

IMD0913
TOKENS

Token

Representação de um ativo negociável.

Tokens

É um ativo digital em um *blockchain* mas que não é a criptomoeda principal daquele *blockchain*
ou seja, você não precisa criar um *blockchain* para criar um *token*

Tokens são similares ao ether: você pode enviar para outros endereços

Algumas classificações:

Tokens de pagamento: similar a criptomoeda

Tokens de *security*: representam um nível de investimento em um projeto

Tokens de utilidade: usados para interagir com um produto ou serviço

Tokens **fungíveis**: similares ao conceitos de criptomoedas (ex: nota de 10 reais)

Tokens **não fungíveis** (NFT): tokens “únicos” (ex: escritura de um imóvel)

Tokens

Como *tokens* não tem seu próprio *blockchain*, por trás dos panos eles usam ***smart contracts***

Todo *token* disponível no blockchain do Ethereum tem seu próprio *smart contract*

Registram os donos dos *tokens* para aquele tipo de *token*

Como a EVM não sabe o que são *tokens*, a transação tem valor de 0 ETH

Endereço de destino e quantidade de *tokens* é especificada como dados de entrada (*input data*)

A transação é enviada para o contrato do *token*



Eth: \$221.43 (-7.29%)

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Transaction Details

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Sponsored: AMFEIX - The World's First Smart Contract Trading Fund - Averaging 20% Compounded Returns Per Month since January.

Overview

Event Logs (1)

State Changes

New

Comments



Transaction Hash: 0xa3e2fc7ca6a3fd8071f6b23c6a4f70eb87eaa0dbb278cff722707e9fe2d63c16

Status: ✓ Success

Block: 7593651 562084 Block Confirmations

Timestamp: 87 days 17 hrs ago (Apr-18-2019 07:50:45 PM +UTC)

From: 0x0b9f45a8a01724f8a6e92beac3e2f4d949351a87

To: Contract 0x89d24a6b4ccb1b6faa2625fe562bdd9a23260359 (Dai Stablecoin) ✓

Tokens Transferred: From 0x0b9f45a8a01724f... To 0x66aa8bee5366b6... For 25 (\$24.58) Dai Stableco... (DAI)

Value: 0 Ether (\$0.00) transfer(address dst, uint256 wad)

Transaction Fee: 0.000067086 Ether (\$0.01)

Click to see More ↓

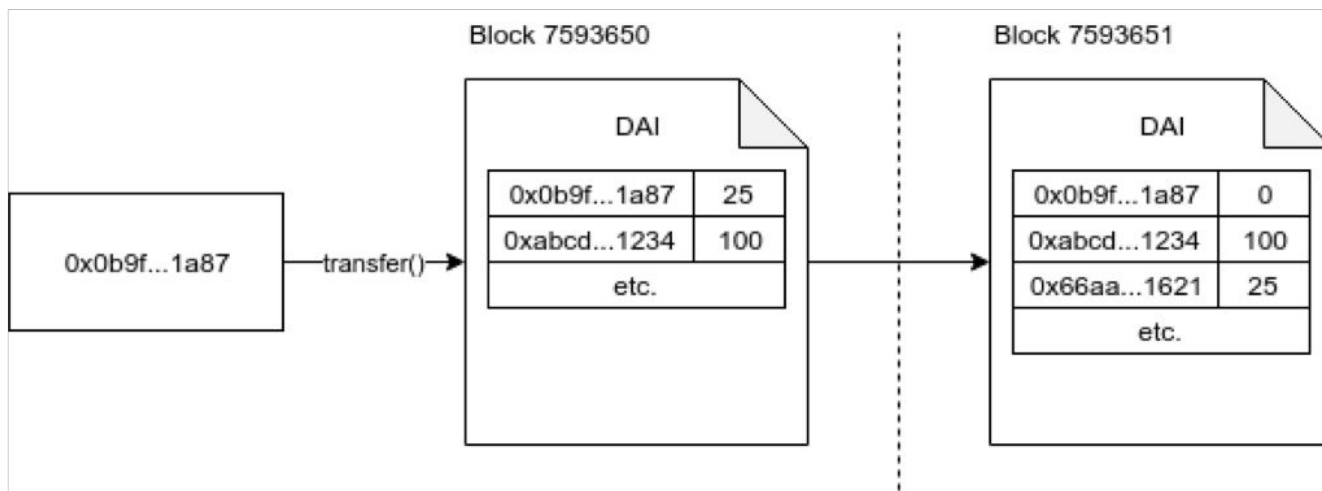
Private Note: To access the Private Note feature, you must be Logged In

Tokens

0x0b9f...1a87

transfer(0x66aa...1621, 25)

```
315     }  
316  
317     function transfer(address dst, uint wad) public returns (bool) {  
318         return transferFrom(msg.sender, dst, wad);  
319     }  
320  
321     function transferFrom(address src, address dst, uint wad)  
322         public  
323         returns (bool)
```





Eth: \$1,165.69 (+0.83%) | 12 Gwei

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Token Tracker

ERC-20

ERC-20 Tokens

A total of 702,911 Token Contracts found

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#	Token	Price	Change (%)	Volume (24H)	Circulating Market Cap	On-Chain Market Cap	Holders
1	 Tether USD (USDT) Tether gives you the joint benefits of open blockchain technology and traditional currency by converting your cash into a stable digital currency equivalent.	\$0.9983 0.000060 Btc 0.000856 Eth	-0.28%	\$39,949,961,172.00	\$65,434,363,539.00	\$39,757,371,874.14	4,470,497 -0.007%
2	 BNB (BNB) Binance aims to build a world-class crypto exchange, powering the future of crypto finance.	\$293.6367 0.017716 Btc 0.251899 Eth	+15.59%	\$1,515,022,981.00	\$46,973,749,375.00	\$4,868,354,081.68	314,126 +0.000%
3	 USD Coin (USDC) USDC is a fully collateralized US Dollar stablecoin developed by CENTRE, the open source project with Circle being the first of several forthcoming issuers.	\$0.9987 0.000060 Btc 0.000857 Eth	-0.50%	\$3,508,365,629.00	\$44,145,246,865.00	\$46,539,890,377.81	1,524,913 -0.022%
4	 Binance USD (BUSD) Binance USD (BUSD) is a dollar-backed stablecoin issued and custodied by Paxos Trust Company, and regulated by the New York State Department of Financial Services. BUSD is available directly for sale 1:1 with USD on Paxos.com and will be listed for trading on Binance.	\$1.001 0.000060 Btc 0.000859 Eth	-0.26%	\$9,565,647,900.00	\$22,769,312,223.00	\$17,592,669,900.81	158,180 +0.042%
5	 Matic Token (MATIC) Matic Network brings	\$0.8605 0.000052 Btc	+6.73%	\$663,334,122.00	\$7,516,127,428.00	\$8,605,283,068.06	538,982 +0.087%

Como *tokens* são criados?

Processo de ***minting*** é feito realizando o *deploy* de um contrato no *blockchain* do Ethereum

Um dos métodos mais comuns de distribuir tokens é a partir de sua venda, também conhecido como **ICO** (*Icon Coin Offering*)

Basicamente um *crowdfunding* para moedas/tokens

Alguns contratos tem funções para criação de tokens:

```
function mint(address _to, uint256 _amount) public {  
    require(msg.sender == owner);  
    balances[_to] += amount;  
    supply += amount;  
    emit Transfer(address(0), _to, _amount);  
}
```


NFT - Token não fungível

Token não fungível (NFT) é único, ou seja, **1 token** não tem o mesmo "valor" que outro

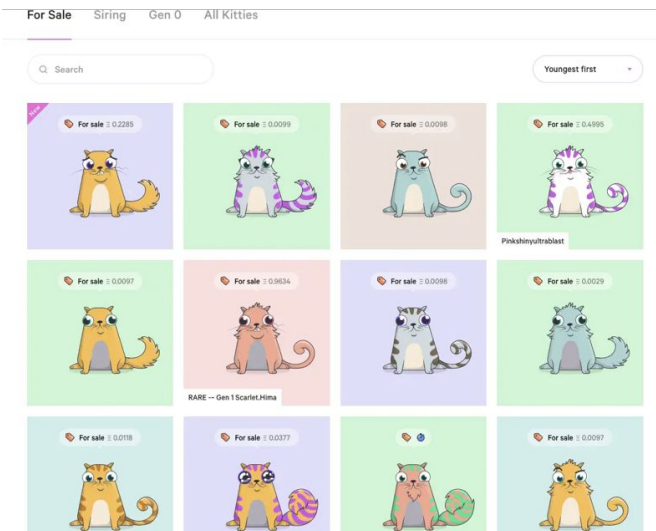
Alguns *tokens* valem mais que outros

Pense em cartas colecionáveis!

Exemplo notável: **Cryptokitties**! Se lembra?

Alguns gatinhos valem mais que outros apesar de que cada gatinho é um *token*

Simples de implementar!





Eth: \$1,175.13 (+7.70%) | 12 Gwei

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Non-Fungible Token Tracker

ERC-721

Non-Fungible Tokens (NFT)



A total of 172,938 ERC-721 Token Contracts found
(Showing the last 100k records)

First

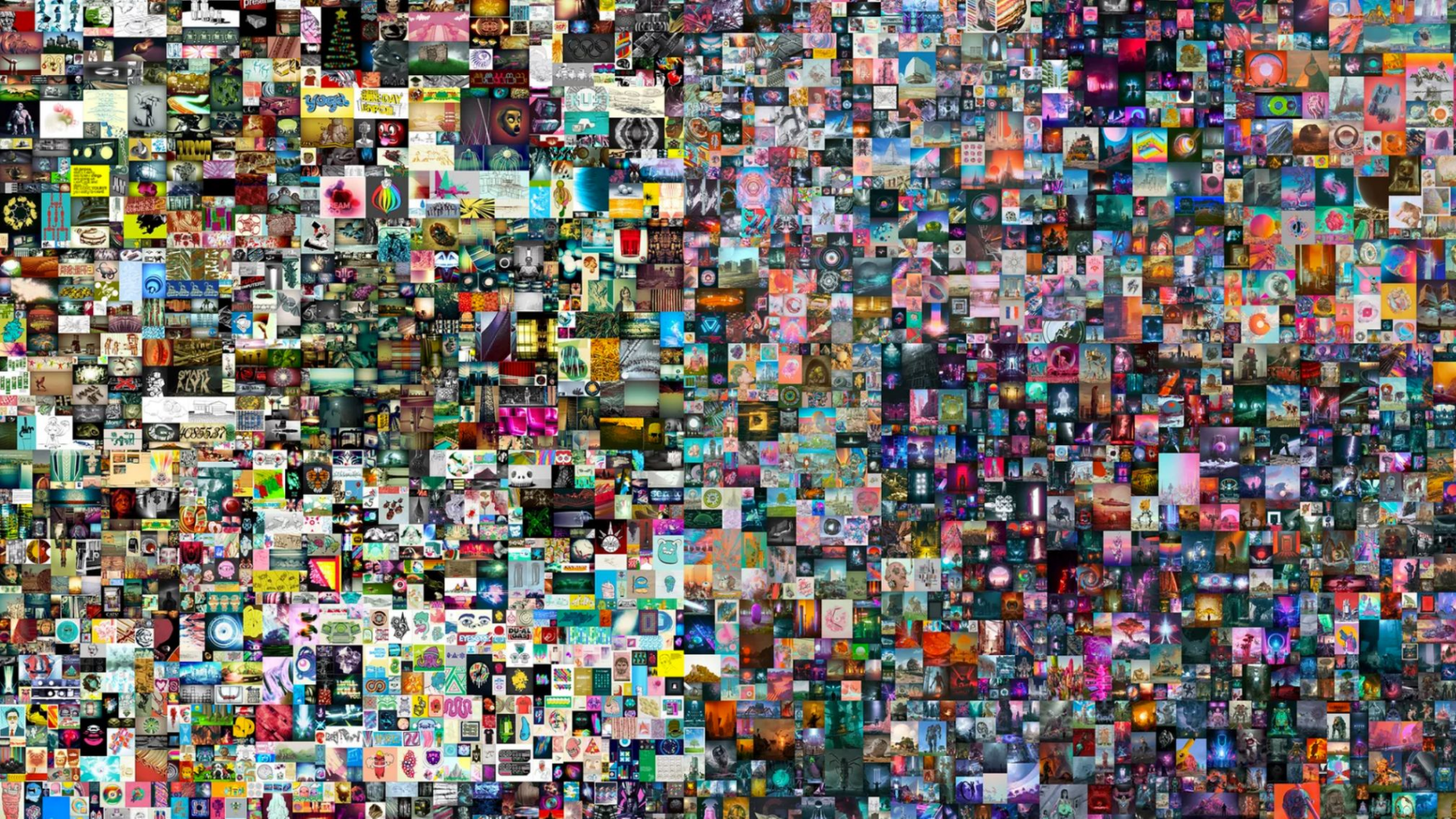


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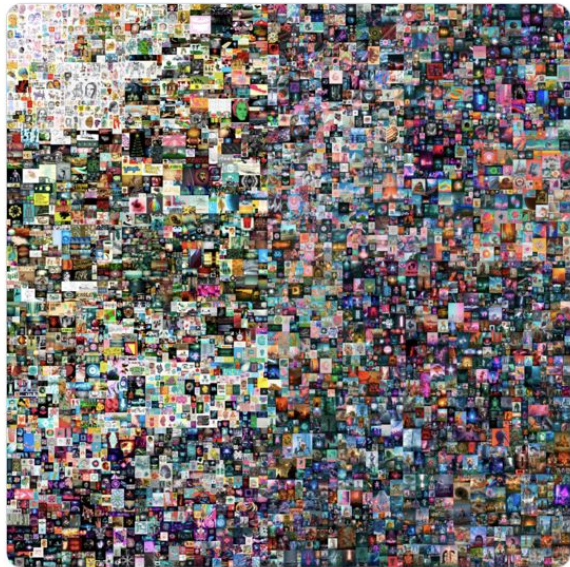
#	Token	Transfers (24H)	Transfers (3D)
1	Valhalla Valhalla is a crypto native brand for gamers. Valhalla represent more than a collection of digital avatars. It represents decades of gaming culture: the clutch plays, the ELO grind, the OT wins. Purchasing one of our avatars grants you access to our exclusive community of gaming enthusiasts and...	12,165	12,165
2	ShamanzV2	10,407	15,613
3	Agoria {Comp-nd} x [L] Market	10,083	10,083
4	Fragments of the Bear Market	9,999	9,999
5	Cel Apes Apes escaped the warden's wrath and are running wild on the blockchain!	9,442	9,493
6	otherfield	7,953	7,953
7	Ethereum Name Service (ENS) ENS offers a secure & decentralised way to address resources both on and off the blockchain using simple, human-readable names.	7,891	22,038
8	Bored y00ts Ape Club	7,405	17,571
9	PixieVixens	7,216	7,216
10	Lofi Originals 3D	5,564	5,564
11	Bored Valhalla Yacht Club	5,256	5,256
12	Recovery Punk	4,489	4,489
13	Antimatter Energy	4,119	4,300
14	LZD7 by VividLimited	3,937	3,937





Christie's is proud to offer "Everydays - The First 5000 Days" by @Beeple as the first purely digital work of art ever offered by a major auction house. Bidding will be open from Feb 25-Mar 11.

Learn more here christies.com/Beeple | NFT issued in partnership w/ @makersplaceco



10:35 AM · Feb 16, 2021

1.4K 527 Copy link to Tweet



Breaking News: The first NFT sold by Christie's was just bought for \$69.3 million. The price for "Everydays — The First 5000 Days," by the artist Beeple, is a new high for an artwork that exists only digitally.



JPG File Sells for \$69 Million, as 'NFT Mania' Gathers Pace
"Everydays — The First 5000 Days," by the artist known as Beeple, set a record for a digital artwork in a sale at Christie's.
nytimes.com

12:24 PM · Mar 11, 2021 · SocialFlow

Beeple sold an NFT for \$69 million

Through a first-of-its-kind auction at Christie's

By Jacob Kastrenakes | @jake_k | Mar 11, 2021, 10:09am EST

The New York Times

JPG File Sells for \$69 Million, as 'NFT Mania' Gathers Pace

"Everydays — The First 5000 Days," by the artist known as Beeple, set a record for a digital artwork in a sale at Christie's.



beeple
@beeple

holy fuck.

12:42 PM · Mar 11, 2021

60.6K 7.7K Copy link to Tweet

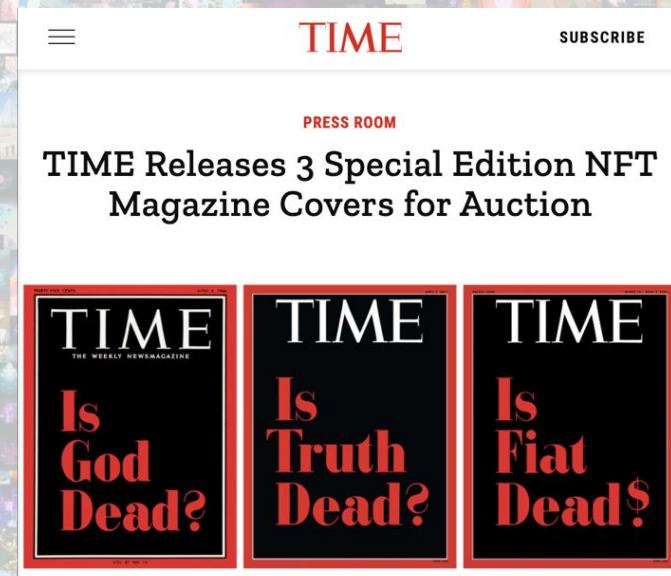
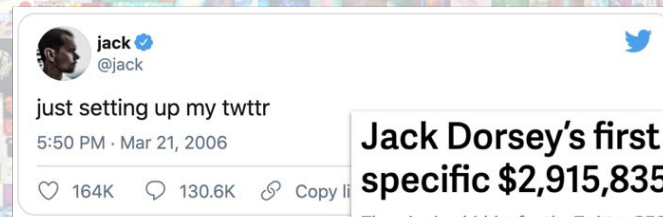
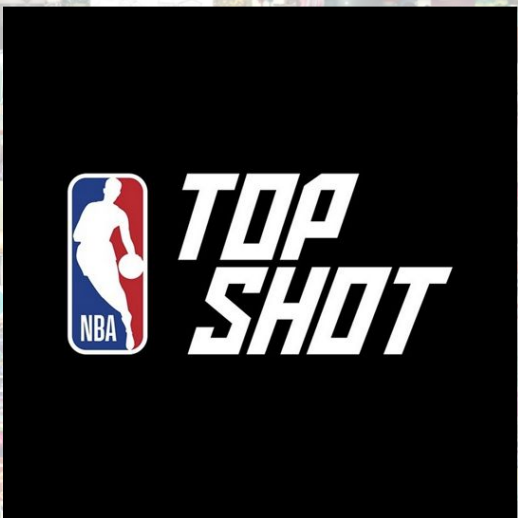
Transaction Details

Sponsored StormGain - Mine Your First Crypto In Just 4 Hours. No expensive equipment needed!

Overview Logs (1) State Comments

Transaction Receipt Event Logs

Address 0x3a462b099e19a0947b202270a030a00756
Name Transfer (index_topic_1 address _from, index_topic_2 address _to, uint256 _tokenId) View Source
Topics
0 0xddf252ad1be2c89699c20068fc378daa952ba7f1333c4a11628f55a4df523b3ef
1 0x - 0xc6046526a5435ec718138482b7f6f2c23807
2 0x - 0x30b13f0eac9596fc20d87c345423d7d180c5301a
Data _tokenId: 48913



Jack Dorsey's first tweet sold as an NFT for an oddly specific \$2,915,835.47

The winning bidder for the Twitter CEO's first tweet was Sina Estavi

Padrões de *tokens*

Você pode construir seu contrato para gerenciar seus *tokens* de qualquer maneira, mas é interessante **seguir um padrão definido**

O mais popular para tokens **fungíveis** é o padrão **ERC20**

O mais popular para tokens **não-fungíveis** é o padrão **ERC721**



ERC20 - tokens fungíveis

Um contrato ERC20 deve prover pelo menos as seguintes funções e eventos:

totalSupply `function totalSupply() constant returns (uint theTotalSupply)`

Retorna o total de unidades deste *token* que existe atualmente. Tokens ERC20 podem ter quantidade fixa ou variável.

balanceOf `function balanceOf(address _owner) constant returns (uint balance)`

Dado um endereço, retorna o saldo de *tokens* deste endereço.

transfer `function transfer(address _to, uint _value) returns (bool success)`

Dado um endereço e uma quantidade, transfere aquela quantidade de *tokens* para o endereço, a partir do saldo do endereço que executou a função.

transferFrom `function transferFrom(address _from, address _to, uint _value) returns (bool success)`

Dado um remetente, destinatário e quantidade, transfere *tokens* de uma conta para outra. Usado em combinação com a função **approve**.

ERC20 - tokens fungíveis

Um contrato ERC20 deve prover pelo menos as seguintes funções e eventos:

approve `function approve(address _spender, uint _value) returns (bool success)`

Dado um endereço de destino e quantidade, autoriza aquele endereço a executar diversas transferências até a quantidade definida, a partir da conta que emitiu a aprovação.

allowance `function allowance(address _owner, address _spender) constant returns (uint remaining)`

Dado o endereço do dono e um endereço emissor, retorna a quantidade restante que este emissor está autorizado a gastar.

Transfer `event Transfer(address indexed _from, address indexed _to, uint _value)`

Evento disparado a partir de uma transferência bem sucedida (**transfer** ou **transferFrom**).

Approve `event Approval(address indexed _owner, address indexed _spender, uint _value)`

Evento disparado a partir de uma chamada **approve** bem sucedida.

ERC20 - tokens fungíveis

```
function totalSupply() constant returns (uint theTotalSupply);  
function balanceOf(address _owner) constant returns (uint balance);  
function transfer(address _to, uint _value) returns (bool success);  
function transferFrom(address _from, address _to, uint _value) returns (bool success);  
function approve(address _spender, uint _value) returns (bool success);  
function allowance(address _owner, address _spender) constant returns (uint remaining);  
event Transfer(address indexed _from, address indexed _to, uint _value);  
event Approval(address indexed _owner, address indexed _spender, uint _value);
```

Especificação da interface ERC20 em Solidity

<https://github.com/ethereum/EIPs/issues/20>

ERC20 - tokens fungíveis

```
mapping(address => uint256) balances;  
mapping (address => mapping (address => uint256)) public allowed;
```

Especificação da interface ERC20 em Solidity

<https://github.com/ethereum/EIPs/issues/20>

ERC20 - tokens fungíveis

```
string public constant name = "Nome do Token";  
string public constant symbol = "SYM";  
uint8 public constant decimals = 18;
```

Especificação da interface ERC20 em Solidity

<https://github.com/ethereum/EIPs/issues/20>

ERC20 - Open Zeppelin



```
pragma solidity ^0.7.0;
import 'openzeppelin-solidity/contracts/token/ERC20/ERC20.sol';

contract MeuToken is ERC20 {
    string public name = 'MeuToken';
    string public symbol = 'MTK';
    uint8 public decimals = 0;
    uint constant public INITIAL_SUPPLY = 1000000;

    constructor() public {
        _mint(msg.sender, INITIAL_SUPPLY); // Gerando tokens iniciais.
    }
}
```

<https://openzeppelin.com/>

<https://github.com/OpenZeppelin/openzeppelin-contracts>

ERC721 - tokens não fungíveis

```
function balanceOf(address _owner) external view returns (uint256);
function ownerOf(uint256 _tokenId) external view returns (address);
function safeTransferFrom(address _from, address _to, uint256 _tokenId, bytes data) external payable;
function safeTransferFrom(address _from, address _to, uint256 _tokenId) external payable;
function transferFrom(address _from, address _to, uint256 _tokenId) external payable;
function approve(address _approved, uint256 _tokenId) external payable;
function setApprovalForAll(address _operator, bool _approved) external;
function getApproved(uint256 _tokenId) external view returns (address);
function isApprovedForAll(address _owner, address _operator) external view returns (bool);

event Transfer(address indexed _from, address indexed _to, uint256 indexed _tokenId);
event Approval(address indexed _owner, address indexed _approved, uint256 indexed _tokenId);
event ApprovalForAll(address indexed _owner, address indexed _operator, bool _approved);
```

Especificação da interface ERC721 em Solidity

<https://ethereum.org/en/developers/docs/standards/tokens/erc-721/>

<https://docs.openzeppelin.com/contracts/3.x/erc721> (OpenZepellin)

