
get_info_payload = ''' { "jsonrpc": "2.0", "params": [], "id": "2", "method": "get_info" } '''

RpcServerEndpoint = "127.0.0.1:10086"
conn_tuple = RpcServerEndpoint.split(":")
endpoint_tuple = (conn_tuple[0], int(conn_tuple[1]))

sd = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
sd.connect(endpoint_tuple)

sd.sendall(login_payload)
recv_data = recv_until_json_complete(sd)
print recv_data

sd.sendall(get_info_payload)
recv_data = recv_until_json_complete(sd)
print recv_data

sd.close()
```

- 在Http-JsonRpc模式下

SimpleHttpJsonRpc.py

```
#!/usr/bin/env python
# encoding: utf-8

import base64
from requests import Request, Session

get_info_payload = {"jsonrpc": "2.0", "params": [], "id": "2", "method": "info"}

rpc_auth = "000000" + base64.b64encode("%s:%s" % ("admin", "123456"))
auth_headers = {'Content-Type': 'application/json', 'Authorization': rpc_auth}
post_url = "http://127.0.0.1:8080/rpc"

s = Session()
req = Request('POST', post_url, json=get_info_payload, headers=auth_headers)
prepped = req.prepare()
resp = s.send(prepped)

print resp.text
```

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