

# BLOCKCHAIN IN IOT AND SUPPLY CHAIN

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**INTRO:** Having the possibility to generate, sign and send transactions from the inside of a system enables any device capable of running the cryptography algorithms to directly take advantage of smart contracts, removing centralized gateways and points of failure. This can be applied to many different fields and increments trust from consumers and third parties.

For example, a supply chain can be monitored from the inside removing any single central authority storing the data and offering to final customers a certificate of the process goods is gone through. Going further, it can enable the economy of things, i.e. objects that can receive payments and offer services in exchange on-demand – like smart electricity meters offering a completely transparent service for the users.

## **ABOUT PROJECT:**

How Blockchain (and IoT) Can Support the Supply Chain Industry?

The biggest problems with the supply chain management industry can be addressed by improving access to data for all stakeholders in a trust-minimized way.

In commerce, supply chain management (SCM), the management of the flow of goods and services, involves the movement and storage of raw materials, of work-in-process inventory, and of finished goods from point of origin to point of consumption.

And within the supply chain management, a supply chain is the connected network of individuals, organizations, resources, activities, and technologies involved in the manufacture and sale of a product or service. A supply chain starts with the delivery of raw material from a supplier to a manufacturer and ends with the delivery of the finished product or service to the end consumer. (Source: Wiki & Investopedia)

WALKTHROUGH ON PROJECT:

Blockchain SCM

localhost/bts\_scm/index.php

# Supply Chain Management System

## Vendors

On receiving ACKNOWLEDGEMENT from IOT devices at material gates release funds to respective vendors address's based on Smart Contracts created.

**Current vendors in queue and awaiting Check-In at Materials Gate for Inventory Audits.**

- Bridgestone -- Tyres  
Send BTS
- NGK Spark Plug Co. -- Spark Plugs  
Send BTS
- Bose Corp -- Speakers  
Send BTS
- GreenKraft Inc -- Fuel Systems & Engines  
Send BTS
- Vystar Corp -- Toppers  
Send BTS
- Anonymous vendor -- xyz Material  
Client Address:   
Amount:   
Send BTS

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## Messages

View details

## Current Balance

Balance that is maintained by the organization on its BLOCKCHAIN Wallet Address.

Get Balance Get Wallet Info

**Balance: 0.601**

## Chain Information:

Wallet\_Version: 60000  
Balance: 0.603  
Unconfirmed\_Balance: 0  
Immature\_Balance: 0  
TxCount: 98  
Keypoololdest: 1550902264  
Keypoolsize: 101  
Paytxfee: 0  
Seed:  
cd9f5e0debe5599726cdf98c59068b0dd493464bc7998435db928402ab97f08

Blockchain SCM

localhost/bts\_scm/index.php

Supply Chain Management System

Vendors

On receiving ACKNOWLEDGEMENT from IOT devices at material gates release funds to respective vendors

chirag@chivb:~/komodo/src

```
chirag@chivb:~/komodo/src$ cd komodo
chirag@chivb:~/komodo$ cd src
chirag@chivb:~/komodo/src$ ./komodod -ac_name=WALRUSCHAIN -ac_supply=2000000 -ad
dnoded=34.236.13.26:9731 -gen -genproclnt=${nproc} &
[1] 7354
chirag@chivb:~/komodo/src$ call komodo_args.(/komodo) NOTARY_PUBKEY.(.)
>>>>>>> WALRUSCHAIN: p2p.9731 rpc.9732 magic.c77470ec 3340297068 2000000 coin
s
Initialized WALRUSCHAIN at 1557169990
set sapling height, if possible from ht.623 1557044217
WALRUSCHAIN transition at 1 (0, 1231006585) -> (1, 1550003140)
SET SAPLING ACTIVATION height.61
WALRUSCHAIN sapling activation at 61
finished loading blocks WALRUSCHAIN
processing /home/chirag/komodo/WALRUSCHAIN/komodostate 3KB, validated.-1
lnd.0x55b48b7879e0 validate /home/chirag/komodo/WALRUSCHAIN/komodostate.lnd fs
lze.1064 datalen.3419 n.266 lastpos.0
/home/chirag/komodo/WALRUSCHAIN/komodostate.lnd validated fpos.3419
took 0 seconds to process /home/chirag/komodo/WALRUSCHAIN/komodostate 3KB
notaryld.-1 Mining WALRUSCHAIN with tromp
try WALRUSCHAIN mining with tromp
skip generating WALRUSCHAIN on-demand block, no tx avail
skip generating WALRUSCHAIN on-demand block, no tx avail
skip generating WALRUSCHAIN on-demand block, no tx avail
```

View details >

Messages

View details >

Asset Node Address: 127.0.0.1:9732

Add node >

Current Balance

Balance that is maintained by the organization on its BLOCKCHAIN Wallet Address.

Get Balance > Get Wallet Info >

Balance:0.0000000

Chain Information:

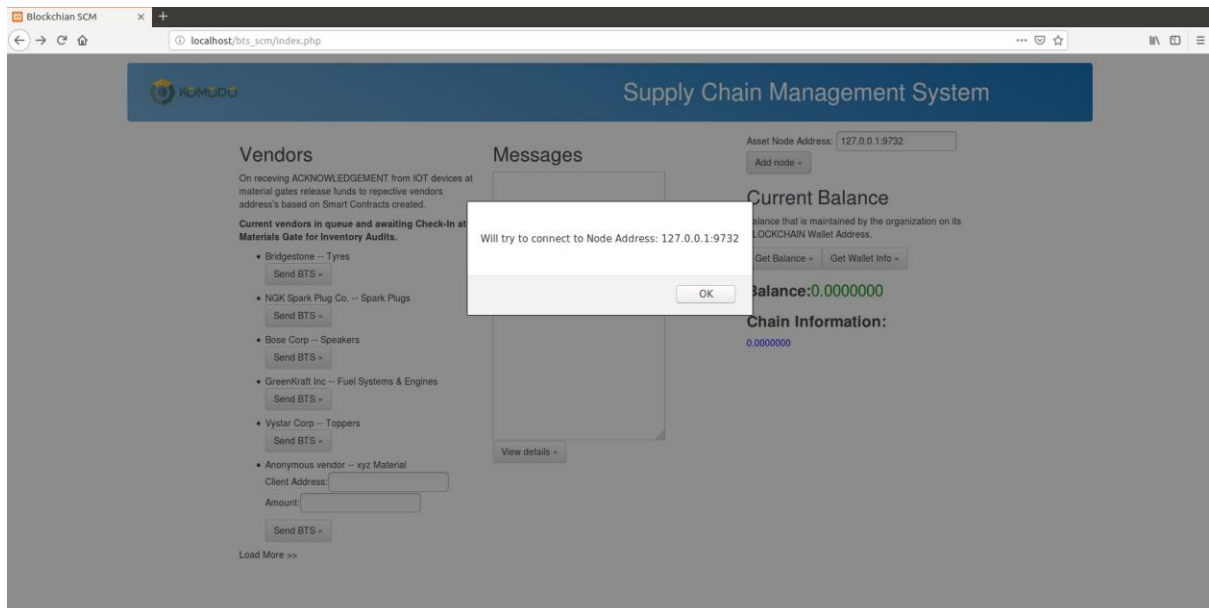
0.0000000

Amount:

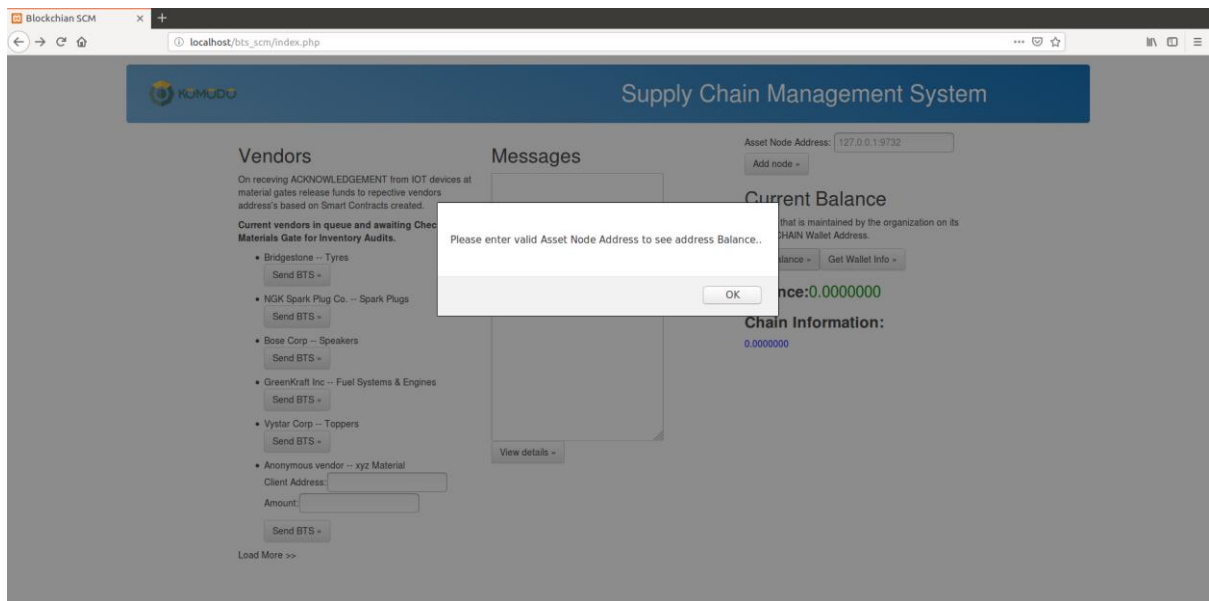
Send BTS >

Load More >>

After providing valid node address with rpc port to connect BTS system with the blockchain server.



Cannot obtain any information if node Address is not entered.




Based on RFID and IoT devices on entry gates of organizations. Audit is taken at inventories and alerts the BTS SCM system. Based on smart contracts logic and quantities that is received from respective vendors, amount is realised in bitcoins.

See the image below to have a clear idea and store the transaction id that is being generated.

Blockchian SCM

localhost/bts\_scm/index.php



Supply Chain Management System

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Send BTS »
- GreenKraft Inc -- Fuel Systems & Engines  
Send BTS »
- Vystar Corp -- Toppers  
Send BTS »
- Anonymous vendor -- xyz Material  
Client Address:   
Amount:   
Send BTS »

[Load More >>](#)

### Messages

Transaction with Tx Id:  
8ec10c4f42670ca7271c1786bcd60f1683  
1f7c897f03fcd8a6689ae77de8780 for  
client Bridgestone is completed.

View details »

Asset Node Address:

Add node »

### Current Balance

Balance that is maintained by the organization on its BLOCKCHAIN Wallet Address.

Get Balance » Get Wallet Info »

**Balance:0.601**


### Chain Information:

Wallet\_Version: 60000  
Balance: 0.8029  
Unconfirmed\_Balance: 0  
Immature\_Balance: 0  
TxCount: 96  
Keypoololdest: 1550902264  
Keypoolsize: 101  
Paytxfee: 0  
Seedfp:  
cd95ed8ebe55999726cdbf98c59068b0dd493464bc79984

In case there are temporary vendors that are still not registered in the system, but we still want to complete the transaction then provide the client address and enter the amount that needs to be transferred. This address is completely known to the manager or organization on their on-trust level.

Blockchian SCM

localhost/bts\_scm/index.php

Supply Chain Management System

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- Vystar Corp -- Toppers  
Send BTS »
- Anonymous vendor -- xyz Material  
Client Address:   
Amount:   
Send BTS »

[Load More >>](#)

### Messages

Transaction with Tx Id:  
3b7541bb976e2782a3fa6757f0d21edc03116639498d46ec182f9e747b1077 for client  
RV9Qrad58eqxko81vffDH4rG8r9PD2Ks Ud is completed.

[View details »](#)

Asset Node Address:

Add node »

### Current Balance

Balance that is maintained by the organization on its BLOCKCHAIN Wallet Address.

Get Balance » Get Wallet Info »

**Balance: 0.601**

### Chain Information:

Wallet\_Version: 60000  
Balance: 0.803  
Unconfirmed\_Balance: 0  
Immature\_Balance: 0  
TxCount: 98  
Keypoololdest: 1550902264  
Keypoolsize: 101  
Paytxfee: 0  
Seedfp:  
cd95ed8ebe55999726cdeb98c59068b0dd493464bc7998435db928402ab971d8

### Some backend snippets:

Using Php and JavaScript fundamentals connecting and making requests to the Blockchain server to get more information.

```

function showWalletInfo() {
    if(nodeAddress!=""){
        $.ajax({
            url: 'rpc_call.php',
            type: 'post',
            data: { "get_wallet_info": "getinfo", "nodeAddress":nodeAddress},
            success: function(response){
                //alert(response);
                document.getElementById("chain_info").innerHTML = response;
            }
        });
    }
    else{
        alert("Please enter valid Asset Node Address to see Wallet Info.. ");
    }
}

```

```

index.php x rpc_call.php x
params: [] / -H 'content-type: text/plain; http://127.0.0.1:9327/

3
4
5 if (isset($_POST['get_wallet_bal'])) {
6     if(isset($_POST['nodeAddress'])){
7         $nodeAddress = $_POST['nodeAddress'];
8         $url = 'http://'.$nodeAddress.'/';
9     }
10    getReceivedByAddressInfo($_POST['get_wallet_bal'],$url);
11 }
12 elseif (isset($_POST['get_wallet_info'])) {
13     if(isset($_POST['nodeAddress'])){
14         $nodeAddress = $_POST['nodeAddress'];
15         $url = 'http://'.$nodeAddress.'/';
16     }
17    getInfo($url);
18 }
19 elseif (isset($_POST['send_address_bal'])) {
20     if(isset($_POST['nodeAddress'])){
21         $nodeAddress = $_POST['nodeAddress'];
22         $url = 'http://'.$nodeAddress.'/';
23     }
24    sendToAddress($_POST['send_address_bal'],$url);
25 }
26
27
28 function getInfo($url){
29     $data = array("jsonrpc" => "1.0", "id" => "curltest","method" => "method", "params"=> "[]");
30     $data_string=json_encode($data);
31     //json_encode($data);
32     $ch = curl_init($url);
33     curl_setopt($ch, CURLOPT_USERPWD, "user1647593239" . ":" . "pass7e6b0d8e6e6af354d69b0a4c4f90226aff7f48aaa912e7d");
34     curl_setopt($ch, CURLOPT_CUSTOMREQUEST, "POST");
35     curl_setopt($ch, CURLOPT_POSTFIELDS, $data_string);
36     curl_setopt($ch, CURLOPT_RETURNTRANSFER, true);
37     curl_setopt($ch, CURLOPT_HTTPHEADER, array('Content-Type: application/json'));
38     $result = curl_exec($ch);
39     // $result= json_encode($result);
40     $chain_info="No Wallet Information Available";
41     $response = json_decode($result,true);
42     foreach($response as $sk=>$v){
43         if($sk == "result"){
44             $chain_info = $v;
45         }
46     }
47 }
48 echo "<div>";
49 echo "<p>Wallet Version: " . $chain_info["walletversion"]."</p>";
50 echo "<p>Balance: " . $chain_info["balance"]."</p>";
51 echo "<p>Unconfirmed_Balance: " . $chain_info["unconfirmed_balance"]."</p>";
52 echo "<p>Immature_Balance: " . $chain_info["immature_balance"]."</p>";
53 echo "<p>Txcount: " . $chain_info["txcount"]."</p>";
54 echo "<p>Keypoololdest: " . $chain_info["keypoololdest"]."</p>";
55 echo "<p>Keypoolsize: " . $chain_info["keypoolsize"]."</p>";
56 echo "<p>Paytxfee: " . $chain_info["paytxfee"]."</p>";
57 echo "<p>Seedfp: " . $chain_info["seedfp"]."</p>";
58 echo "</div>";

```