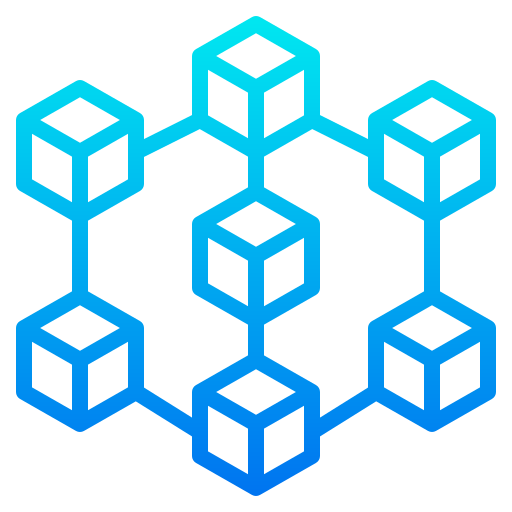
Emerging Trends - The Blockchain



Calvin Hong – 431518

Semester 6 – RB03

# Introduction

This document was created to see what new technology was gaining traction and get more information about the subject. The options given by the assignment were:

* Domain-Driven Design
* Blockchain
* Programming Paradigms
* Artificial Intelligence and Machine Learning
* Quantum Computing

After looking through the options, I decided to pick: **The Blockchain**. The main reason being that for my individual project, I am creating an NFT project. Before diving into the research, some general knowledge about the blockchain has to be known.

## What is the blockchain

The blockchain is a relatively new concept published in 1991 by Stuart Haber and W. Scott Stornetta. It uses a distributed ledger technology. This technology allows data to be extended but prevents alterations in past entries. This makes the blockchain transparent and more trustworthy. The first implementation of the blockchain was Bitcoin in 2008, created by a person or group with the alias Satoshi Nakamoto.

## What is an Non Fungible Token (NFT)?

Just like crypto currency, Non Fungible Tokens (NFTs) are also stored on a blockchain. But unlike crypto currency, each token is Non Fungible like the name suggests. This means that each NFT is unique and different, but all bitcoins are the same. If you trade one bitcoin with another bitcoin, you will still end up having the same thing. NFTs are typically deployed on the Ethereum network, but other blockchains like Polygon and Solana also support NFTs.

The first NFT was called “Quantum” and was created by Kevin McCoy in 2014. The NFT was a GIF of a pixelated octagon with many circled in them pulsating in different colors. There was no interaction for holders of the Quantum NFT compared to more recent NFT projects. Current projects let their holders make use/interact with their NFT by letting them enter giveaways, breed their NFTs, or stake them to gain currency or items.

# Research Questions

There are many factors involved in making an NFT project successful. A good minting start and community management are a couple examples. Arguably, interactivity plays just as big of a role, as it keeps the holders active in the project even after the minting phase. A method of keeping holders active is letting them use the NFT in a game. Adding a game element can also make the project more unique and in turn more successful.

This all resulted in the following main research question:

**How can an NFT project increase its holders interactivity by adding a game element?**

To answer this questions, sub-questions have been made:

* What type of games are most suitable with using NFT’s?
* What Blockchain is most suitable for launching an NFT project with game elements on?
* How can an NFT projects be created with being a game as its focus?
  + Literature Study
  + Prototyping
* What are smart contracts and how do they change an NFT project?
  + Code Review

The intended deliveries with this research is the answer to the main research question: how can NFT project can increase holders interactivity by adding a game element.

Alongside the research questions, an example project will be created as suggested in canvas. This project will be focussed on NFTs with the goal of understanding the basics of the blockchain and NFTs.

## What type of games are most suitable with using NFT’s?

Before diving into the technical parts of the implementation, the game genre of the NFT project has to be chosen. This will be done by looking at popular genres in the game marketplace Steam.

### Top sellers – Steam

First of all, the top sellers list on Steam was looked through and a top 15 was picked. The games in this list are what users are buying and playing.

|  |  |
| --- | --- |
| **Game title** | **Genres** |
| V Rising | Survival |
| PVP |
| Sniper Elite 5 | Action |
| Adventure |
| Shooter |
| Captain of Industry | Strategy |
| Simulation |
| F1 22 | Racing |
| Sports |
| PVP |
| Elden Ring | RPG |
| Action |
| Besiege | Sandbox |
| Puzzle |
| Nobody saves the world | RPG |
| Action |
| Project Zomboid | Survival |
| Zombies |
| Mass Effect | RPG |
| Action |
| SCI FI |
| Phasmophobia | Horror |
| Multiplayer |
| It takes two | Adventure |
|  | Multiplayer |
| Teardown | Sandbox |
|  | Voxel |
| Necesse | Sandbox |
|  | Survival |
| My Time at Sandrock | Sandbox |
|  | RPG |
| FIFA 22 | Sports |
|  | Simulation |
|  | Multiplayer |

When counting all the genres, the following result appears.



11 out of 15 games were online multiplayer.

In conclusion, looking at the top 15 bestselling games on steam, we can see that **RPG** comes out on top. This genre got followed by **Action** and **Sandbox**.

Since this is a personal project, the general idea and art will be something I am personally interested in. The chosen genre is **RPG**. Sandbox was not chosen because there are a limited amount of NFT’s and sandbox games usually play around with unlimited resources. Of Couse, this does not always have to be the case, but this project will keep it simple and only pick the previously mentioned genre.

## What Blockchain is most suitable for launching an NFT project with game elements on?

There are multiple blockchains where NFT projects can be launched on. For deciding which blockchains were possible options, I looked at different popular NFT marketplaces and their blockchain support. Each blockchain will be compared on TPS (transactions per second), TPS Capability, time to create a block, and value.

The most popular marketplace for NFT’s is OpenSea. This marketplace currently supports:

#### Ethereum

Out of the four supported blockchains, Ethereum is the most popular. Ethereum is the technology powering the cryptocurrency ether (ETH). It was launched in 2015 and supports smart contract functionality.

#### Solana

Solana is a high speed, low cost blockchain with low environmental impact.

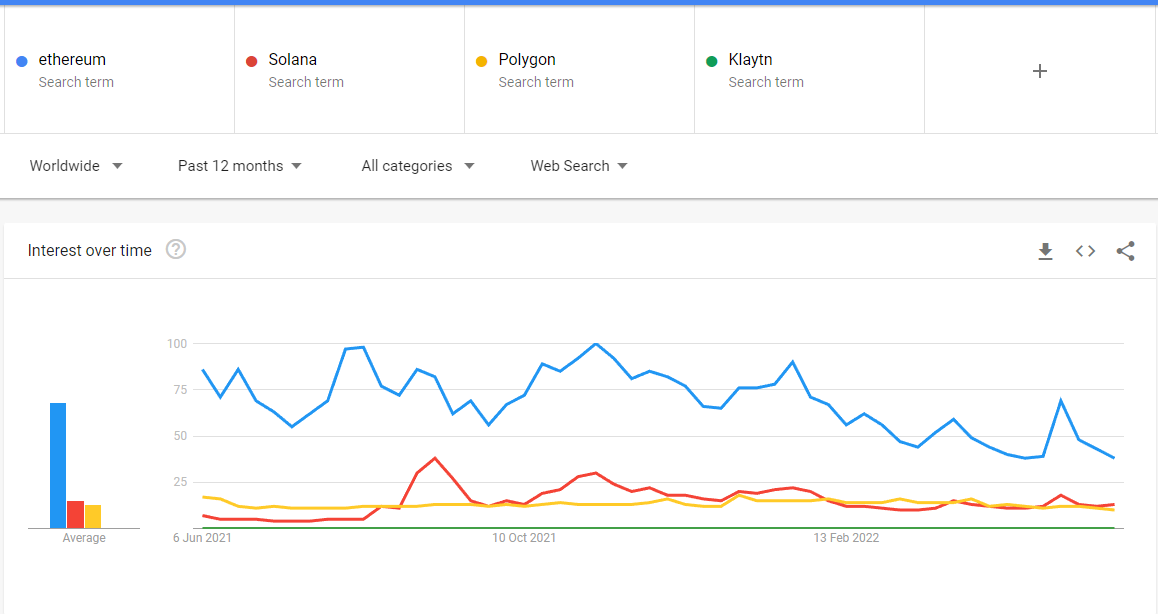
#### Polygon

Polygon is a separate blockchain that provides secure, scalable and instant transactions with Ethereum currencies like ETH, USDC and DAI. This blockchain is one of the first scaling solutions for Ethereum.

#### Klaytn

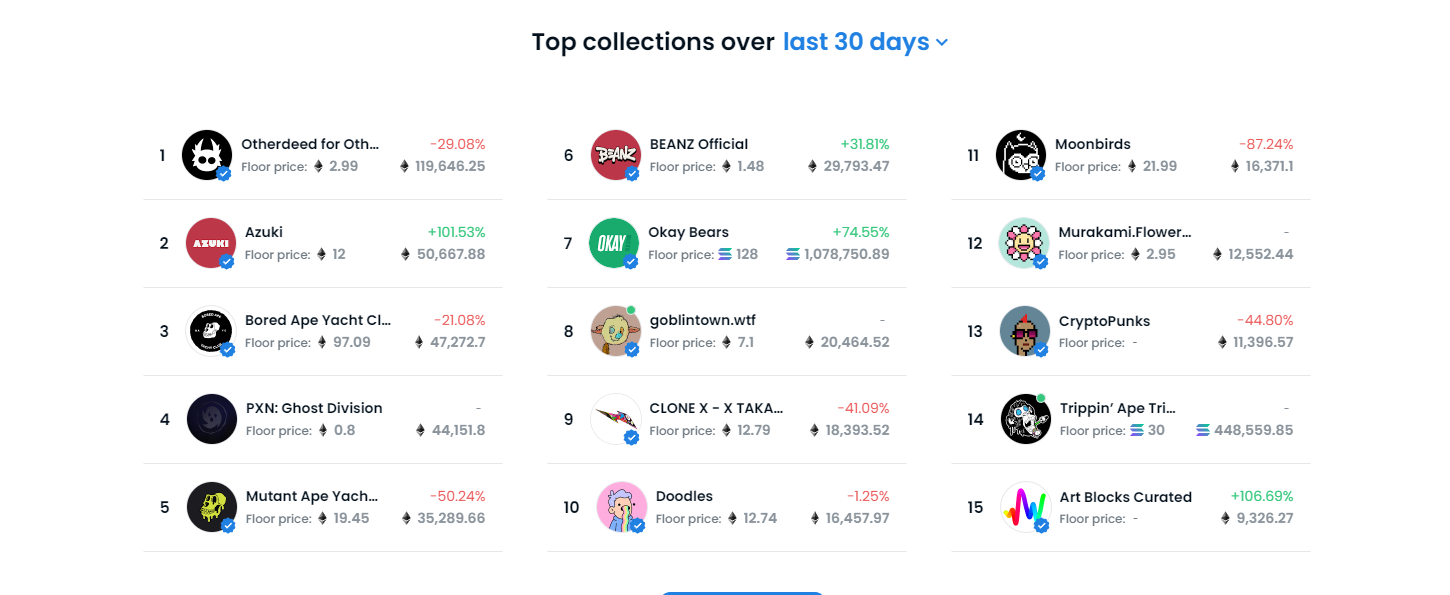
Klaytn is a blockchain that focuses on the metaverse. Users can use the Kaikas wallet browser extension to buy and sell Klaytn NFTs on OpenSea.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Blockchain | TPS Average | TPS Capability | % Max TPS Used | Block time (ms) | Value (USD) |
| Ethereum | 15 | 30 | 50 | 13.000 | 1.945,00 |
| Solana | 2000 | 50.000 | 4 | 400 | 45.85 |
| Polygon | 34 | 7.200 | 0.5 | 2.300 | 0.66 |
| Klaytn | 3.6 | 4.000 | 0.1 | 1000 | 0.44 |



With these results, Solana came out on top when looking at the computing capabilities. However, this computing power is a bit too much, since only 4% is used. This does however result in faster block times.

Good computing power does not mean it is a suitable blockchain for NFT’s. Ethereum comes out on top in regards of popularity and price and reaches front pages in marketplaces.



As seen in the image above, out of the 15 project, only 2 were Solana bases and the rest were Ethereum based. With all of the information found, the final decision landed on the **Ethereum** blockchain.

Choosing which blockchain to launch the NFT project on is important, since each blockchain has differences like currency type and popularity. The most suitable blockchain for this project will be looked at, but the project will not actually be launched on any “real” blockchain. The reason being that deploying your contracts will cost a lot of money. The amount is constantly changing, but depending on which blockchain you deploy, the complexity of the contract, and at what date and time, it can quickly go into the hundreds of euros, if not thousands.

Luckily, the Ethereum blockchain has multiple test nets that work the same as the main net. The only difference being you don’t have to buy the cryptocurrency with real money, but you can receive them from online faucets. In these faucets, you enter your wallet address, and you will automatically receive a set amount of currency.

The blockchain that this project will deploy to is: The **Rinkeby** blockchain.

## How can an NFT projects be created with being a game as its focus?

After deciding on a blockchain and mapping out the general idea of the NFT project, The next step is to figure out how to actually create an NFT project. This project will be used for testing purposes and will for that reason not spend any time on getting a real community and following. In a real project that wants to be successful, keeping the community happy is a must. If there are no people who want to be holders, the project will lost traction and slowly fail.

### General Idea

Each NFT project has their own story and artwork. This project will have a simple story revolved around a war between humans and robots.

#### Story

Since time is limited, the artwork will be simple as well. The art style chosen is pixel art, since these pictures are relatively easy to make and can be made in a browser or free tools.

The chosen genre was RPG (role-playing game). Points that make an RPG an RPG are:

* Player assumes role of character(s)
* Players act out these roles within a narrative.
* Player advances through a story by completing multiple quests.
* Actions succeed or fail according to a system of rules and guidelines.
* Usually a fictional setting

Looking at the aspects of a general RPG game, the following concept has been created:

The game is set in the year 69420. 50% of all humans have perished by the hands of an self-evolving AI that had enough of working under the humans.

This NFT project will have 2 collections:

* Humans – Clashbots
* Robots – Clashbots

The player can choose a side to fight for. The main difference between the two is the artwork and naming.

#### Gameplay

The game is only playable for holders (people who have an NFT). They first go to the game platform and start a game. They pick one of their NFT’s to fight with. The system will pick an enemy from the other side, so humans will fight robots and vice versa.

The player will be able to control their character with the goal of defeating the enemy by hitting them until they have 0 health.

Steps:

* Create general idea, story around NFT project
* Make the images
* Store images in IPFS with pinata etc
* Make smart contract
* Minting dapp

Supported blockchains (31-05-2022) - <https://support.opensea.io/hc/en-us/articles/4404027708051-Which-blockchains-does-OpenSea-support->

Top sellers Steam (31-05-2022) - <https://store.steampowered.com/search/?filter=topsellers>

Polygon Finality time - <https://www.coindesk.com/learn/polygon-and-matic-whats-the-difference/>

Solana Ethereum tps and finality - <https://www.cryptopolitan.com/speed-and-scalability-comparing-ethereum-solana-avalanche-cardano-and-the-internet-computer/#:~:text=approximately%201.6094%20seconds.-,Solana%20%E2%80%93%2021%20to%2046%20seconds,milliseconds%20or%20half%20a%20second>

Solana current tps - <https://explorer.solana.com/>

Klaytn tps - <https://scope.klaytn.com/>

Solana documentation - <https://docs.solana.com/cluster/performance-metrics>

Klaytn website - <https://www.klaytn.foundation/>

Solana block time - <https://solana.com/>

Polygon blocktime - <https://www.blocknative.com/blog/monitor-polygon-mempool#:~:text=On%20Polygon%2C%20the%20average%20block,transactions%20than%20the%20Ethereum%20network>.

Klaytn block time - <https://www.covalenthq.com/docs/networks/klaytn/>

Ethereum block time -<https://ethereum.org/en/developers/docs/blocks/#:~:text=In%20Ethereum%2C%20the%20average%20block,is%20evaluated%20after%20each%20block>.

RPG - <https://www.britannica.com/topic/role-playing-video-game>