



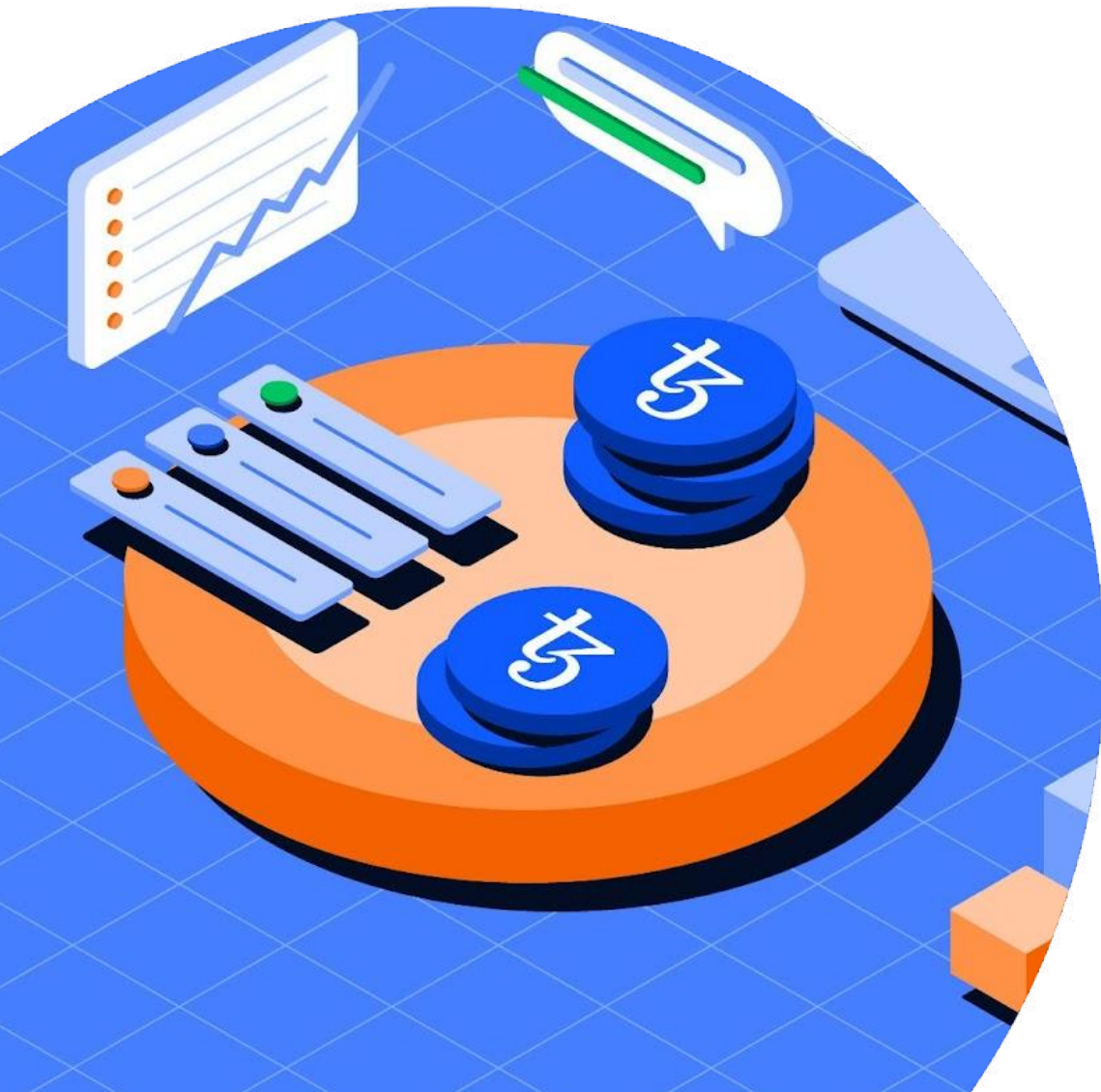
nomadic labs

June, 1st 2022

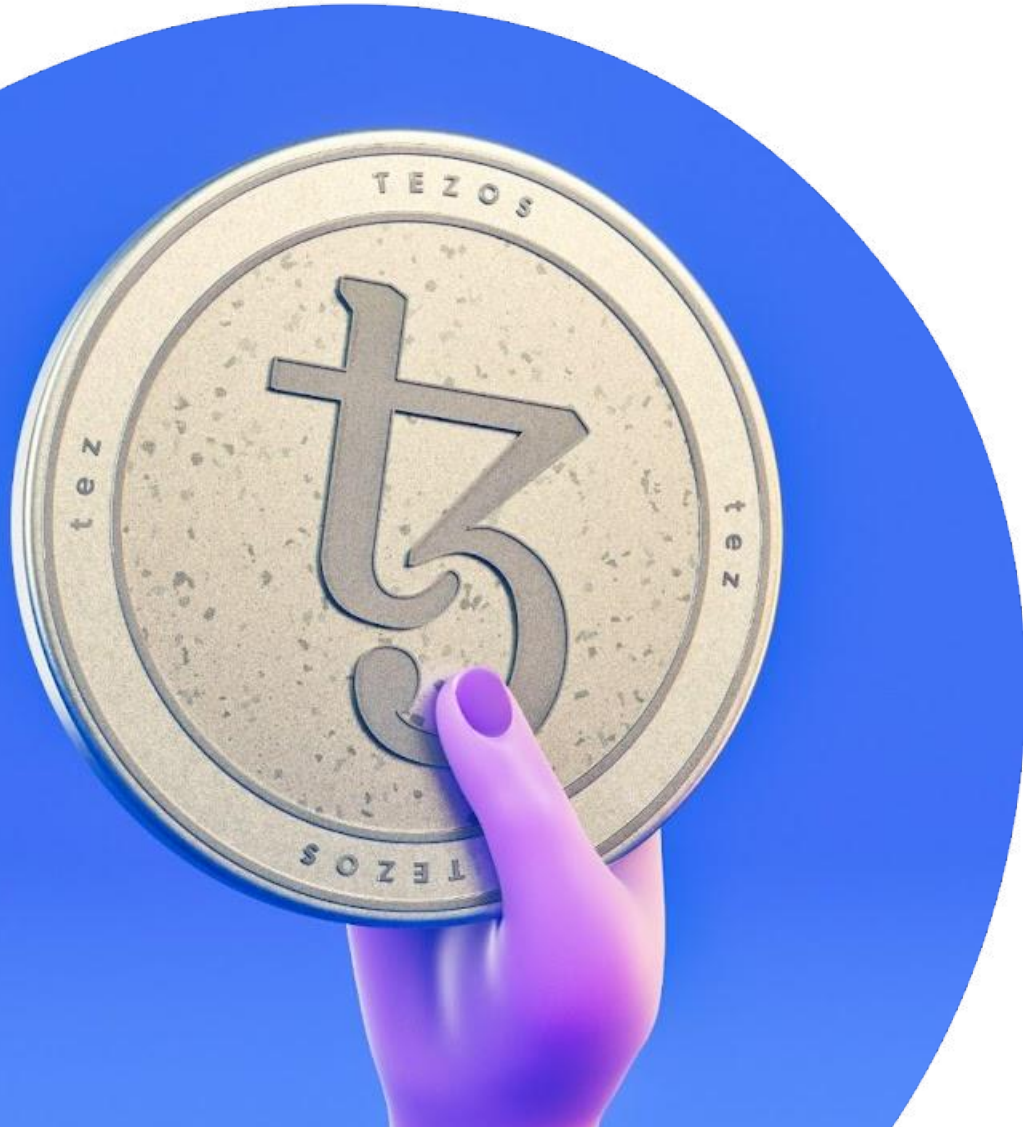
What are NFTs?

Understanding the NFT technology on Tezos






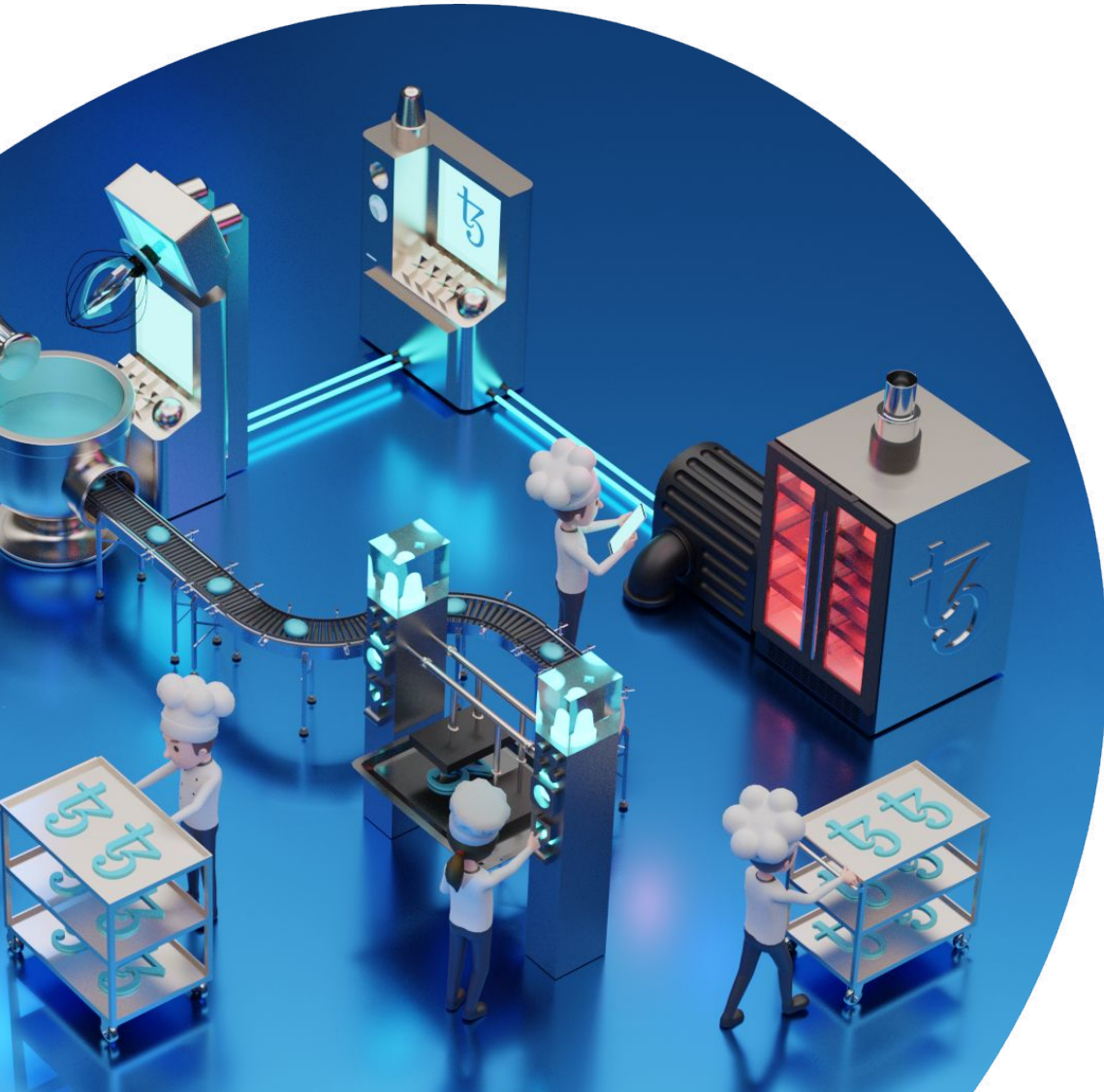
01 Tezos



Main features

Tezos addresses the main barriers to blockchain adoption: smart contract security, long-term scalability and open participation.

-  **Liquid Proof of Stake**
-  **Secured smart contracts**
-  **Decentralized governance**
-  **Self amendability and auto updates**



01 Road to NFTs



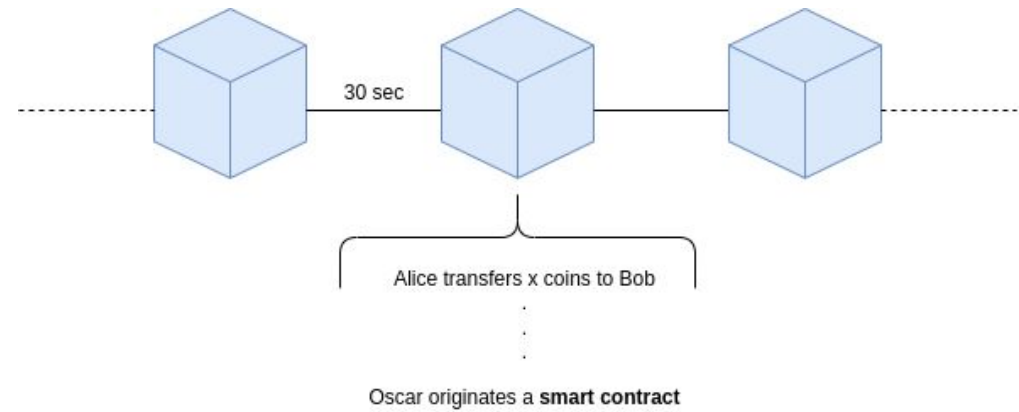
Gen 1



Gen 2

₮ Tezos

Gen 3



You said smart contracts?



.py, .arl, .tz, .ligo, etc

Smart contracts on Tezos

- FA1.2 (Financial assets) : **For fungible assets**
- FA2 (Financial assets) : Both **Fungible and Non-fungible assets**
- Others, of any kind... (oracles, proxy, etc)

FA2 interface

- Mandatory functions:

entrypoints:

transfer
balance_of
update_operators

Transfer

```
record transfer_destination {
  to_dest      : address;
  token_id_dest : nat;
  token_amount_dest : nat
} as ((%to, (token_id, amount)))

entry %transfer (txs : list<address * list<transfer_destination>>) {
  require {
    r2: mustBeUnpause()
  }
  effect [
    for tx in txs do
      var %from = tx[0];
      var tds = tx[1];
      for td in tds do begin
        if caller <> %from then begin
          (* check operator *)
          dorequire(operator.contains((caller, td.token_id_dest, %from)) or operator_for_all.contains((caller, %from)), "FA2_NOT_OPERATOR");
        end;
        (* set token ownership *)
        var tokenid = td.token_id_dest;
        var amount = ledger[(%from, tokenid)].lamount;
        if td.token_amount_dest > amount then
          fail("FA2_INSUFFICIENT_BALANCE")
        else if td.token_amount_dest = amount then
          ledger.remove((%from, tokenid))
        else
          ledger.update((%from, tokenid), { lamount -= td.token_amount_dest });
          ledger.addupdate((td.to_dest, tokenid), { lamount += td.token_amount_dest })
        end done;
      end done;
    done
  ]
}
```

Balance of

```
record balance_of_request {
  bo_owner : address;
  btoken_id : nat;
} as ((owner, token_id))

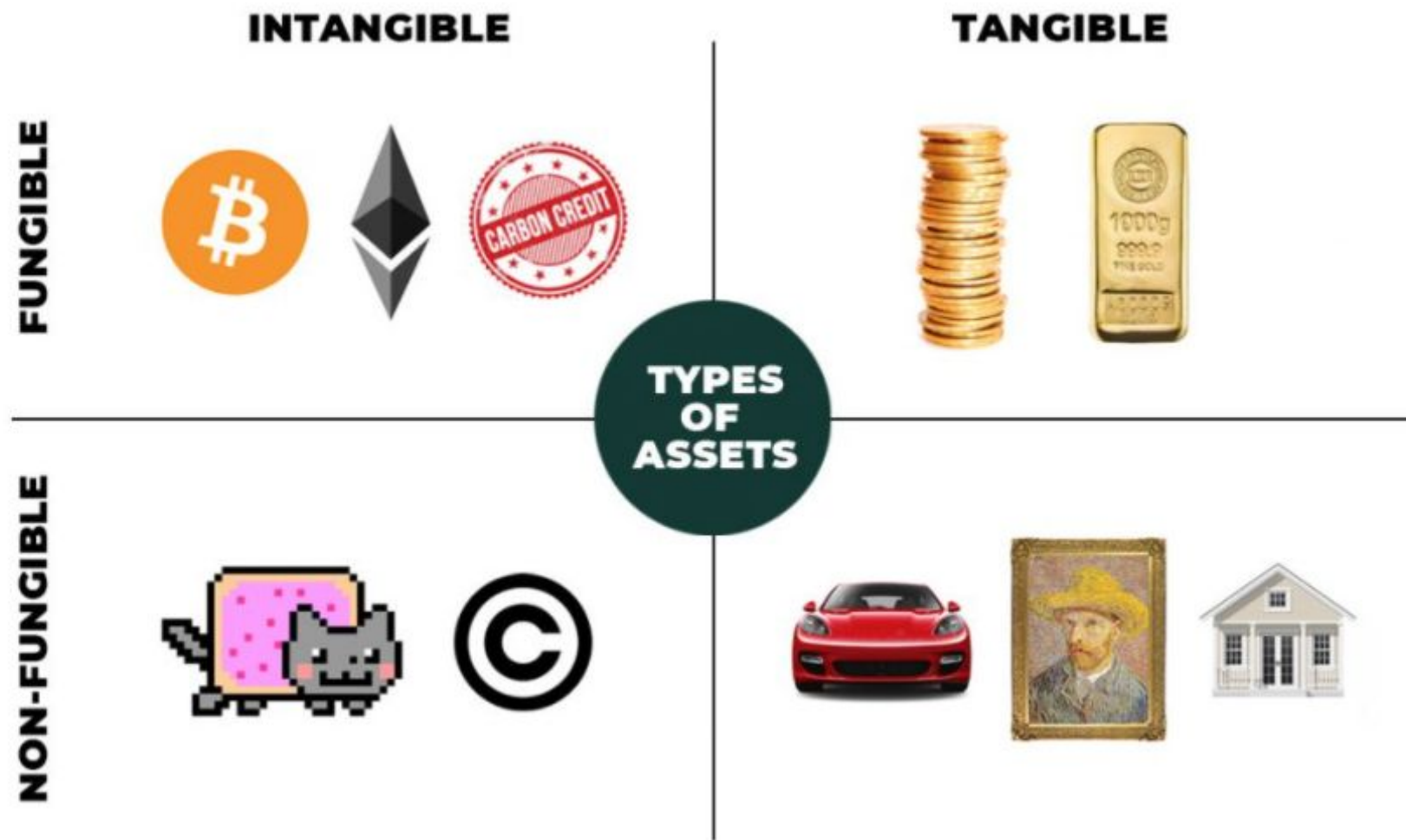
record balance_of_response {
  request : balance_of_request;
  balance_ : nat;
} as ((request, balance))

getter balance_of (requests : list<balance_of_request>) : list<balance_of_response> {
  return map(requests, br -> {
    request = br;
    balance_ = (
      if ledger.contains((br.bo_owner, br.btoken_id))
      then ledger[(br.bo_owner, br.btoken_id)].lamount
      else 0
    )
  })
}
```

Update operators

```
record operator_param {
  opp_owner    : address;
  opp_operator : address;
  opp_token_id : nat
} as ((owner, (operator, token_id)))

entry update_operators (upl : list<or<operator_param, operator_param>>) {
  require {
    r0: mustBeUnpause()
  }
  effect {
    for up in upl do
      match up with
      | left(param) -> (* add *)
        dorequire(ledger.contains((caller, param.opp_token_id)), "CALLER NOT OWNER");
        operator.add({oaddr = param.opp_operator; otoken = param.opp_token_id; oowner = param.opp_owner })
      | right(param) -> (* remove *)
        dorequire(ledger.contains((caller, param.opp_token_id)), "CALLER NOT OWNER");
        operator.remove((param.opp_operator, param.opp_token_id, param.opp_owner))
      end;
    done
  }
}
```



What 's inside?

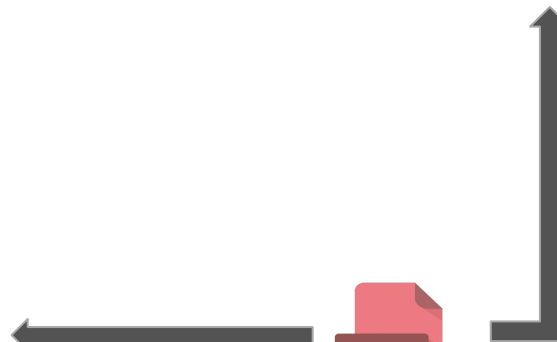
After origination on SmartPy online IDE...

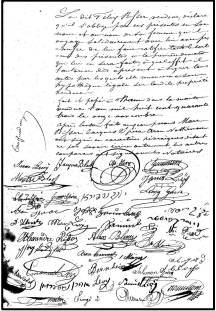
Build Transaction Parameters

☒ Regular ☐ Micheline ☐ JSON ☐ Micheline (Full Path) ☐ JSON (Full Path)

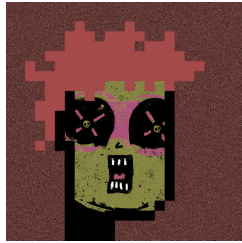
Mint ▾

Address	Amount	Metadata	Token_id
<input type="text"/>	<input type="text"/>	One ▾ <div>url <input type="text"/></div>	<input type="text"/>





notarial acts



digital & interactive
pieces of art



certificate of
authenticity



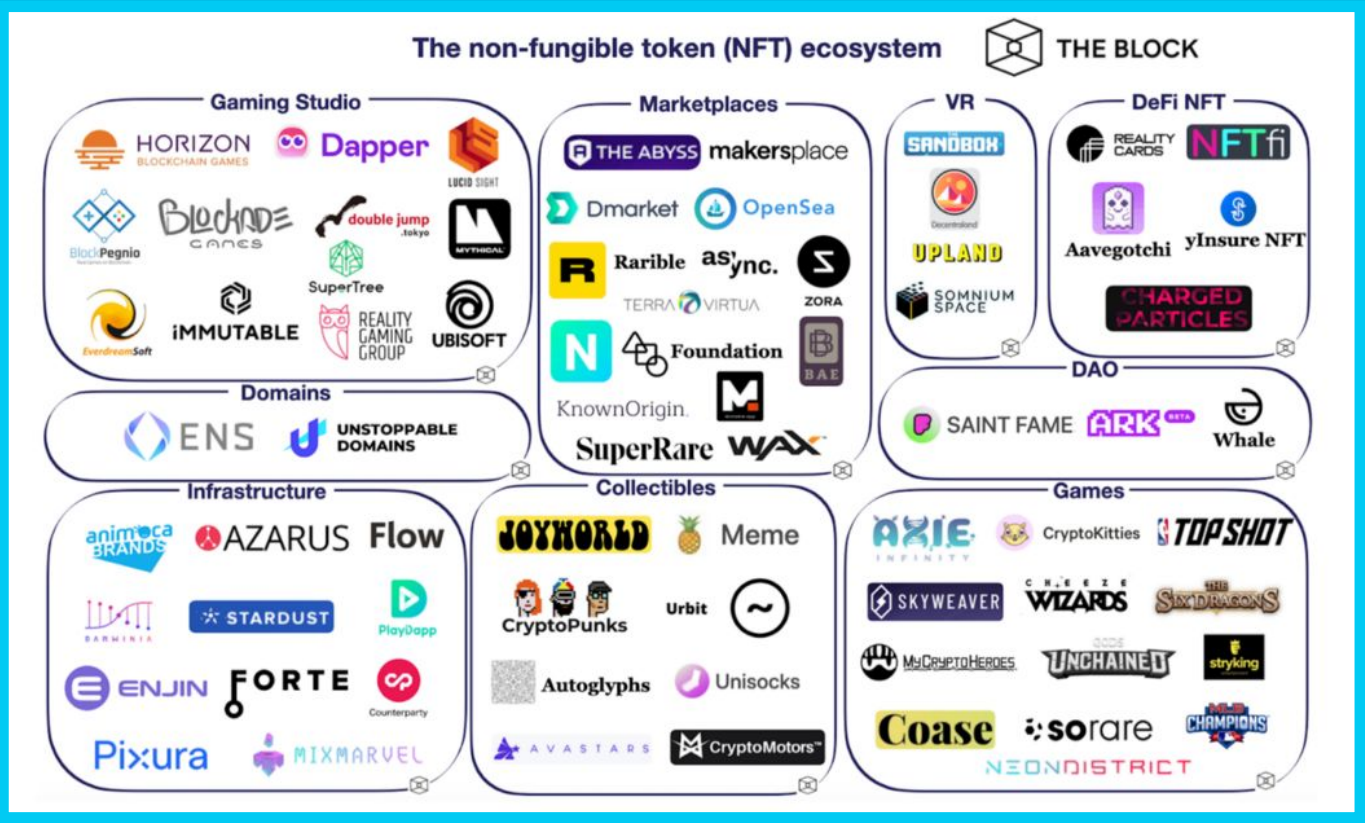
ticketing

What for?

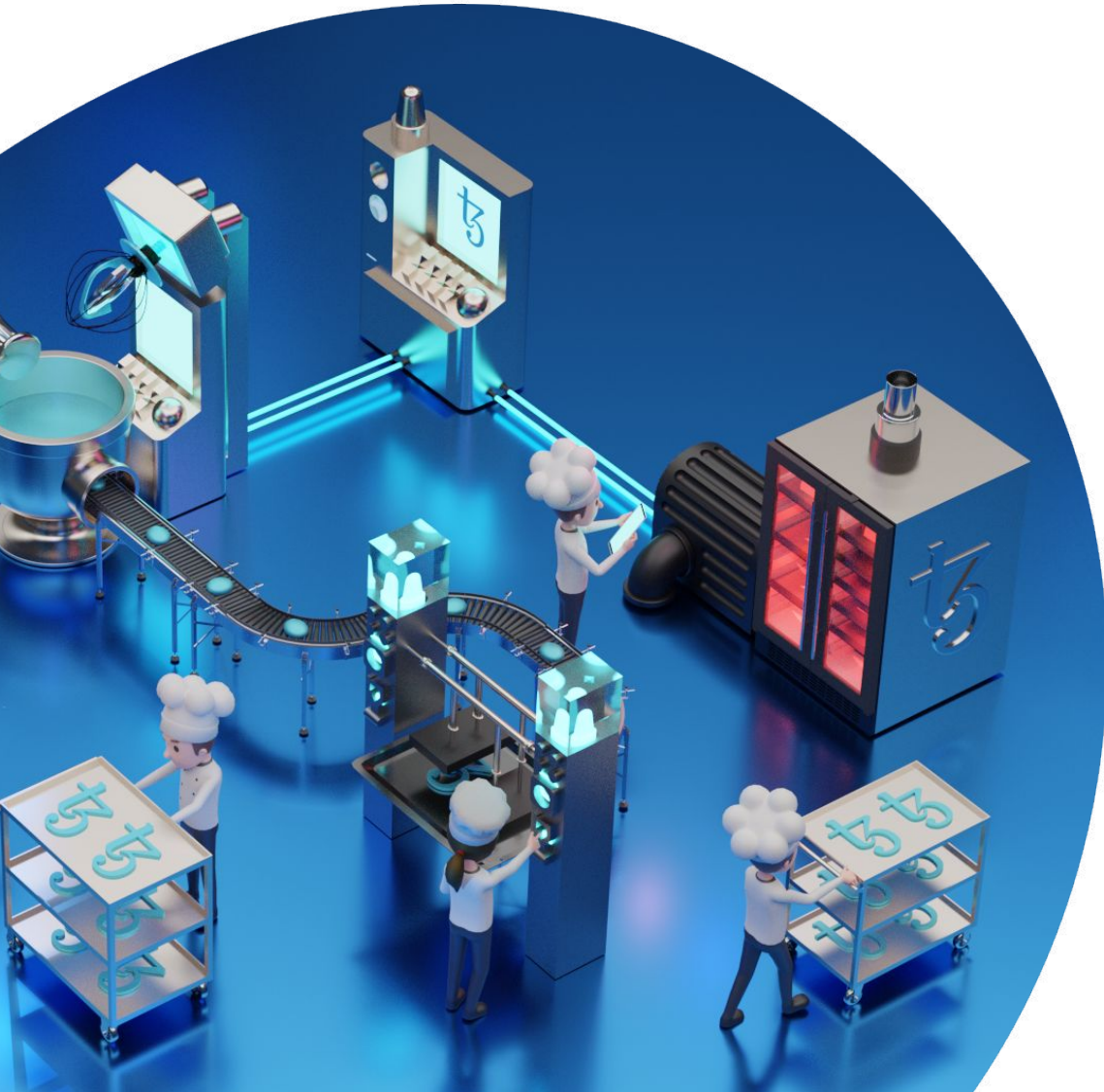
- Avoid forgery (trustworthy and authentic)
- Evolutive artworks
- Immutable data stored on the blockchain for life
- Easily emitted and transferable across the world



03 The industry



NFT sales volume totalled **\$24.9 billion** in 2021, compared to **\$94.9 million** the year before, according to DappRadar. DappRadar collects data across ten different blockchains, which are used to record who owns the NFT.



02 State of art on Tezos

Tezos ecosystem is on track for NFT deployment : Tezos sees its NFT ecosystem grow, benefiting from low storage costs and energy saving consensus.

Non-Fungible Tokens platforms

DOGAMI

objkt.com

tzcolors

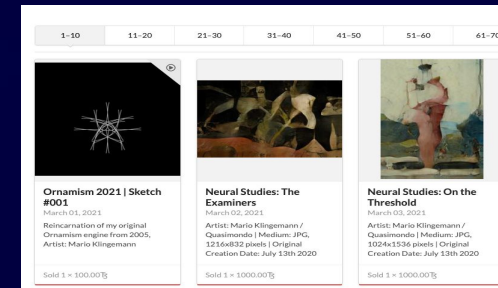
hic et nunc



Kalamint



Diversified NFT market



Supported formats: bmp, gif, jpeg, png, svg, tiff, webp, mp4, ogv, quicktime, webm, glb, gltf, mp3, oga

Supporting NFT wallets



Challenging transactional capacities

Transaction throughput: ~4.1k batched NFT transactions per minute

Transaction costs: NFT minting/swap fees @~0.001 XTZ=~0.0021€



Stay in touch



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Thank you



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