



# Sprint1

## Overview about Cool Cat Transactions

### Find Cool Cat Contract

```
select *  
FROM `bigquery-public-data.crypto_ethereum.transactions`  
where to_address = lower('0x1a92f7381b9f03921564a437210bb9396471050c')
```

**Finding:** I found all cool cat related transactions by setting the contract address of cool cat as to\_address.

**Question:** When I set the from\_address to cool cat contract address I can only find 1 transaction. Why all transactions related to cool cat are in the to\_address.

### Total Number of Transactions for Cool\_cat: all transaction is distinct

```
select count(*) total_transaction  
from `bigquery-public-data.crypto_ethereum.transactions` tr  
where tr.to_address = lower('0x1a92f7381b9f03921564a437210bb9396471050c')
```

total_transaction
24653

## Overview of Transactions and Token\_transfer

### Total Number of Transactions for Cool Cat with Token\_transfer

```
select count(*) total_transaction_with_token
FROM `bigquery-public-data.crypto_ethereum.transactions` tr
join `bigquery-public-data.crypto_ethereum.token_transfers` tk_tr
  on tk_tr.transaction_hash = tr.`hash`
  and tk_tr.block_number = tr.block_number
where tr.to_address = lower('0x1a92f7381b9f03921564a437210bb9396471050c')
```

total_transaction_with_token
17994

## T1 Table: use cool cat transactions left join token\_transfer

```
SELECT tr.`hash` tr_hash, tr.block_number, tr.transaction_index,
  ifnull(cast(tk_tr.value as FLOAT64), 0) token_transfer, tr.receipt_gas_used,
  tr.receipt_cumulative_gas_used,
  tk_tr.from_address, tk_tr.to_address transaction_address
FROM `bigquery-public-data.crypto_ethereum.transactions` tr
left join `bigquery-public-data.crypto_ethereum.token_transfers` tk_tr
  on tk_tr.transaction_hash = tr.`hash`
  and tk_tr.block_number = tr.block_number
where tr.to_address = lower('0x1a92f7381b9f03921564a437210bb9396471050c')
```

## Total Number of Distinct Transactions for Cool Cat with token\_transfer

```
select count(distinct tr_hash) total_distinct_transaction_with_token
FROM t
where token_transfer is not null
```

total_distinct_transaction_with_token
10484

## Total Number of Distinct Transactions with No Token\_transfer

```
select count(distinct tr_hash ) transaction_no_token from t
where token_transfer is null
```

transaction\_no\_token

14172

## Finding

1. There are transactions have multiple token\_transfer
2. There are transactions do not have token\_transfer

**Question:** Why some transactions have multiple token\_transfer?

Can I get the total token\_transfer for each transaction by (group by transaction)?

## T2 Table

```
select distinct tr_hash distinct_tr, block_number, transaction_index,  
    receipt_gas_used, sum(receipt_gas_used) over(partition by tr_hash) total_gas_used,  
    token_transfer, sum(token_transfer) over(partition by tr_hash) total_token_transfer,  
    receipt_cumulative_gas_used,  
from t
```

block_number	transaction_index	receipt_gas_used	total_gas_used	token_transfer	total_token_transfer	receipt_cumulative_gas_used
14110391	80	86561	86561	583.0	583.0	6622440
12744200	93	1756110	26341650	5575.0	83715.0	11248624
12848230	160	73575	73575	9645.0	9645.0	14835672
12864294	77	74263	74263	7670.0	7670.0	7041153
12788601	269	146275	438825	3307.0	1.0E20	14356190

## Question:

1. Sum(receipt\_gas\_used) should be same as receipt\_gas\_used for each transaction, because I think each transaction should only have one receipt\_gas\_used, but there are some difference.
2. If we have total\_token\_transfer and total\_gas\_used for each transaction, should we calculate  $\text{gas\_for\_unit\_token} = \text{total\_gas\_used} / \text{total\_token\_transfer}$ ?

## total\_gas\_used and total\_token\_transfer for each transaction

```
-- some hash has multiple token-transfer
select distinct tr_hash, sum(receipt_gas_used) total_gas_used,
    sum(token_transfer) total_token_transfer from t
group by 1
```

tr_hash	total_gas_used	total_token_transfer
0x0377e5c8a1a2a9ef3ba71a9c7af2e8d9ce209f7ce426b2abbd7d4498c95cc7df	1975968	10690.0
0xd9124cfd22824392153bf20898f6604013cd25e26e59cdd48fff8cd7b8fd1299	28879	0.0
0xc76ac775b8d95d56bd926a6310cc665c7e9ad410d60695a8442a74f98ebb82a4	71381	427.0
0x35c9cf96770406ad78e83825eba6e35a42e009fbd02d44570c1bef9f26a71567	28879	0.0
0x92a2949bff59faa8e9768909fae2a166d55ced21f0c67ff3aa42fb2ad54ebc0d	93963	76.0
0x744405b02d3072aab446e1198d94dfdb47c179496a29463b7c51d70dcb5fee80	28879	0.0
0x744b66e50810e3585baf764b94c9f5f3654184872c2f2451d4a361b5caa12424	71381	8024.0
0x024fddb34e348c2a70cf048c388657dcf1b8044a52ff6d8f3a591e269ca76c35	21000	0.0

### Finding

- I group by tr\_hash because there are some transactions have multiple token\_transfer.

## T3 Table: Number of tr, avg(total\_gas\_used), avg(total\_token\_transfer) in each block,

```
select distinct block_number, count(distinct_tr) as num_transaction,
    avg(total_gas_used) as avg_gas_used_block,
    avg(total_token_transfer) as avg_token_transfer_block
from t2
group by 1
```

block_number	num_transaction	avg_gas_used_block	avg_token_transfer_block
12743463	13	1255699.4615384615	3881.6923076923076
12743391	4	339405.0	1517.75
12744240	21	4.44326950952381E7	109533.33333333333
12744474	21	4.4437760857142866E7	142441.42857142858
12743379	3	117117.66666666666	599.0

### Question:

1. Is it reasonable to calculate the average gas used and average token transferred in each block as this way?
2. Another potential way to calculate

$\text{average\_gas\_per\_block} = \text{receipt\_cumulative\_gas\_used} / \text{transaction\_index}$

## Overview of Cool Cat Block

**B1 Table:** for each block how many total transactions and total gas

```
SELECT block_number,
       count('hash') num_transactions,
       sum(receipt_gas_used) total_gas_used
FROM `bigquery-public-data.crypto_ethereum.transactions`
where to_address = lower('0x1a92f7381b9f03921564a437210bb9396471050c')
group by 1
```

block_number	num_transactions	total_gas_used
12735776	1	153525
12735807	2	307050
12741208	1	153525
12741212	1	153525
12741228	2	309850
12741231	1	153525
12742999	1	28730

## The Number of Blocks in Cool Cat

```
select count(distinct block_number) total_block_used_coolcat from t
```

total_block_used_coolcat
21442

## B2 Table: Max receipt\_cumulative\_gas\_used for each block

```
select block_number, max(receipt_cumulative_gas_used) max_cumulative
from `bigquery-public-data.crypto_ethereum.transactions`
where to_address = lower('0x1a92f7381b9f03921564a437210bb9396471050c')
group by 1
order by 1
```

block_number	max_cumulative
12735776	5323170
12735807	6186745
12741208	8869006
12741212	6948086
12741228	10323697
12741231	3238696
12742999	10838320

## Find Proportion of CoolCat Gas Used in Each Block

```
select b.block_number, num_transactions, total_gas_used,
       max_cumulative, total_gas_used/max_cumulative proportion
from b join max_b
  on b.block_number = max_b.block_number
order by 1, proportion
```

block_number	num_transactions	total_gas_used	max_cumulative	proportion
12735776	1	153525	5323170	0.028840897435174904
12735807	2	307050	6186745	0.04963029832327015
12741208	1	153525	8869006	0.01731028257281594
12741212	1	153525	6948086	0.022096013204211923
12741228	2	309850	10323697	0.030013472886699408
12741231	1	153525	3238696	0.04740333763959322
12742999	1	28730	10838320	0.0026507798256556366

## Energy for Each Transaction

```
select `hash` transaction_hash, receipt_gas_used,
       (receipt_gas_used*0.0000036756792144+66.1136)*20/3600 *0.0004 watt_per_tran
FROM `bigquery-public-data.crypto_ethereum.transactions`
where to_address = lower('0x1a92f7381b9f03921564a437210bb9396471050c')
```

transaction_hash	receipt_gas_used	watt_per_tran
0x935ab5c708d44de8cf5d9d022ec2045860735c59f1641b2aa9bf4826559637b5	74169	1.4752493655922853E-4
0xf57ae0a2ff529d534b6e8cbabcd3bdf08616539b4e0a5bdc23ac490baa441222	86561	1.4762615659661706E-4
0xe7a5d721906f51bfb1ef344f20911d1081e8c0afc1eda06a99b984fc973f6a42	24273	1.4711737724793587E-4
0x56886f70151ad6d2eced15569c36e191a5b9c507754821f9b6dc37cd5613e763	86561	1.4762615659661706E-4
0x2ceb7e63a9939b77469ecc039ec393d71327663ca60b4caa4c47e66723ad55b6	71381	1.475021636844513E-4
0xee8de3611604a2ef7c1452e4da20d3dd01c71150d801c8559fd5d163ab21fc3	74169	1.4752493655922853E-4
0x8b2586e7479f4e1aa9f5f62c4d940b0f34f4d2ca4e8c0bc5e81cd831c35b774e	86561	1.4762615659661706E-4
0x5b7de2cca12b50ce42b231f2ceea4f2c054fcacac603f6a20f6f6be80ea40edc	24273	1.4711737724793587E-4
0xeaa1d46f3bace9c2dd39539a552631241bd8e99f64f53d39a694c3646b62a66b	46173	1.4729626030303666E-4

## Energy for Each Token

block_number	transaction_index	receipt_gas_used	total_gas_used	token_transfer	total_token_transfer	receipt_cumulative_gas_used
14110391	80	86561	86561	583.0	583.0	6622440
12744200	93	1756110	26341650	5575.0	83715.0	11248624
12848230	160	73575	73575	9645.0	9645.0	14835672
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12788601	269	146275	438825	3307.0	1.0E20	14356190

Should we calculated ?:

1.  $\text{gas\_for\_unit\_token} = \text{total\_gas\_used} / \text{total\_token\_transfer}$
2. formula = Find formula of gas with energy
3. Use  $\text{gas\_for\_unit\_token} * \text{formula}$