



# Blockchain 101 With CryptoKitties

Andrew Kennedy, Global Food Traceability Center

# Andrew Kennedy · Global Food Traceability Center



@foodsafetydad

- MBA, Duke · BA Economics
- Co-Founder of FoodLogiQ
- GFTC Director Emeritus
- IFT's GFTC Vision is to become the global resource and authoritative voice on food traceability.
- IFT Led the FDA FSMA traceability pilot in 2012



# Blockchain 101

# Why Blockchain Matters:

*“This is not about the technology, **it’s about trust.**”*

David Furlonger, Research Vice President, Gartner

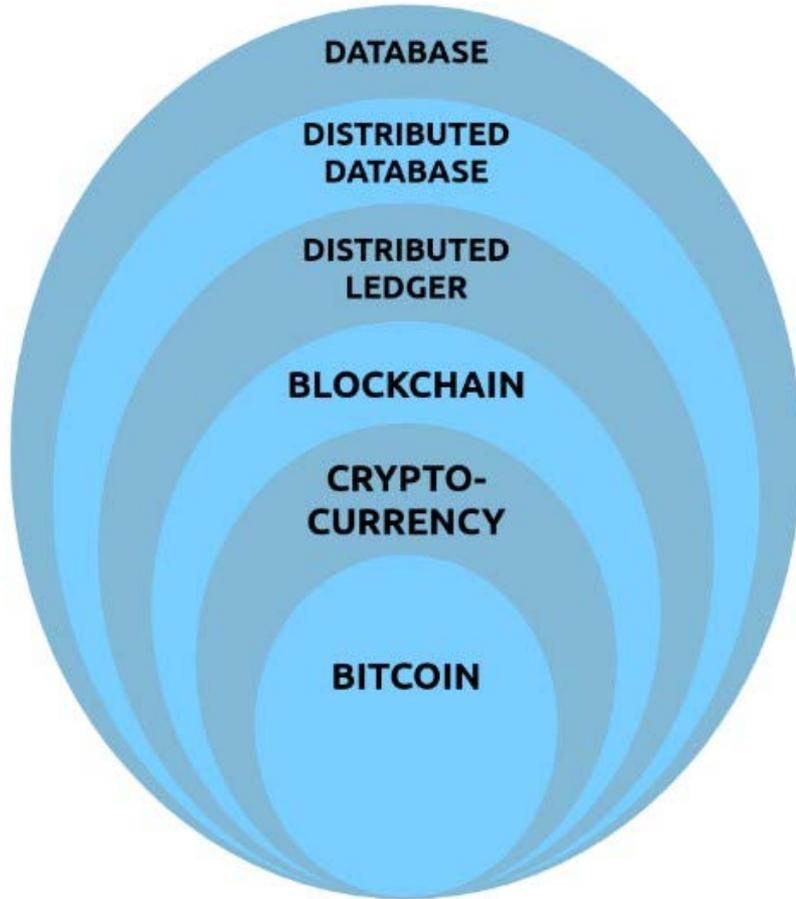
*“The blockchain does one thing: It replaces **third-party trust** with mathematical proof that something happened.”*

Adam Draper, Founder of Boost VC

*“The interesting thing about blockchain is that it has made it possible for humanity to reach a **consensus** about a piece of data without having any authority to dictate it.”*

*Jaan Tallinn, Co-Founder Bluemoon*

# Blockchain Architecture



Source: Sogeti Netherlands 2018

## Leading Cryptocurrencies



Bitcoin (BTC)



Ethereum (ETH)



Ripple (XRP)



Bitcoin Cash (BCH)



Litecoin (LTC)



EOS (EOS)

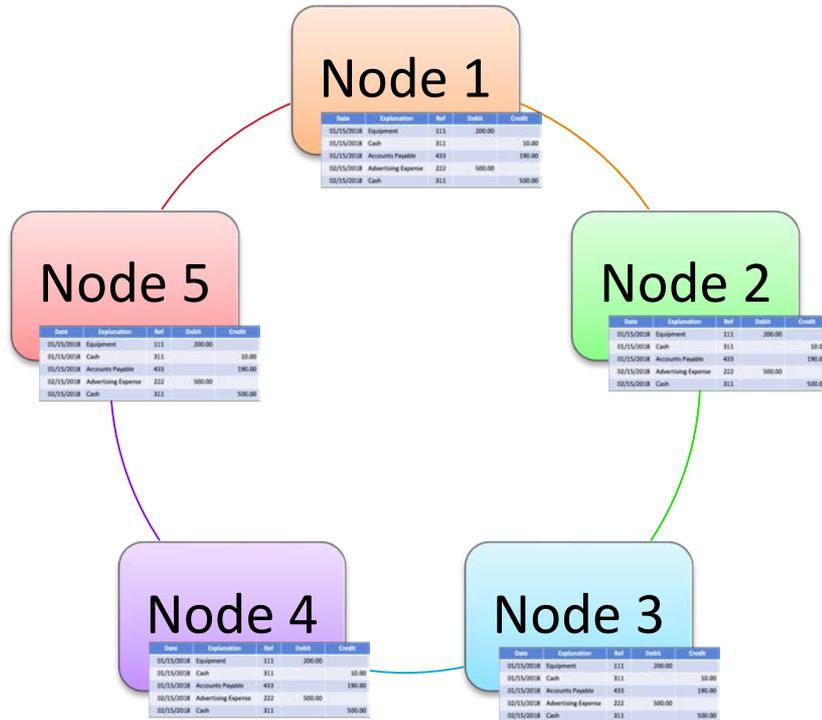
# Ledger

Is the principal book or computer file for recording and totaling economic transactions measured in terms of a monetary unit of account by account type, with debits and credits in separate columns and a beginning monetary balance and ending monetary balance for each account.

Source: <https://en.wikipedia.org/wiki/Ledger>

Date	Explanation	Ref	Debit	Credit
01/15/2018	Equipment	111	200.00	
01/15/2018	Cash	311		10.00
01/15/2018	Accounts Payable	433		190.00
02/15/2018	Advertising Expense	222	500.00	
02/15/2018	Cash	311		500.00

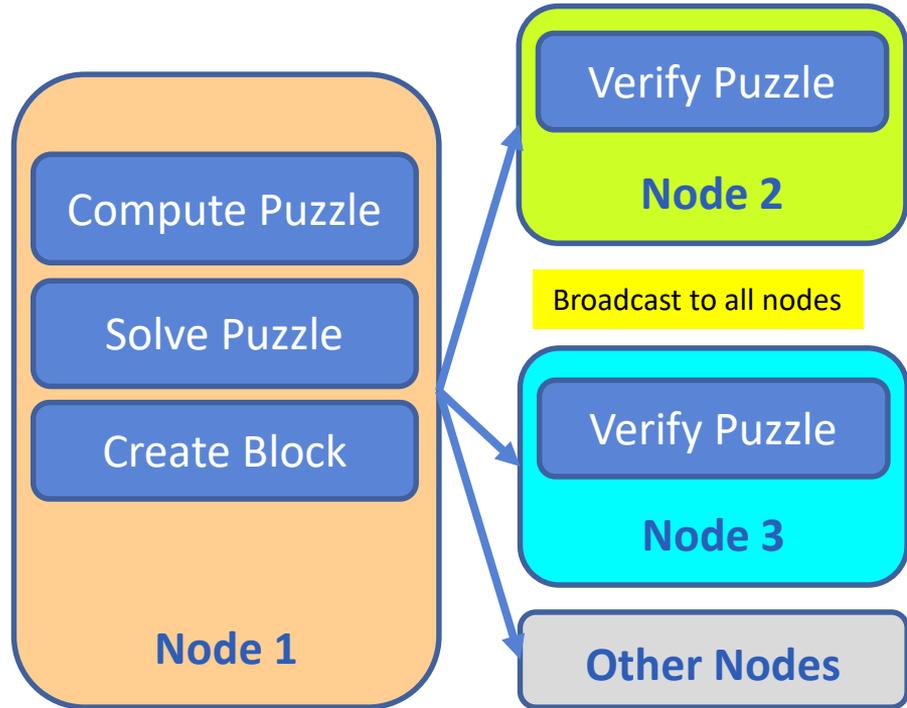
# Shared (or Distributed) Ledger



- It is a consensus of replicated, shared, and synchronized digital data geographically spread across multiple sites, countries, or institutions.
- There is no central administrator or centralized data storage.
- A peer-to-peer network is required as well as consensus algorithms to ensure replication across nodes is undertaken.
- One form of distributed ledger design is the blockchain system.

[https://en.wikipedia.org/wiki/Distributed\\_ledger](https://en.wikipedia.org/wiki/Distributed_ledger)

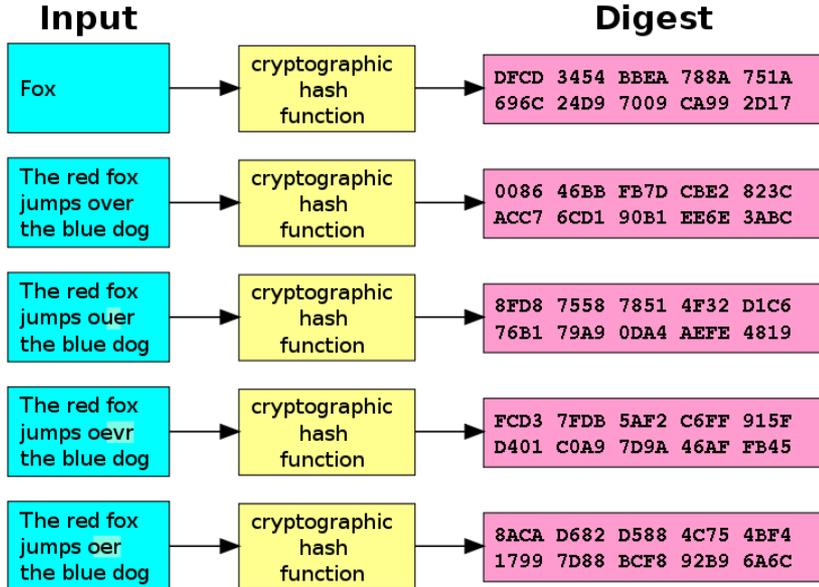
# Consensus



- The critical challenge in a distributed ledger is that there is no central authority to determine what to add to the ledger.
- Consensus procedures enable nodes to reach agreement on what to add next to the ledger. Proof of work, proof of stake are examples.

<https://blockgeeks.com/guides/blockchain-consensus/>

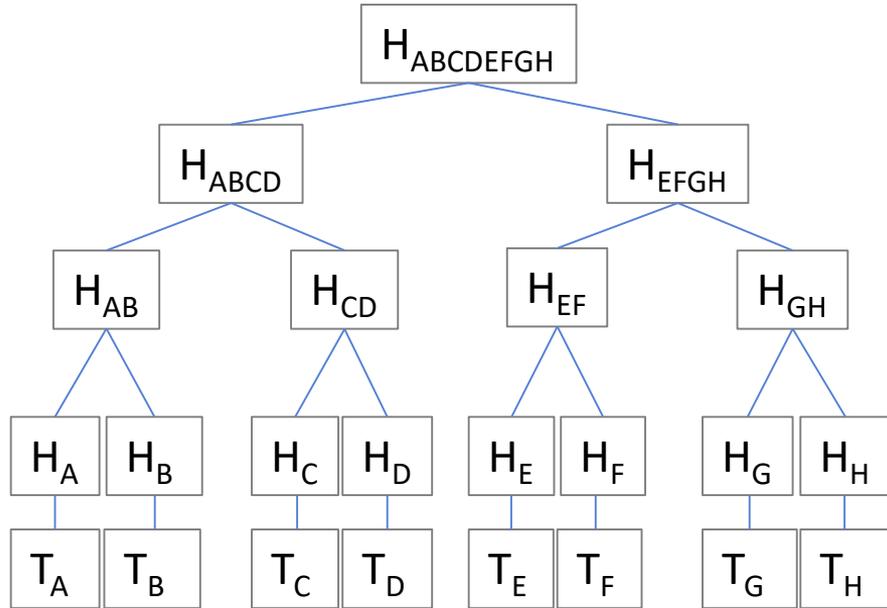
# Cryptographic Hash Function



- It is a mathematical algorithm that maps data of arbitrary size to a bit string of a fixed size (a hash)
- and is designed to be a one-way function, that is, a function which is infeasible to invert.

Source: [https://en.wikipedia.org/wiki/Cryptographic\\_hash\\_function](https://en.wikipedia.org/wiki/Cryptographic_hash_function)

# Blocks, Merkle Tree

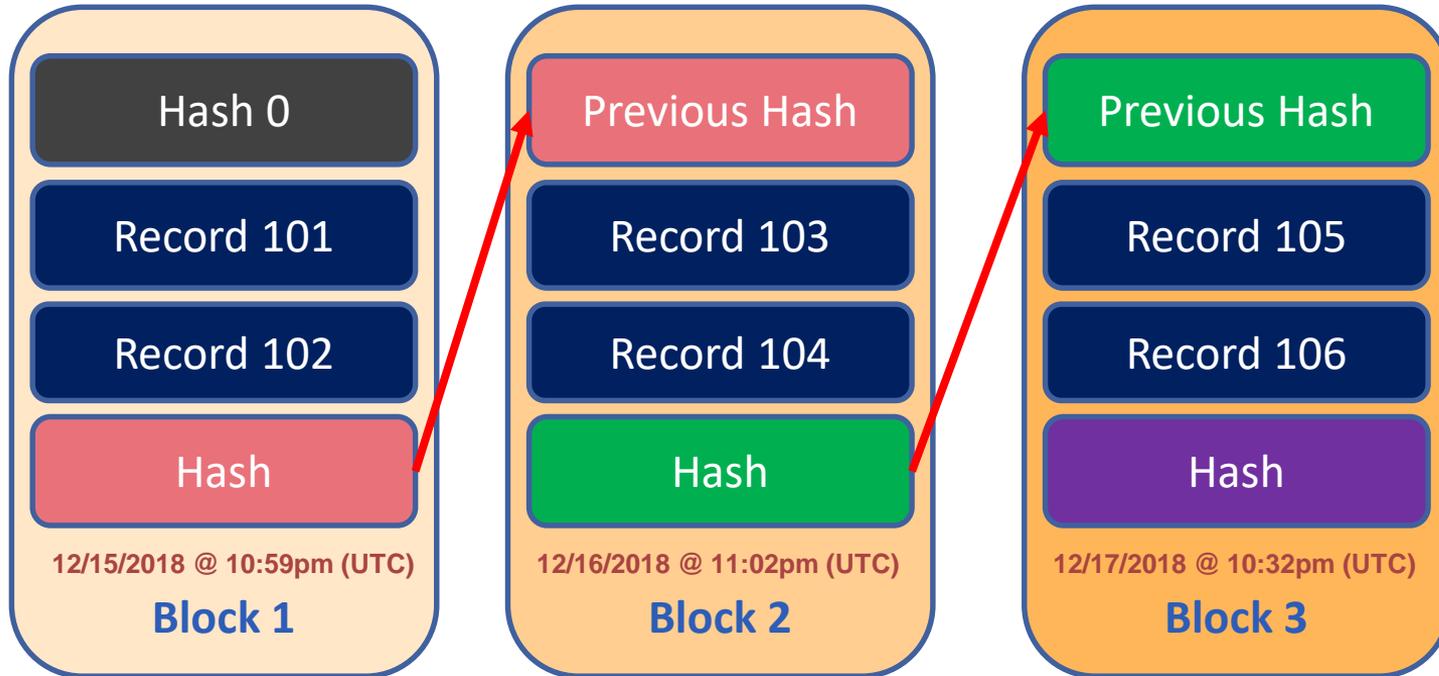


<https://www.investopedia.com/terms/m/merkle-tree.asp>

- Blocks hold batches of valid transactions that are hashed and encoded into a Merkle tree;
- Each transaction (example:  $T_A$ ) is hashed;
- Then each pair of transactions is concatenated and hashed together, and so on until there is one hash for the entire block;
- “T” designates a transaction, “H” is a hash;
- A typical block has over 100 transactions.

# Blockchain

- It is a growing list of records, called blocks, which are linked using cryptography.
- Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data.



# Smart Contract

- Is a computer protocol intended to digitally facilitate, verify, or enforce the negotiation or performance of a contract.
- Allow the performance of credible transactions without third parties.
- Transactions are trackable and irreversible.
- Aim is to provide security that is superior to traditional contract law and to reduce other transaction costs associated with contracting.

[https://en.wikipedia.org/wiki/Smart\\_contract](https://en.wikipedia.org/wiki/Smart_contract)



<https://www.tradefinanceglobal.com/posts/ethereum-competitor-to-bitcoin/>

# Example Application



# CryptoKitties Workflow

1. **Setup Account on Gemini to buy Ethereum (ETH)**
2. **Setup Metamask Wallet (Google Chrome Plugin)**
3. **Setup Account on [www.cryptokitties.co](http://www.cryptokitties.co)**
4. **Wire transfer USD from my bank to Gemini Account**
5. **Transfer ETH from Gemini to a Metamask Wallet**
6. **Purchase Two CryptoKitties**
7. **Breed them**
8. **Now I have Three CryptoKitties!**

# Transfer Fiat (USD) from My Bank into Gemini Account and Buy Ether (ETH)

**Buy Ether**  
Purchase ETH with USD

24 HOUR CHANGE: +\$336.06 LAST

**USD Available to Trade**  
**\$52.09** [Add Funds](#)

Account Values  
0.2 ETH  
\$52.09

**CONTINUOUS ORDER BOOK** AUCTION BLOCK TRADE

Bid-Ask **\$158.07 - \$158.33** Last Price **\$158.12** Order Book Display [Chart: Zoom](#) [+](#) [-](#) [☰](#)

24-Hour Range **\$150.51 - \$175.92** 24-Hour Change ▼ \$17.10 (-9.76%) Refresh [🕒 5 seconds](#)

At **\$158.33** per ETH...  
94.2232 ETH for sale  
\$14,918.36 total

After your order...  
93.9232 ETH for sale  
\$14,870.86 total

Buyers Sellers  
Sellers, After Limit Order

**CURRENCY PAIR**  
ETHUSD

**ORDER TYPE** [What is this?](#)  
Limit

**PRICE**  
158.40 USD

**QUANTITY**  
0.3 ETH

**TOTAL**  
47.52 USD

Order \$47.52  
Fee \$0.48  
Total \$48.00

**BUY**

**0.3 ETH**  
**@ 158.40 USD**  
**47.52 USD**  
**+ Fee 0.48 USD**  
**Total 48.00 USD**

# Transfer Ethereum (ETH) to Metamask Wallet

**GEMINI** DASHBOARD BUY SELL TRANSFER FUNDS

## Withdraw ETH

USD (BANK TRANSFER) USD (WIRE TRANSFER) BTC **ETH** ZEC BCH LTC

**DESTINATION ADDRESS**  
0x3962A3d0553155E56c858436d638f633a5B

**WITHDRAWAL AMOUNT**  
0.1

Approximately \$15.79 USD

**REVIEW WITHDRAWAL**

Main Ethereum Network

Account 1  
0x3962...0118

0.1 ETH  
\$15.72 USD

DEPOSIT SEND

History  
You have no transactions

## Transaction Details

Earn Interest Crypto Loan

Sponsored: Nexo - Get instant cash in 40+ currencies using crypto as collateral without selling it. Get Crypto Loan!

Overview State Changes Comments

Transaction Hash

Transaction Hash: 0x1c054e98535740e5fb56aa51b6de81676d51b64496da894c014ba5e8bae980c7

Status: Success

Block: 7504176 35 Block Confirmations

Block # 7504176

TimeStamp: 8 mins ago (Apr-04-2019 09:45:58 PM +UTC)

From: 0xd24400ae8bfebb18ca49be86258a3c749cf46853 (Gemini 1)

Destination Address

0x3962a3d0553155e56c858436d638f633a5bc0118

Value: 0.1 Ether (\$15.98)

Transaction Fee: 0.000147 Ether (\$0.02)

Gas Limit: 90,000

Gas Used by Transaction: 21,000 (23.33%)

Gas Price: 0.000000007 Ether (7 Gwei)

Nonce 524534 Position 28

0.100000 (\$15.98) ETH Transferred  
0.000147 ( \$0.02) ETH Transaction Fee

Etherscan

Eth: \$159.36 (-8.33%)

Home Blockchain Tokens

All Filters Search by Ad

Block #7504175

Overview Comments

Block Height: 7504175

Time Stamp: 13 mins ago (Apr-04-2019 09:45:41 PM +UTC)

Transactions: 125 transactions and 1 contract internal transaction

Mined by: 0x52bc44d5378309ee2abf1539bf71de1b7d7be3b5 (N...

Block Reward: 2.0152039323 Ether (2 + 0.0152039323)

Uncles Reward: 0

Difficulty: 1,856,640,632,997,485

Total Difficulty: 9,710,880,209,000,243,275,107

Size: 29,292 bytes

Gas Used: 7,975,848 (99.70%)

Gas Limit: 8,000,029

Extra Data: PPYE nanopool.org (Hex:0x50505945206e616e6f706f6e)

Hash: 0x3ee26aaec5dc9407687f7a2b7666c6263b3b31e344

Parent Hash: 0xa54b10164f13066ccaa86e931547a55520be4060e2e

Block 7504175

# Block that Contains The Transaction

Etherscan

Eth: \$159.46 (-8.27%)

Home Blockchain Tokens

All Filters Search by Ad

Block #7504176

Overview Comments

Block Height: 7504176

Time Stamp: 9 mins ago (Apr-04-2019 09:45:58 PM +UTC)

Transactions: 111 transactions and 47 contract internal transactions

Mined by: 0xea674fdde714fd979de3ed0f56aa9716b898ec8 (Ethe...

Block Reward: 2.03981917296027438 Ether (2 + 0.03981917296027438)

Uncles Reward: 0

Difficulty: 1,856,640,641,386,093

Total Difficulty: 9,710,882,065,640,884,661,200

Size: 28,082 bytes

Gas Used: 7,985,370 (99.82%)

Gas Limit: 8,000,000

Extra Data: PPYE-ethermine-eu1-12 (Hex:0x505059452d657468657)

Hash: 0x164691ccab0ae32d26b05effce4ab47eae8c52f2614c

Parent Hash: 0x3ee26aaec5dc9407687f7a2b7666c6263b3b31e3443

Block 7504176

Etherscan

Eth: \$159.28 (-8.38%)

Home Blockchain Tokens

All Filters Search by Ad

Block #7504177

Overview Comments

Block Height: 7504177

Time Stamp: 11 mins ago (Apr-04-2019 09:46:02 PM +UTC)

Transactions: 104 transactions and 44 contract internal transactions in this block

Mined by: 0xe29bd824b016326a401d083b33d092293333a830 (F2Pool 2) in 4 secs

Block Reward: 2.12200886665309304 Ether (2 + 0.05950886665309304 + 0.0625)

Uncles Reward: 1.75 Ether (1 uncle at Position 0)

Difficulty: 1,857,547,212,587,877

Total Difficulty: 9,710,883,923,188,097,249,077

Size: 27,792 bytes

Gas Used: 6,858,108 (85.64%)

Gas Limit: 8,007,811

Extra Data: ppye 七彩神仙鱼 (Hex:0x7070796520e4b883e5bda9e7a59ee4bb99e9b1bc)

Hash: 0xc96b0c53a33c8213810e66b9e335fe2172340e0a7de997d089c0807ccba3d56c

Parent Hash: 0x164691ccab0ae32d26b05effce4ab47eae8c52f2614c665c8b237a14174e290

Block 7504177

Hash

Hash

Parent Hash

Parent Hash

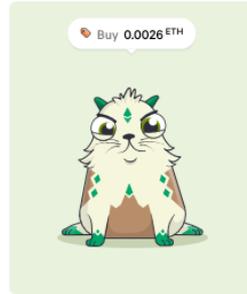
# Shop for CryptoKitties

Search

filters

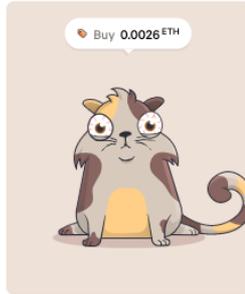
for sale  siring  other

sort by price low to high



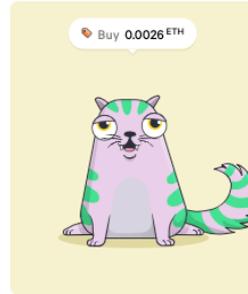
# 1240788 ♡ 0

⌘ Gen 4 ⌚ Sluggish



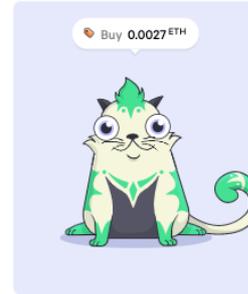
# 1476161 ♡ 1

⌘ Gen 8 ⌚ Snappy



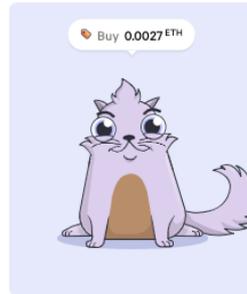
# 1476175 ♡ 1

⌘ Gen 6 ⌚ Snappy



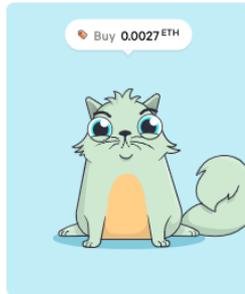
# 1476343 ♡ 1

⌘ Gen 6 ⌚ Snappy



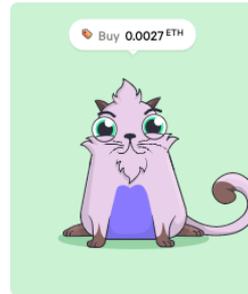
# 1056548 ♡ 1

⌘ Gen 15 ⌚ Plodding



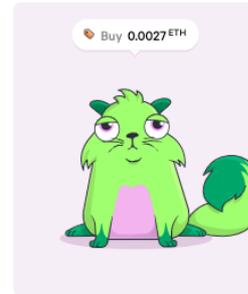
# 1494365 ♡ 2

⌘ Gen 8 ⌚ Snappy



# 1494135 ♡ 3

⌘ Gen 7 ⌚ Snappy



# 1246939 ♡ 0

⌘ Gen 13 ⌚ Brisk

# Each Kittie has a Unique Number (Token ID)



## Panda Achoobobo

# 1476343 Gen 6 Snappy Cooldown

happybeaver  
Owner

Like 1

Make offer

Buy now price Time left

0.0027 9 days

Buy now

Started at = 0.005

Price goes to = 0.001

## Bio i

Ooope. I am Panda Achoobobo and I am better at glaring at the neighbour's cat than you. Try me. My hobbies include catching leprechauns, but only in moderation. This conversation is over.



Hatched by  
happybeaver



Birthday  
Mar 21 2019

## Cattributes i



dahlia  
eye colour



bananacream  
base colour



highsociety  
pattern



selkirk  
fur



shale  
accent colour



stunned  
eye shape



soserious  
mouth



swampgreen  
highlight colour

## Parents

Mother



Father



# To Buy a Kittie, the Application Opens Metamask Wallet to Pay For It

The image shows a digital marketplace listing for a virtual pet named "Panda Achoobobo". The listing includes the pet's name, ID (# 1476343), generation (Gen 6), and a status "Snappy Cooldown". It features a "Like 1" button and a share icon. A price chart shows the "Buy now price" at 0.0027 with "9 days" left, starting at 0.005. The pet's bio reads: "Oopee. I am Panda Achoobobo and I am better at glaring at the neighbour's cat than you. Try me. My hobbies include catching leprechauns, but only in moderation. This conversation is over." Below the bio are icons for "Hatched by happybeaver" and "Birthday Mar 21 2019".

Overlaid on the listing is a "MetaMask Notification" window for the "Main Ethereum Network". It shows "Account 1" with address "0xb169...7d8C". The transaction is a "BID" for 0.002654 ETH, equivalent to \$0.42. The "DETAILS" section shows a "GAS FEE" of 0.000476 ETH (\$0.07) and a "TOTAL" of 0.00313 ETH (\$0.49). The window has "REJECT" and "CONFIRM" buttons.

Item	Amount (ETH)	Amount (USD)
BID	0.002654	\$0.42
GAS FEE	0.000476	\$0.07
TOTAL	0.00313	\$0.49

# Behind the scenes, the following is the actual Blockchain Transaction

Overview Internal Transactions Event Logs (2) State Changes New Comments

Transaction Hash: [0x57ec3d69753b26004a54630edf614d1e977ddac99cbc90e1038b4d6e3de7bfaa](#)

Status: Success

Block: [7504479](#) 39 Block Confirmations

TimeStamp: 10 mins ago (Apr-04-2019 10:51:19 PM +UTC)

From: [0x3962a3d0553155e56c858436d638f633a5bc0118](#)

To: [Contract 0xb1690c08e213a35ed9bab7b318de14420fb57d8c \(CryptoKitties: Sales Auction\)](#)

- TRANSFER 0.002554046850887347 Ether From [0xb1690c08e213a35ed9b...](#) To [0x9f7064df6ca5856b3af...](#)
- TRANSFER 0.00000018749606673 Ether From [0xb1690c08e213a35ed9b...](#) To [0x3962a3d0553155e56c8...](#)

Tokens Transferred: From [0xb1690c08e213a3...](#) To [0x3962a3d0553155...](#) For ERC-721 TokenID [1476343] 



Value: 0.00265374266581976 Ether (\$0.42)

Transaction Fee: 0.000181524 Ether (\$0.03)

Gas Limit: 158,820

Gas Used by Transaction: 60,508 (38.1%)

Gas Price: 0.000000003 Ether (3 Gwei)

Nonce Position 0 86

Input Data:

#	Name	Type	Data
0	_tokenId	uint256	1476343

tokenId = Cat

# You Need Two Kitties to Breed



## Kotka Scrummykey

# 1445288 ⚙ Gen 6 ⌚ Snappy Cooldown

mouse  
Owner



Like 0



Make offer

Buy now price

0.003

Buy now

### Bio ⓘ

Uh, hi. I'm Kotka Scrummykey. And you are? I have made a mixtape for a duet with Celine Dion, but I'm having a hard time tracking them down. You can help, right? I used to be a Professional Sleeper until I hurt my knees.



Hatched by  
mouse



Birthday  
Mar 8 2019

### Cattributes ⓘ



pearl  
highlight colour



icy  
accent colour



sapphire  
eye colour



amur  
pattern



serpent  
eye shape



whixtensions  
mouth



sphynx  
fur



greymatter  
base colour

### Parents

Mother



Father



# Second Transaction

Overview Internal Transactions Event Logs (2)

Transaction Hash: [0x95ee9ba8d846df529c05c4291b00b171c0fae4745c9254f4029c116ea2bad45b](#)

Status: Success

Block: [7504496](#) 2 Block Confirmations

TimeStamp: 30 secs ago (Apr-04-2019 10:56:17 PM +UTC)

From: [0x3962a3d0553155e56c858436d638f633a5bc0118](#)

To: [Contract 0xb1690c08e213a35ed9bab7b318de14420fb57d8c \(CryptoKitties: Sales Auction\)](#)  
TRANSFER 0.0028875 Ether From 0xb1690c08e213a35ed9b... To 0x7045540552d1fcc2ab1...

Tokens Transferred: From 0xb1690c08e213a3... To 0x3962a3d0553155... For ERC-721 TokenID [1445288] CK



Value: **0.003 Ether** (\$0.47)

Transaction Fee: 0.000125616 Ether (\$0.02)

Gas Limit: 125,815

Gas Used by Transaction: 41,872 (33.28%)

Gas Price: 0.000000003 Ether (3 Gwei)

Nonce Position 1 73

Input Data:

#	Name	Type	Data
0	_ <u>tokenId</u>	uint256	1445288

Decoded input inspired by [Canoe Solidity](#)

# My Token (Cat) Inventory

## Token CryptoKitties

CryptoKitties NFT Collectibles

Earn Interest Crypto Loan

### Overview [ERC-721]

Total Supply: 1,508,099 CK  
Holders: 73,797 addresses

### Profile Summary

Contract: 0x06012c8cf97bead5deae237070f9587f8e7a266d  
Official Site: <https://www.cryptokitties.co/>  
Social Profiles: [Email] [Discord] [Twitter]

**FILTERED BY TOKEN HOLDER**  
0x3962a3d0553155e56c858436d638f633a5bc0118

BALANCE  
2 CK

Transfers **Inventory** Info DEX Trades Read Contract Write Contract Analytics New

0x3962a3d0553155e56c85... x

A total of 2 tokens

First < Page 1 of 1 > Last



#1476343  
CryptoKitties



#1445288  
CryptoKitties

Breeding Costs: 0.008 ETH plus fees

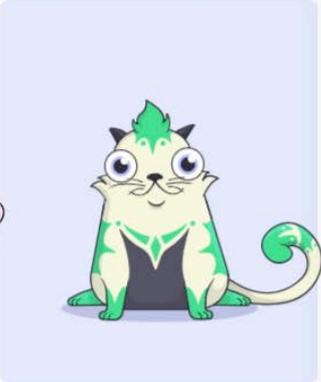
## Breed Kitties

These two lovely Kitties will soon be parents!

**Dame**  This Kitty will be preppers



**Sire**  This Kitty will... you know ;)



# 1445288      # 1476343

⊗ Gen 6   ⚙ Snappy      ⊗ Gen 6   ⚙ Snappy

Birthing fee 	≡ 0.008
Estimated transaction fee 	≡ 0.0004
<b>Estimated total</b>	<b>≡ 0.0084</b>

By clicking the button below, your two kitties will breed, and the **offspring** will belong to you once it's born.

MetaMask Notification

Main Ethereum Network

Account 1 → Crypto Kitties

CONTRACT INTERACTION

◆ 0.008

\$1.25

DETAILS DATA

EDIT

GAS FEE      ◆ 0.00036  
\$0.06

AMOUNT + GAS FEE

TOTAL      ◆ 0.00836  
\$1.31

REJECT      CONFIRM

# Breeding Transaction on Blockchain

## Transaction Details

Etherscan - Sponsored slots available. [Book your slot here!](#)

**Overview** Event Logs (1) State Changes New Comments

Transaction Hash: [0x04e6265ba830145f12ed5ac898df1faa561897d8e62edd50764cbb462ab44714](#)

Status: Success

Block: [7504579](#) 4 Block Confirmations

TimeStamp: 57 secs ago (Apr-04-2019 11:14:10 PM +UTC)

From: [0x3962a3d0553155e56c858436d638f633a5bc0118](#)

To: Contract [0x06012c8cf97bead5deae237070f9587f8e7a266d](#) (CryptoKitties: Core)

Value: 0.008 Ether (\$1.27)

## Breeding Cost

Transaction Fee: 0.000239955 Ether (\$0.04)

Gas Limit: 119,977

Gas Used by Transaction: 79,985 (66.67%)

Gas Price: 0.000000003 Ether (3 Gwei)

## Parents

Nonce Position 2 68

Input Data:

#	Name	Type	Data
0	_matronId	uint256	1445288
1	_sireId	uint256	1476343

# My Transaction History

All Filters

Search by Address / Txhash / Block / Token / Ens



Blockchain

Tokens

Resources

More

Sign In



Address [0x3962A3d0553155E56c858436d638f633a5Bc0118](#)



Earn Interest

Crypto Loan

Sponsored: **Ethereal Virtual Hackathon** - Compete for \$50K in prizes, hosted by Gitcoin + Microsoft [Sign up now!](#)

## Overview

Balance: 0.085799349830246913 Ether

Ether Value: \$13.61 (@ \$158.64/ETH)

Token:

1

## More Info



Transactions: 4 txns

## Transactions

Internal Txns

Erc721 Token Txns

Analytics New

Comments

Latest 4 txns



TxHash	Block	Age	From	To	Value	[TxFee]
<a href="#">0x04e6265ba83014...</a>	<a href="#">7504579</a>	10 mins ago	<a href="#">0x3962a3d0553155...</a>	OUT <a href="#">CryptoKitties: Core</a>	0.008 Ether	0.000239955
<a href="#">0x95ee9ba8d846df...</a>	<a href="#">7504496</a>	28 mins ago	<a href="#">0x3962a3d0553155...</a>	OUT <a href="#">CryptoKitties: Sales ...</a>	0.003 Ether	0.000125616
<a href="#">0x57ec3d69753b26...</a>	<a href="#">7504479</a>	33 mins ago	<a href="#">0x3962a3d0553155...</a>	OUT <a href="#">CryptoKitties: Sales ...</a>	0.002653742665819 Ether	0.000181524
<a href="#">0x1c054e98535740...</a>	<a href="#">7504176</a>	1 hr 38 mins ago	<a href="#">Gemini 1</a>	IN <a href="#">0x3962a3d0553155...</a>	0.1 Ether	0.000147

# The Proud Parents

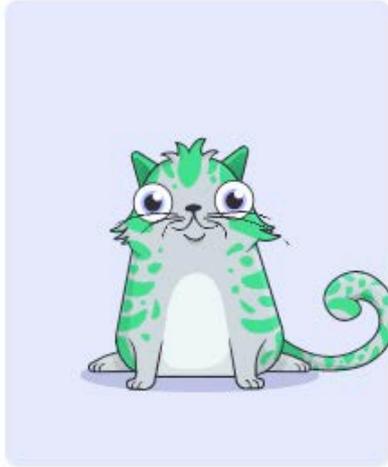
Kitties

Special Cats

Cat Codex

Collections

## New Cat



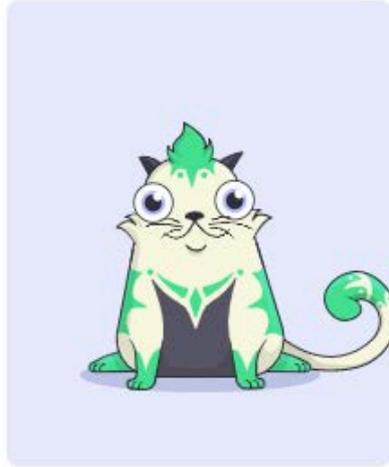
Loki Fabbear

# 1508109

♡ 0

🕒 Gen 7 ⌚ Snappy

## Sire



Panda Achoobobo

# 1476343

♡ 1

🕒 Gen 6 ⌚ Snappy

## Matron



Kotka Scrummykey

# 1445288

♡ 0

🕒 Gen 6 ⌚ Snappy

# Loki's Transaction, Cattributes, ID and Link to Matron



## Loki Fabbear

# 1508109 X Gen 7 ⌚ Snappy Cooldown

Like 0



Breed

Sell

Gift

Food Safety Dad (you)

Owner



## Bio

Good day, I'm Loki Fabbear. Let's cut to the chase. I can whistle any Tom Jones song. It's a weird talent, but it entertains most people. Pffft, whatever.



Hatched by  
Food Safety Dad



Birthday  
Apr 4 2019

## Cattributes



icy  
accent colour



amur  
pattern



dahlia  
eye colour



ragdoll  
fur

Event Logs (2) State Changes New Comments

0x2fe6241ece12722f12caeecb9bf5baa897423c34bfa505afd07747ec3286b01c

Success

7504621 36 Block Confirmations

10 mins ago (Apr-04-2019 11:23:54 PM +UTC)

0xab5622d7da96c571c6abe08e4b85e462eb666e4f

Contract 0x06012c8cf97bead5deae237070f9587f8e7a266d (CryptoKitties: Core)

TRANSFER 0.008 Ether From 0x06012c8cf97bead5dea... To 0xab5622d7da96c571c6a...

From 0x00000000000000... To 0x3962a3d0553155... For ERC-721 TokenID [1508109] CK



0 Ether (\$0.00)

0.0029631284139 Ether (\$0.47)

350,000

260,266 (74.36%)

0.000000011385000015 Ether (11.385000015 Gwei)

38333 11

## Matron

Nonce Position

Input Data:

#	Name	Type	Data
0	_matronId	uint256	1445288

# Querying a Smart Contract on the Blockchain

The screenshot shows the Etherscan website interface for the CryptoKitties token. At the top, the Etherscan logo is on the left, and a search bar with the text "Search by Address / Txhash / Block / Token / Ens" is on the right. Below the logo, the current price of ETH is shown as \$158.30 with a -1.70% change. Navigation links for Home, Blockchain, Tokens, Resources, and More are visible, along with a Sign In button. The main content area is titled "Token CryptoKitties" and includes tabs for CryptoKitties, NFT, and Collectibles. On the right side of this area, there are buttons for "Earn Interest" and "Crypto Loan".

The "Overview [ERC-721]" section displays the following data:

Total Supply:	1,508,113 CK
Holders:	73,799 addresses
Transfers:	3,825,117

The "Profile Summary" section on the right shows:

- Contract: [0x06012c8cf97bead5dae237070f9587f8e7a266d](#)
- Official Site: <https://www.cryptokitties.co/>
- Social Profiles: [Email](#), [YouTube](#), [Twitter](#)

At the bottom, a navigation bar contains links for Transfers, Holders, Inventory, Info, DEX Trades, **Read Contract** (highlighted with a red box), Write Contract, Analytics New, and Comments. Below this bar, there is a "Read Contract Information" link and a "[Reset]" button.

## Query by tokenID results in a listing of attributes

32. getKitty

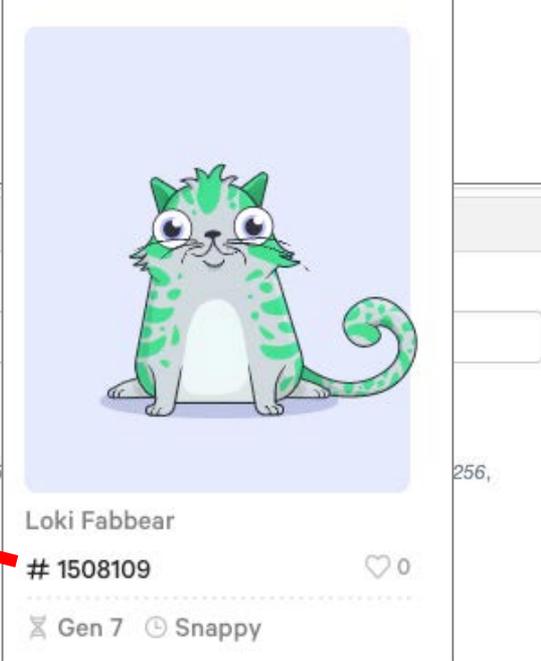
\_id (uint256)

1508109

Query

isGestating bool, isReady bool, cooldownIndex uint256, nextActionAt uint256, siringWithId uint256, birthTime uint256, genes uint256

```
[getKitty method Response ]
> isGestating bool : false
> isReady bool : true
> cooldownIndex uint256 : 3
> nextActionAt uint256 : 0
> siringWithId uint256 : 0
> birthTime uint256 : 1554420234
> matronId uint256 : 1445288
> sireId uint256 : 1476343
> generation uint256 : 7
> genes uint256 : 623491275775300058545664179263902970762878246791542975961715931384846415
```



Loki Fabbear

# 1508109

Gen 7 Snappy

# What else can I do with my cats?



# KittyVerse

## Take your Kitties to new heights

Your CryptoKitty unlocks a universe of infinite experiences.

You can still breed and collect the CryptoKitties—but now, your favourite Kitty can participate in races, get in a literal catfight, and much more!



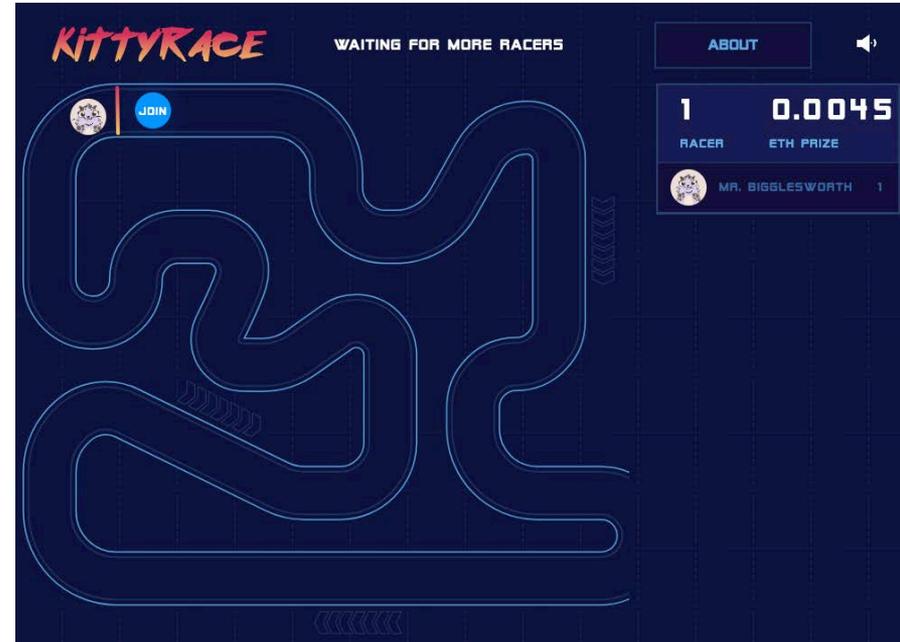
Kitty Race  
kittyrace.com



Kitty Hats  
kittyhats.co



Kitty Battles  
alpha.kittybattles.io



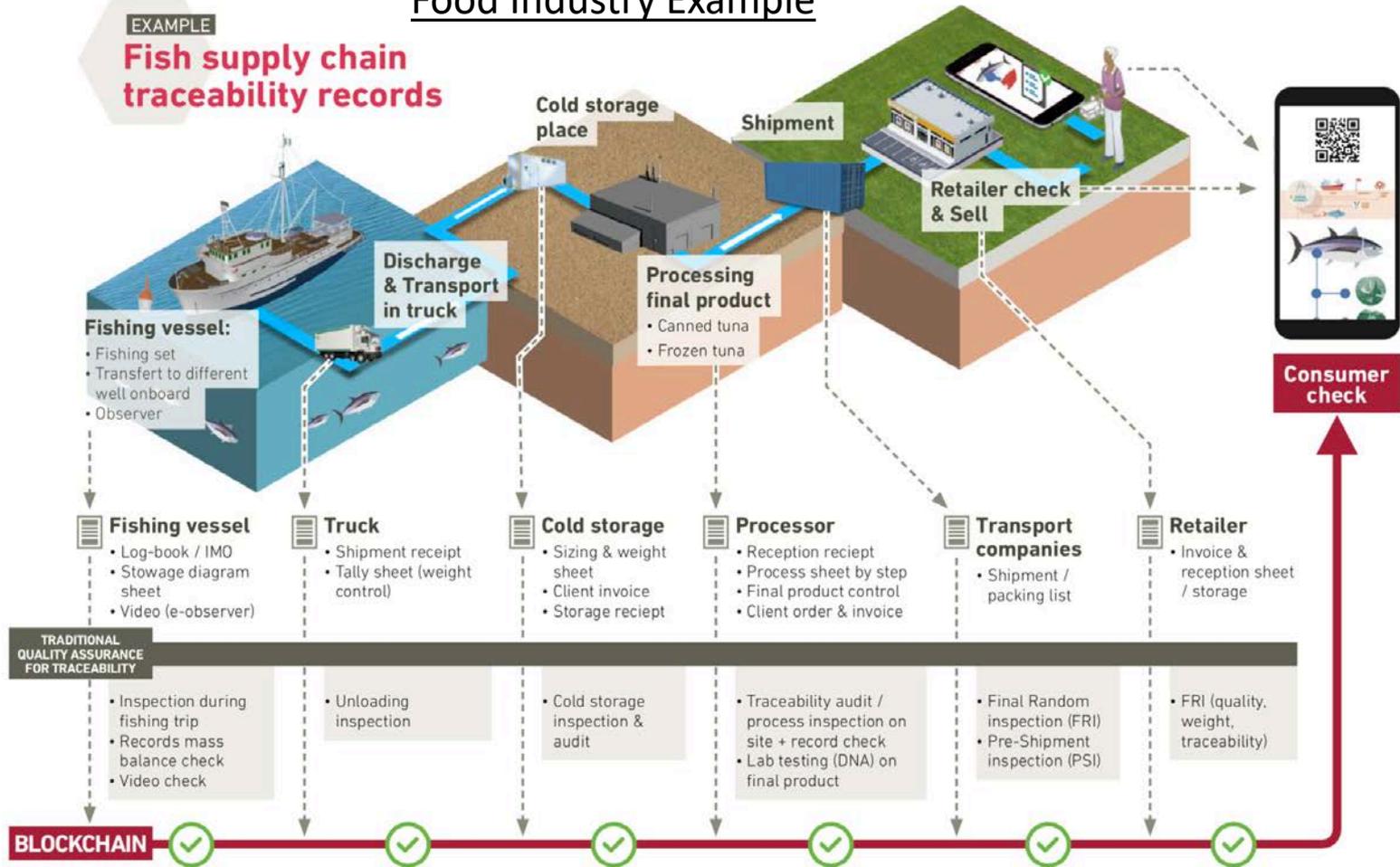
# Food Industry Example

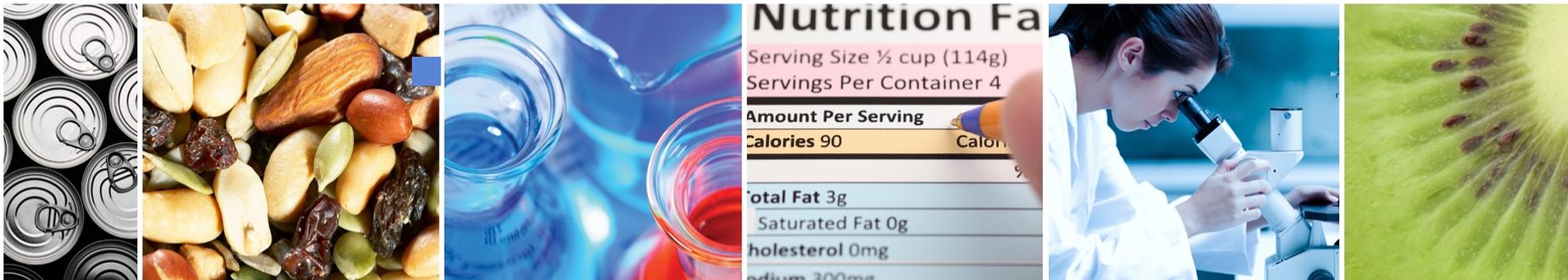


EXAMPLE

## Fish supply chain traceability records

# Auditing & Traceability





## Blockchain 101 With CryptoKitties

Andrew Kennedy, Global Food Traceability Center

  
**twitter**  
@foodsafetydad

