

总结

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1. 比较通用的要用到的函数:

core/db/DynamicPropertiesStore.java

存的是很多交易类型的交易费用, 也就是下面的 `fee= calcFee()`;

例如: AssetIssueActuator.java 的调用链:

```
public long getAssetIssueFee() {  
    return Optional.ofNullable(getUnchecked(ASSET_ISSUE_FEE))  
        .map(BytesCapsule::getData)  
        .map(ByteArray::toLong)  
        .orElseThrow(  
            () -> new IllegalArgumentException("not found ASSET_ISSUE_FEE"));  
}
```

```
try {  
    this.getAssetIssueFee();  
} catch (IllegalArgumentException e) {  
    this.saveAssetIssueFee(1024000000L);  
}
```

```
public void setDynamicPropertiesStore(final DynamicPropertiesStore dynamicPropertiesStore) {  
    this.dynamicPropertiesStore = dynamicPropertiesStore;  
}
```

```
public DynamicPropertiesStore getDynamicPropertiesStore() {  
    return this.dynamicPropertiesStore;  
}
```

这里的 `calcFee()` 不是一成不变的, 有些地方直接返回 NULL, 具体应该根据上下文代码判断

```
public long calcFee() {  
    return dbManager.getDynamicPropertiesStore().getAssetIssueFee();  
}
```

```
long fee = calcFee();
```

有时候它会给 blackhole 发送 trx, 还没看懂

```
/**  
 * Min TRX account.  
 */  
public AccountCapsule getBlackhole() {  
    return getUnchecked(assertsAddress.get("Blackhole"));  
}
```

```
byte[] getUnchecked(byte[] key);
```

这里的 `getUnchecked` 还有一种情况下会返回 NULL

```
public T getUnchecked(byte[] key) {  
    byte[] value = revokingDB.getUnchecked(key);
```

```
try {
return of(value);
} catch (BadItemException e) {
return null;
}
```

2.各种能改变balance的类型:

(1)发布Token

java/org/tron/core/actuator/AssetIssueActuator.java

```
public long calcFee() {
return dbManager.getDynamicPropertiesStore().getAssetIssueFee();
}
```

```
dbManager.adjustBalance(ownerAddress, -fee);
//里面的逻辑就是直接运算
dbManager.adjustBalance(dbManager.getAccountStore().getBlackhole().getAddress().toByteArray(),
fee);//send to blackhole
```

(2)买储存?

java/org/tron/core/actuator/BuyStorageActuator.java

```
public long calcFee() {
return 0;
}
```

```
AccountCapsule accountCapsule = dbManager.getAccountStore()
.get(buyStorageContract.getOwnerAddress().toByteArray());
long quant = buyStorageContract.getQuant();

storageMarket.buyStorage(accountCapsule, quant);
long newBalance = accountCapsule.getBalance() + quant;
accountCapsule.setBalance(newBalance);
```

(3)

java/org/tron/core/actuator/BuyStorageBytesActuator.java

与BuyStorageActuator一样

(4)创建账户

java/org/tron/core/actuator/CreateAccountActuator.java

```
dbManager.adjustBalance(accountCreateContract.getOwnerAddress().toByteArray(), -fee);
// Add to blackhole address
dbManager.adjustBalance(dbManager.getAccountStore().getBlackhole().createDbKey(), fee);
```

(5)创建交易所

java/org/tron/core/actuator/ExchangeCreateActuator.java

```
public long calcFee() {  
return dbManager.getDynamicPropertiesStore().getExchangeCreateFee();  
}
```

```
long newBalance = accountCapsule.getBalance() - fee;  
accountCapsule.setBalance(newBalance);  
dbManager.getAccountStore().put(accountCapsule.createDbKey(), accountCapsule);  
dbManager.getDynamicPropertiesStore().saveLatestExchangeNum(id);  
  
dbManager.adjustBalance(dbManager.getAccountStore().getBlackhole().createDbKey(), fee);
```

(6)给交易所注资

java/org/tron/core/actuator/ExchangeInjectActuator.java

```
public long calcFee() {  
return 0;  
}
```

```
long newBalance = accountCapsule.getBalance() - calcFee();  
accountCapsule.setBalance(newBalance);
```

(6.5)在交易所交易

java/org/tron/core/actuator/ExchangeTransactionActuator.java

```
public long calcFee() {  
return 0;  
}
```

```
long newBalance = accountCapsule.getBalance() - calcFee();  
accountCapsule.setBalance(newBalance);
```

(7)从交易所撤资

java/org/tron/core/actuator/ExchangeWithdrawActuator.java

这里token和balance混合运算 比较奇怪

```
public long calcFee() {  
return 0;  
}
```

```
long newBalance = accountCapsule.getBalance() - calcFee();  
  
if (Arrays.equals(tokenID, "_".getBytes())) {  
accountCapsule.setBalance(newBalance + tokenQuant);  
} else {  
accountCapsule.addAssetAmountV2(tokenID, tokenQuant, dbManager);  
}  
  
if (Arrays.equals(anotherTokenID, "_".getBytes())) {  
accountCapsule.setBalance(newBalance + anotherTokenQuant);  
} else {
```

```
accountCapsule.addAssetAmountV2(anotherTokenID, anotherTokenQuant, dbManager);
}
```

(8)冻结资产

java/org/tron/core/actuator/FreezeBalanceActuator.java

```
long newBalance = accountCapsule.getBalance() - freezeBalanceContract.getFrozenBalance();
accountCapsule.setBalance(newBalance);
```

(9)购买发行的Token

java/org/tron/core/actuator/ParticipateAssetIssueActuator.java

```
public long calcFee() {
    return 0;
}
```

```
long balance = Math.subtractExact(ownerAccount.getBalance(), cost);
balance = Math.subtractExact(balance, fee); //安全的减法
ownerAccount.setBalance(balance);
```

```
cost = participateAssetIssueContract.getAmount();
```

```
byte[] toAddress = participateAssetIssueContract.getToAddress().toByteArray();
AccountCapsule toAccount = this.dbManager.getAccountStore().get(toAddress);
toAccount.setBalance(Math.addExact(toAccount.getBalance(), cost));
```

(10)转账

java/org/tron/core/actuator/TransferActuator.java

```
long amount = transferContract.getAmount();
byte[] toAddress = transferContract.getToAddress().toByteArray();
byte[] ownerAddress = transferContract.getOwnerAddress().toByteArray();
```

```
dbManager.adjustBalance(ownerAddress, -fee);
dbManager.adjustBalance(dbManager.getAccountStore().getBlackhole().createDbKey(), fee);
```

(11)转账发布的Token

java/org/tron/core/actuator/TransferAssetActuator.java

```
public long calcFee() {
    return 0;
}
```

```
if (toAccountCapsule == null) {
    toAccountCapsule = new AccountCapsule(ByteString.copyFrom(toAddress), AccountType.Normal,
    dbManager.getHeadBlockTimeStamp());
    dbManager.getAccountStore().put(toAddress, toAccountCapsule);

    fee = fee + dbManager.getDynamicPropertiesStore().getCreateNewAccountFeeInSystemContract();
}
```

```
dbManager.adjustBalance(ownerAddress, -fee);
```

```
dbManager.adjustBalance(dbManager.getAccountStore().getBlackhole().createDbKey(), fee);
```

java/org/tron/core/actuator/UnfreezeAssetActuator.java

没找到

(12)解冻资产

java/org/tron/core/actuator/UnfreezeBalanceActuator.java

```
public long calcFee() {
    return 0;
}

long oldBalance = accountCapsule.getBalance();

long unfreezeBalance = 0L;;

byte[] receiverAddress = unfreezeBalanceContract.getReceiverAddress().toByteArray();
//If the receiver is not included in the contract, unfreeze frozen balance for this account.
//otherwise, unfreeze delegated frozen balance provided this account.
if (!ArrayUtils.isEmpty(receiverAddress) && dbManager.getDynamicPropertiesStore().supportDR())
{
    byte[] key = DelegatedResourceCapsule
        .createDbKey(unfreezeBalanceContract.getOwnerAddress().toByteArray(),
            unfreezeBalanceContract.getReceiverAddress().toByteArray());
    DelegatedResourceCapsule delegatedResourceCapsule = dbManager.getDelegatedResourceStore()
        .get(key);

    AccountCapsule receiverCapsule = dbManager.getAccountStore().get(receiverAddress);

    switch (unfreezeBalanceContract.getResource()) {
        case BANDWIDTH:
            unfreezeBalance = delegatedResourceCapsule.getFrozenBalanceForBandwidth();
            delegatedResourceCapsule.setFrozenBalanceForBandwidth(0, 0);
            receiverCapsule.addAcquiredDelegatedFrozenBalanceForBandwidth(-unfreezeBalance);
            accountCapsule.addDelegatedFrozenBalanceForBandwidth(-unfreezeBalance);
            break;
        case ENERGY:
            unfreezeBalance = delegatedResourceCapsule.getFrozenBalanceForEnergy();
            delegatedResourceCapsule.setFrozenBalanceForEnergy(0, 0);
            receiverCapsule.addAcquiredDelegatedFrozenBalanceForEnergy(-unfreezeBalance);
            accountCapsule.addDelegatedFrozenBalanceForEnergy(-unfreezeBalance);
            break;
        default:
            //this should never happen
            break;
    }
    accountCapsule.setBalance(oldBalance + unfreezeBalance);
}
```

(13)提取奖励

java/org/tron/core/actuator/WithdrawBalanceActuator.java

```
AccountCapsule accountCapsule = (Objects.isNull(getDeposit())) ? dbManager.getAccountStore().  
get(withdrawBalanceContract.getOwnerAddress().toByteArray()) :  
getDeposit().getAccount(withdrawBalanceContract.getOwnerAddress().toByteArray());  
long oldBalance = accountCapsule.getBalance();  
long allowance = accountCapsule.getAllowance();  
  
long now = dbManager.getHeadBlockTimeStamp();  
accountCapsule.setInstance(accountCapsule.getInstance().toBuilder()  
.setBalance(oldBalance + allowance)  
.setAllowance(0L)  
.setLatestWithdrawTime(now)  
.build());
```

(14)创建超级节点候选人

java/org/tron/core/actuator/WitnessCreateActuator.java

```
public long calcFee() {  
return dbManager.getDynamicPropertiesStore().getAccountUpgradeCost();  
}  
  
long cost = dbManager.getDynamicPropertiesStore().getAccountUpgradeCost();  
dbManager.adjustBalance(witnessCreateContract.getOwnerAddress().toByteArray(), -cost);  
  
dbManager.adjustBalance(this.dbManager.getAccountStore().getBlackhole().createDbKey(),  
+cost);
```

core/witness/WitnessController.java

貌似还没有加入reward代码??

```
// TODO add vote reward  
// long reward = Math.round(sum.get() * this.manager.getDynamicPropertiesStore()  
// .getVoteRewardRate());  
//account.setBalance(account.getBalance() + reward);  
//accountStore.put(account.createDbKey(), account);
```

```
account.createReadableString();  
  
// TODO add vote reward  
// long reward = Math.round(sum.get() * this.manager.getDynamicPropertiesStore()  
// .getVoteRewardRate());  
//account.setBalance(account.getBalance() + reward);  
//accountStore.put(account.createDbKey(), account);
```