Order Something!项目文档

设计

一基础区块网络&智能合约

- 业务场景：客户进行外卖点单
  - 1、用户对外卖平台下订单并计算出用户距离，根据距离和商品价格，订金暂存至外卖平台
  - 2、商家确认订单后将餐品送出
  - 3、用户确认收货后，外卖平台根据客户距离向商家支付相应金额

- model.cto 组成：
  - asset
    - Customer

```
asset Customer identified by ID {
  o String ID
  o Double deposit
  o String[] commodities//客户拥有的商品
  o Integer index//客户拥有的商品数
  --> Person owner
}
```

    - Merchant

```
asset Merchant identified by ID {
  o String ID
  o String Name //商家姓名
  o Double deposit
  o Double x //商家坐标x
  o Double y //商家坐标y
  o Double[] commodities//id索引商品价格
  o String[] comname//货物名称
```

```
  o Integer index//指待发货
  --> Customer[] cust//顾客名录
  --> Platform[] plat//平台名录
  o Integer[] commidToDeliver//相应要发的商品id
  --> Person owner
}
```

- Platform

```
asset Platform identified by ID{
  o String ID
  o String Name
  o Double deposit
  o Double[] commidToPay//待付款值
  o Integer index//指待付款
  --> Merchant[] merc//相应要付款的商家
}
```

- participant—Person

```
participant Person identified by ID {
  o String ID
  o String Name
}
```

- transaction
  - Order

```
transaction Order{//下单：客户指定num，客户+num存进mc
  --> Merchant mc
  --> Customer ct
  --> Platform pt
  o Integer num
  o Double x////客户目前x坐标
```

```
  o Double y////客户目前y坐标
}
```

- Deliver

```
transaction Deliver {//送货：mc从index-1位置得到发货num:=id+减对应客户；ct在index位置存活+待付款商家，index+1
  --> Merchant mc
}
```

- Pay

```
transaction Pay {
  //付款：ct从index-1位置得到付款商家+付款商品号num:=id；用num在mt商品数组中索引bill；ct.deposit-bill&&mc.deposit+bill
  --> Platform pt
}
```

- query_customer

```
transaction query_customer{
  o String id
}
```

- logistics

```
transaction logistics{
  --> Merchant from
  --> Customer to
  o Integer num
}
```

- script.js 组成
  - function Order

```
/**
 * Sample transaction processor function.
 * @param {org.example.empty.Order} tx The sample transaction instance.
 * @transaction
```

```
 */
async function Order(tx){
  //下单
    tx.mc.commidToDeliver[tx.mc.index] = tx.num;//对应商家添加订
单，订单号对应到商品
    tx.mc.cust[tx.mc.index] = tx.ct;     //订单号对应到客户
    tx.mc.plat[tx.mc.index] = tx.pt;    //订单号对应到平台
    tx.mc.index += 1;              //对应商家订单总数加一
    tx.ct.deposit -= tx.mc.commodities[tx.num]
+Math.sqrt((tx.mc.x-tx.x)*(tx.mc.x-tx.x)+(tx.mc.y-
tx.y)*(tx.mc.y-tx.y));//对应客户付款
    tx.pt.deposit += tx.mc.commodities[tx.num]
+Math.sqrt((tx.mc.x-tx.x)*(tx.mc.x-tx.x)+(tx.mc.y-
tx.y)*(tx.mc.y-tx.y));//对应平台收款
    const assetRegistry1 = await
getAssetRegistry('org.example.empty.Merchant');//等待更新
    await assetRegistry1.update(tx.mc);
    const assetRegistry2 = await
getAssetRegistry('org.example.empty.Platform');
    await assetRegistry2.update(tx.pt);
    const assetRegistry3 = await
getAssetRegistry('org.example.empty.Customer');
    await assetRegistry3.update(tx.ct);
}


   - function Deliver
/**
 * Sample transaction processor function.
 * @param {org.example.empty.Deliver} tx The sample
transaction instance.
 * @transaction
 */
async function Deliver(tx){
```

```
//送货
    tx.mc.index -= 1;//商家对应的商品数减1
    let num=tx.mc.commidToDeliver[0];//取出第一个要送的商品，对应顾
客和对应平台
    let ct = tx.mc.cust[0];
    let pt = tx.mc.plat[0];
    for(i=0;i<tx.mc.index;i++){
     tx.mc.commidToDeliver[i]=tx.mc.commidToDeliver[i+1];
        tx.mc.cust[i]=tx.mc.cust[i+1];
        tx.mc.plat[i]=tx.mc.plat[i+1];
    }//所有订单号对应的商品，顾客和平台都前移一个
    //对应平台要付的货款加1，对应到对应的货款和商家
    pt.commidToPay[pt.index] = tx.mc.commodities[num];
    pt.merc[pt.index] = tx.mc;
    pt.index += 1;
    //对应客户拥有的货物
    ct.commodities[ct.index] = tx.mc.comname[num];
    ct.index +=1;
    //等待更新
    const assetRegistry1 = await
getAssetRegistry('org.example.empty.Merchant');
    await assetRegistry1.update(tx.mc);
    const assetRegistry2 = await
getAssetRegistry('org.example.empty.Platform');
    await assetRegistry2.update(pt);
    const assetRegistry3 = await
getAssetRegistry('org.example.empty.Customer');
    await assetRegistry3.update(ct);
}


   - function Pay
/**
 * Sample transaction processor function.
```

```
 * @param {org.example.empty.Pay} tx The sample transaction
instance.
 * @transaction
 */
async function Pay(tx){
    tx.pt.deposit-=tx.pt.commidToPay[0];//平台支付货款
    tx.pt.merc[0].deposit+=tx.pt.commidToPay[0];//商家收款
    for(i=0;i<tx.pt.index-1;i++){
        tx.pt.commidToPay[i]=tx.pt.commidToPay[i+1];
        tx.pt.merc[i]=tx.pt.merc[i+1];
    }
    const assetRegistry1 = await
getAssetRegistry('org.example.empty.Merchant');
    await assetRegistry1.update(tx.pt.merc[tx.pt.index-1]);
    tx.pt.index-=1;//平台待支付价款减一
    const assetRegistry2 = await
getAssetRegistry('org.example.empty.Platform');
    await assetRegistry2.update(tx.pt);
}


   - function query_customer
/**
 * Sample transaction processor function.
 * @param {org.example.empty.query_customer} tx The sample
transaction instance.
 * @transaction
 */
  async function query_customer(tx){
    let assetRegistry1 = await
getAssetRegistry('org.example.empty.Customer');
   let resource = await assetRegistry1.getAll();
   let l = resource.length;
   var money=0;
```

```
   for(let i=0; i<l;i++){
      if(resource[i].ID==tx.ID){
          money=resource[i].deposit;
      }
   }
  console.log(money);
  return money;

  }
```

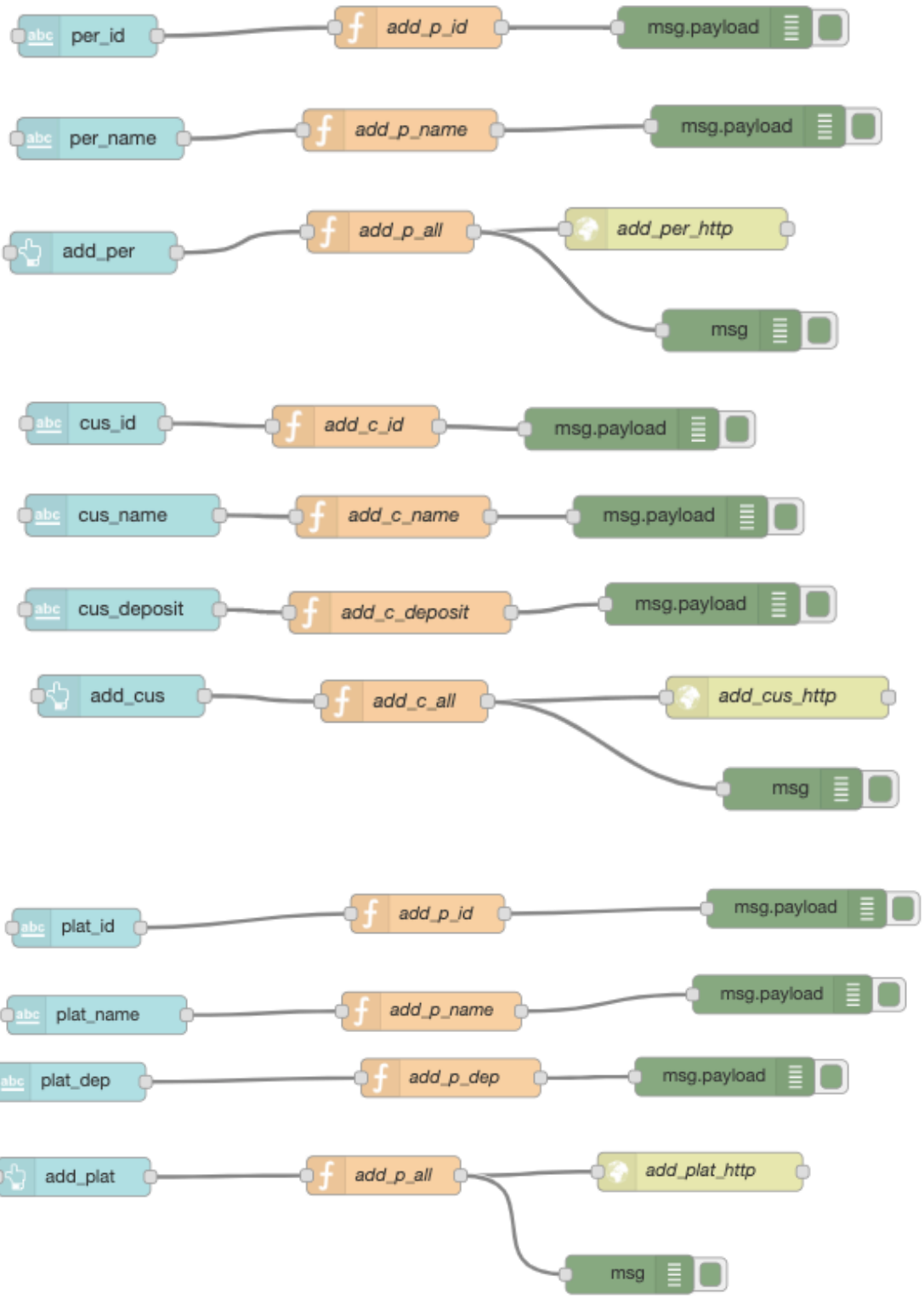
- function logistics

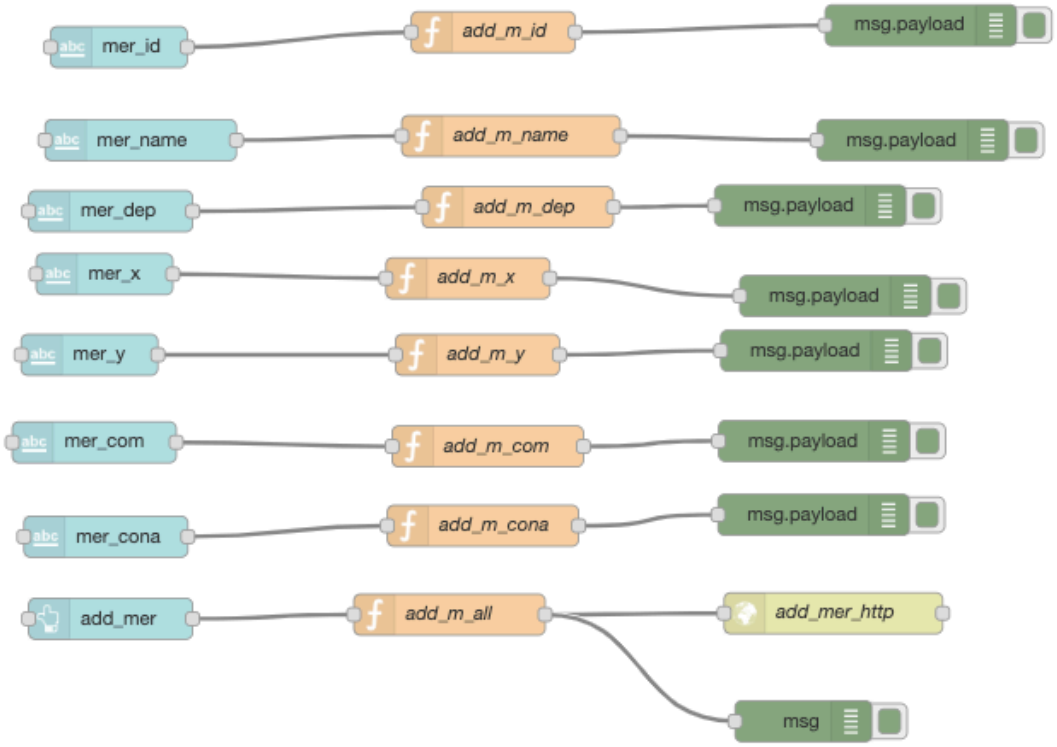
```
/**
 * Sample transaction processor function.
 * @param {org.example.empty.logistics} tx The sample
transaction instance.
 * @transaction
 */
async function logistics(tx){
  console.log("commodity transfer successful");
}
```

-Node-red前端设计

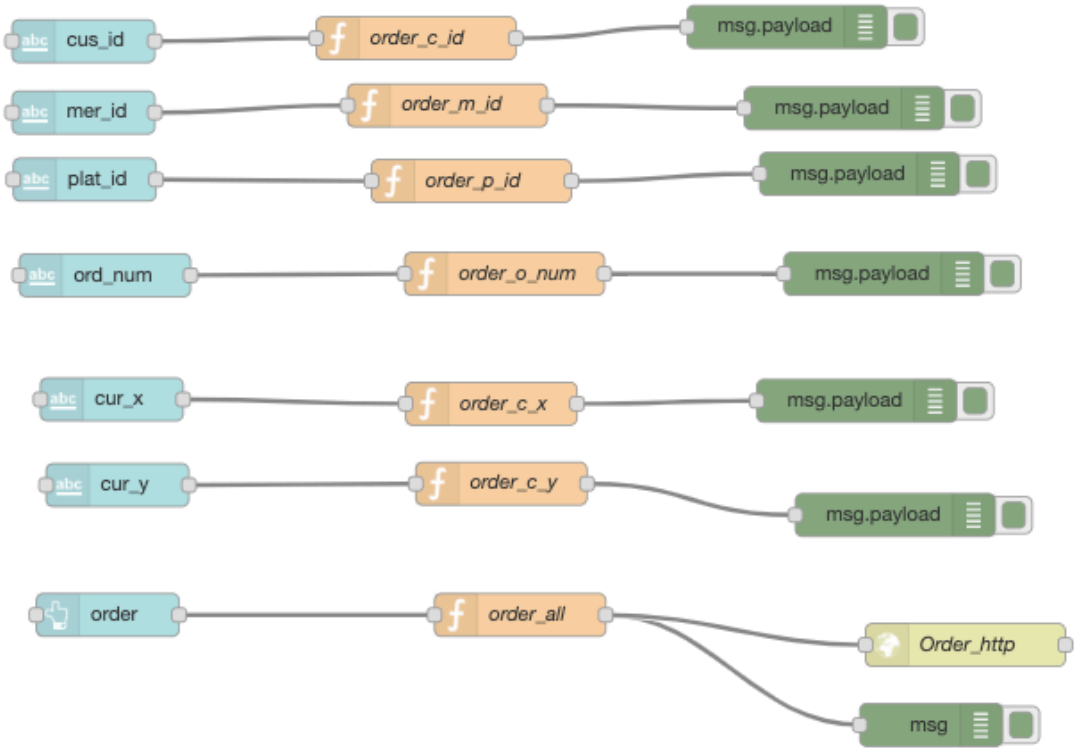
- 流程图

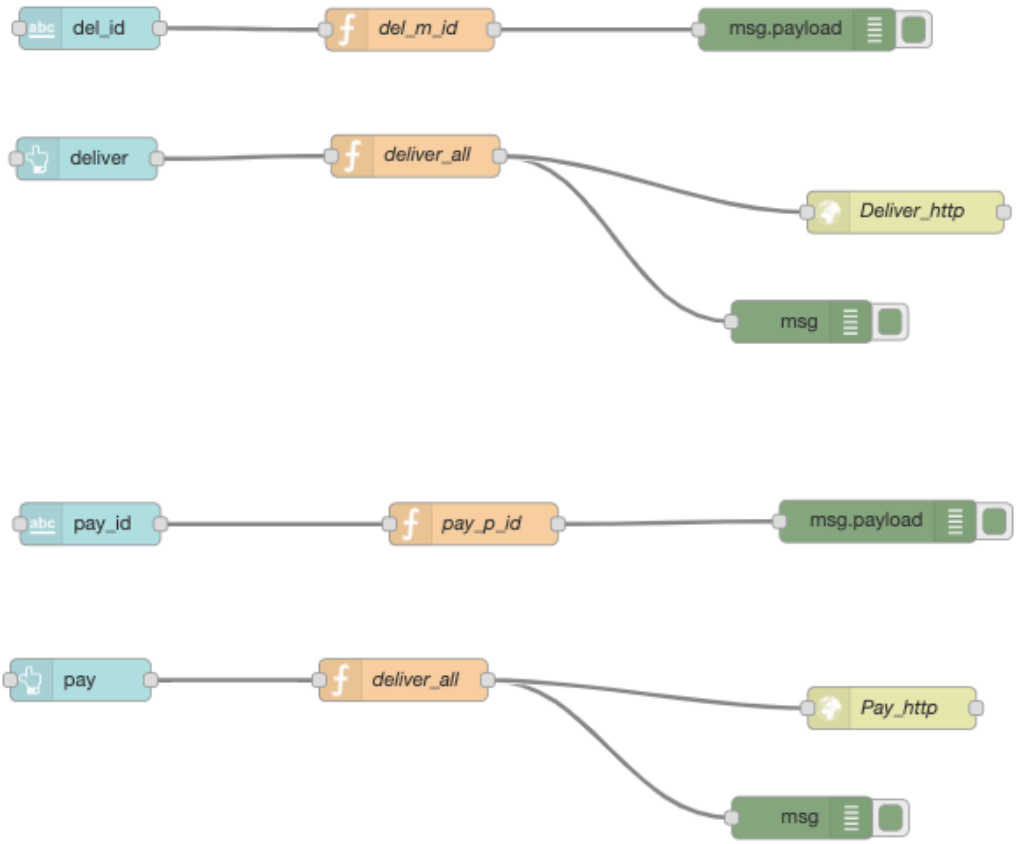
– 添加数据


per_id
add_p_id
msg.payload
per_name
add_p_name
msg.payload
add_per
add_p_all
add_per_http
msg
cus_id
add_c_id
msg.payload
cus_name
add_c_name
msg.payload
cus_deposit
add_c_deposit
msg.payload
add_cus
add_c_all
add_cus_http
msg
plat_id
add_p_id
msg.payload
plat_name
add_p_name
msg.payload
plat_dep
add_p_dep
msg.payload
add_plat
add_p_all
add_plat_http
msg

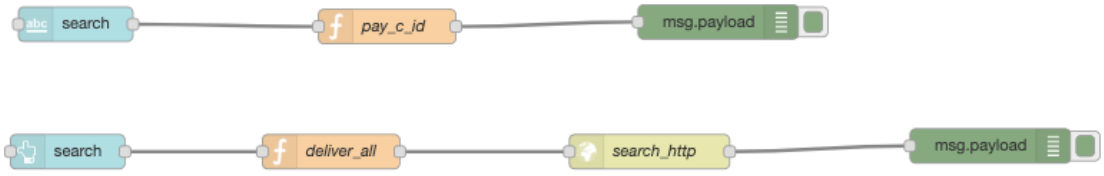

mer_id
add_m_id
msg.payload
mer_name
add_m_name
msg.payload
mer_dep
add_m_dep
msg.payload
mer_x
add_m_x
msg.payload
mer_y
add_m_y
msg.payload
mer_com
add_m_com
msg.payload
mer_cona
add_m_cona
msg.payload
add_mer
add_m_all
add_mer_http
msg

– 交易实现


cus_id
order_c_id
msg.payload
mer_id
order_m_id
msg.payload
plat_id
order_p_id
msg.payload
ord_num
order_o_num
msg.payload
cur_x
order_c_x
msg.payload
cur_y
order_c_y
msg.payload
order
order_all
Order_http
msg

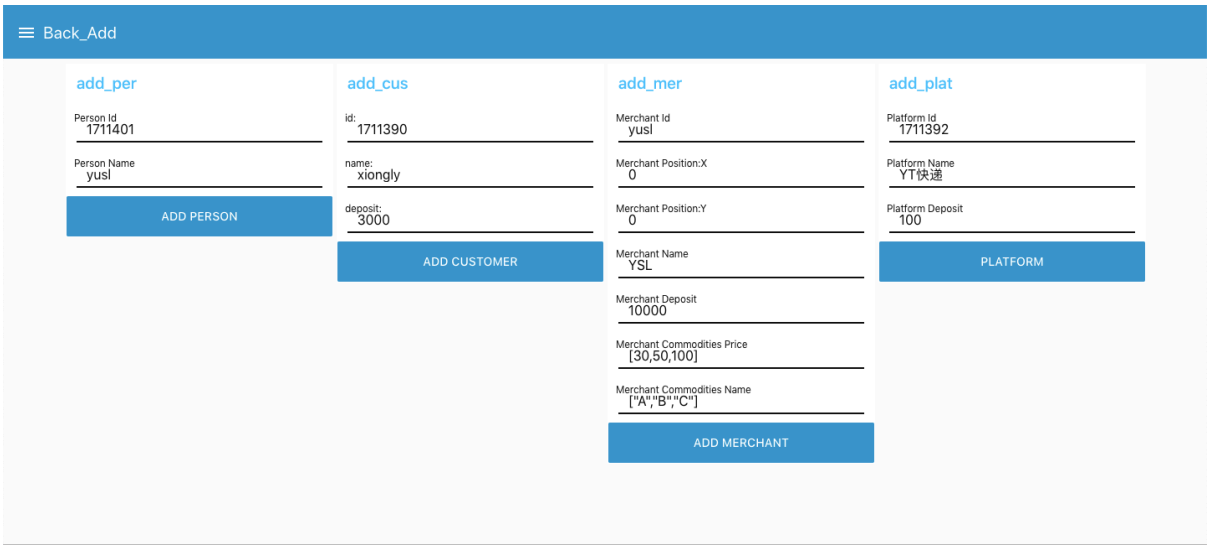

del_id
del_m_id
msg.payload
deliver
deliver_all
Deliver_http
msg
pay_id
pay_p_id
msg.payload
pay
deliver_all
Pay_http
msg

– 查找用户

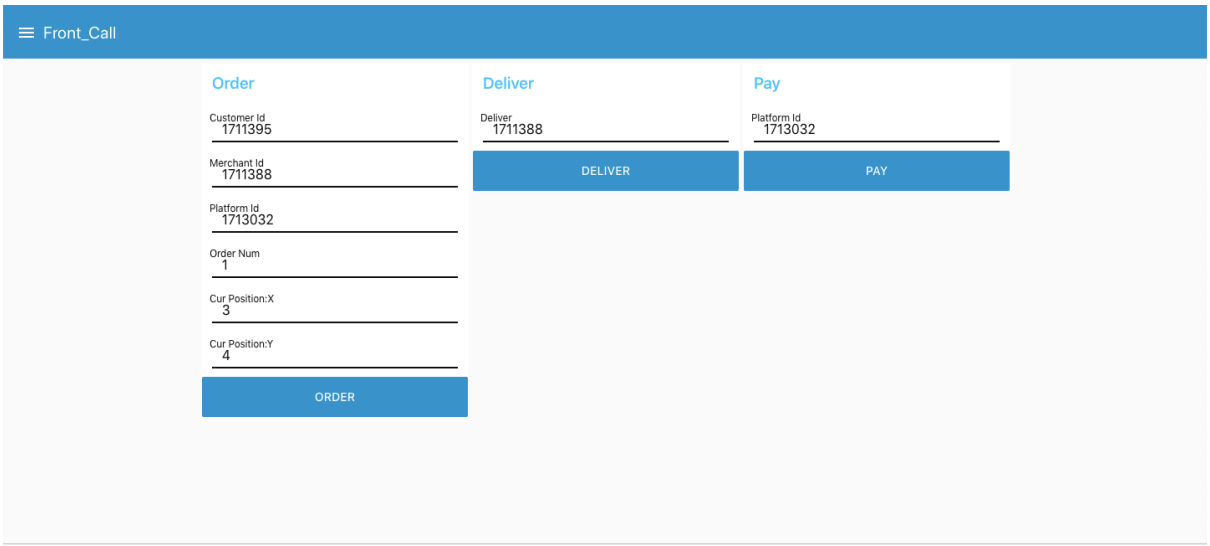

search
pay_c_id
msg.payload
search
deliver_all
search_http
msg.payload

- 效果图

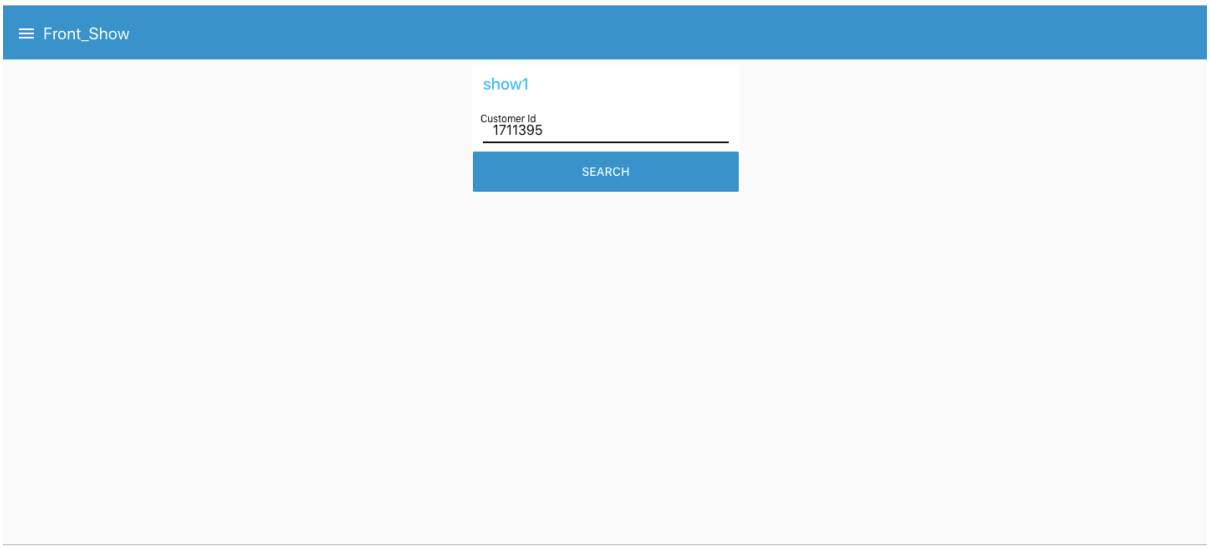
- 添加用户


Back_Add
add_per
Person Id
1711401
Person Name
yusl
ADD PERSON
add_cus
id:
1711390
name:
xiongly
deposit:
3000
ADD CUSTOMER
add_mer
Merchant Id
yusl
Merchant Position:X
0
Merchant Position:Y
0
Merchant Name
YSL
Merchant Deposit
10000
Merchant Commodities Price
[30,50,100]
Merchant Commodities Name
["A","B","C"]
ADD MERCHANT
add_plat
Platform Id
1711392
Platform Name
YT快递
Platform Deposit
100
PLATFORM

- 交易实现


Front_Call
Order
Customer Id
1711395
Merchant Id
1711388
Platform Id
1713032
Order Num
1
Cur Position:X
3
Cur Position:Y
4
ORDER
Deliver
Deliver
1711388
DELIVER
Pay
Platform Id
1713032
PAY

– 查询用户



Readme

Order Something!

PART ONE 基础网络定义:

Participant
`Person`

Asset
`Customer`
`Merchant`

Transaction
`Order`
`Deliver`
`Pay`
`logistics`

To test this Business Network Definition in the **Test** tab:

Create two `Person` participants:

```
```

```
{
    "$class": "org.example.empty.Person",
    "ID": "1",
    "Name": "Toby"
}
{
    "$class": "org.example.empty.Person",
    "ID": "2",
    "Name": "Bob"
}
```

Create a`Customer`asset:

```
{
    "$class": "org.example.empty.Customer",
    "ID": "1",
    "deposit": 0,
    "commodities": [],
    "index": 0,
    "owner": "resource:org.example.empty.Person#1"
}
```

Create a`Merchant`asset:

```
{
    "$class": "org.example.empty.Merchant",
    "ID": "2",
    "owner": "resource:org.example.empty.Person#2",
    "deposit": "original value",
    "x": 0,
    "y": 0,
    "commodities": [],
    "comname": [],
    "index":0,
    "cust": [],
    "plat": [],
    "commidToDeliver": [],
    "owner": "resource:org.example.empty.Person#2"
}
```

Create a`Platform`asset:

```
{
```

```
    "$class": "org.example.empty.Platform",
    "ID": "3",
    "Name": "",
    "deposit": 0,
    "commidToPay": [],
    "index": 0,
    "merc": []

}
```

Submit a `Order` transaction:

```
{
    "$class": "org.example.empty.Order",
    "mc": "resource:org.example.empty.Merchant#2",
    "ct": "resource:org.example.empty.Customer#1",
    "pt": "resource:org.example.empty.Platform#3",
    "num": 4,
    "x": 1,
    "y": 1

}
```

Submit a `Deliver` transaction:

```
{
    "$class": "org.example.empty.Deliver",
    "mc": "resource:org.example.empty.Merchant#ID:2",

}
```

Submit a `Pay` transaction:

```
{
    "$class": "org.example.empty.Pay",
    "pt": "resource:org.example.empty.Platform#3"

}
```

Submit a `logistics` transaction:

```
{
    "$class": "org.example.empty.logistics",
    "from": "resource:org.example.empty.Merchant#2",
    "to": "resource:org.example.empty.Customer#1",
    "num": 4
}
```

Submit a `query_customer` transaction:

```
{
    "$class": "org.example.empty.query_customer",
    "id": ""
}
```

PART TWO 智能合约实现逻辑：

在“Order”阶段，首先系统根据客户的坐标确定运费。之后客户可对我们的外卖平台提交订单（指定一个平台、商品编号、商家）。商家将用户记录在cust数组中，将对应商品编号存入commidToDeliver，并将“指针”变量i“index”+1。将通过commodities数组用商品编号索引出商品价值，平台根据商品价格对s客户进行收款。此时，客户的存款减去相应的金额，平台c存款增加。

"Deliver"阶段，在商家asset的定义中，我们使用“index”变量记录从0位置到index位置为商家此刻还没有进行发货的订单。当商家发起“Deliver”操作时，系统自动为商家根据cust数组中记录的客户顺序和commidToDeliver中记录的商品顺序发出缓冲列表中的第一单，即最早进行的订单。后续的客户和商品依次向数组头移动一位，后续收到的订单被记录在此时的“index”之后。平台此时在merc数组和commidToPay记录待付款的商家和对应商家编号。存储对应客户所拥有的商品的commodities数组从商家comname数组中用商品id索引出商品名称，记录在commodities中。

在对商家付款的“Pay”阶段，平台首先从缓冲表commidToPay[0]和merc[0]位置取出当前要支付的商品编号和相应的商家。平台的存款减去商品的金额，为对应商家存款t增加金额。根据“index”将两个数组中后续的商品编号和商家前移，后续收到的订单被记录在此时的“index”之后。

“logistics”可为我们提示一系列交易已成功进行。

“query_customer”可以实现查看指定客户实时的存款金额。

进行完上述一系列操作，客户commodities中新增商品编号为4的商品名称，客户存款中扣除运费和该商品的价格。平台获得运费，商家获得商品价格。