HIBBS&POLLEY
SHAP NFT TECHNOLOGY

Inspiration, Vision, Design, and Analysis of Audio to Image Conversion, Audio Non-Fungible Tokens, and the Purpose-Built Audio Blockchain

Whitepaper 2022

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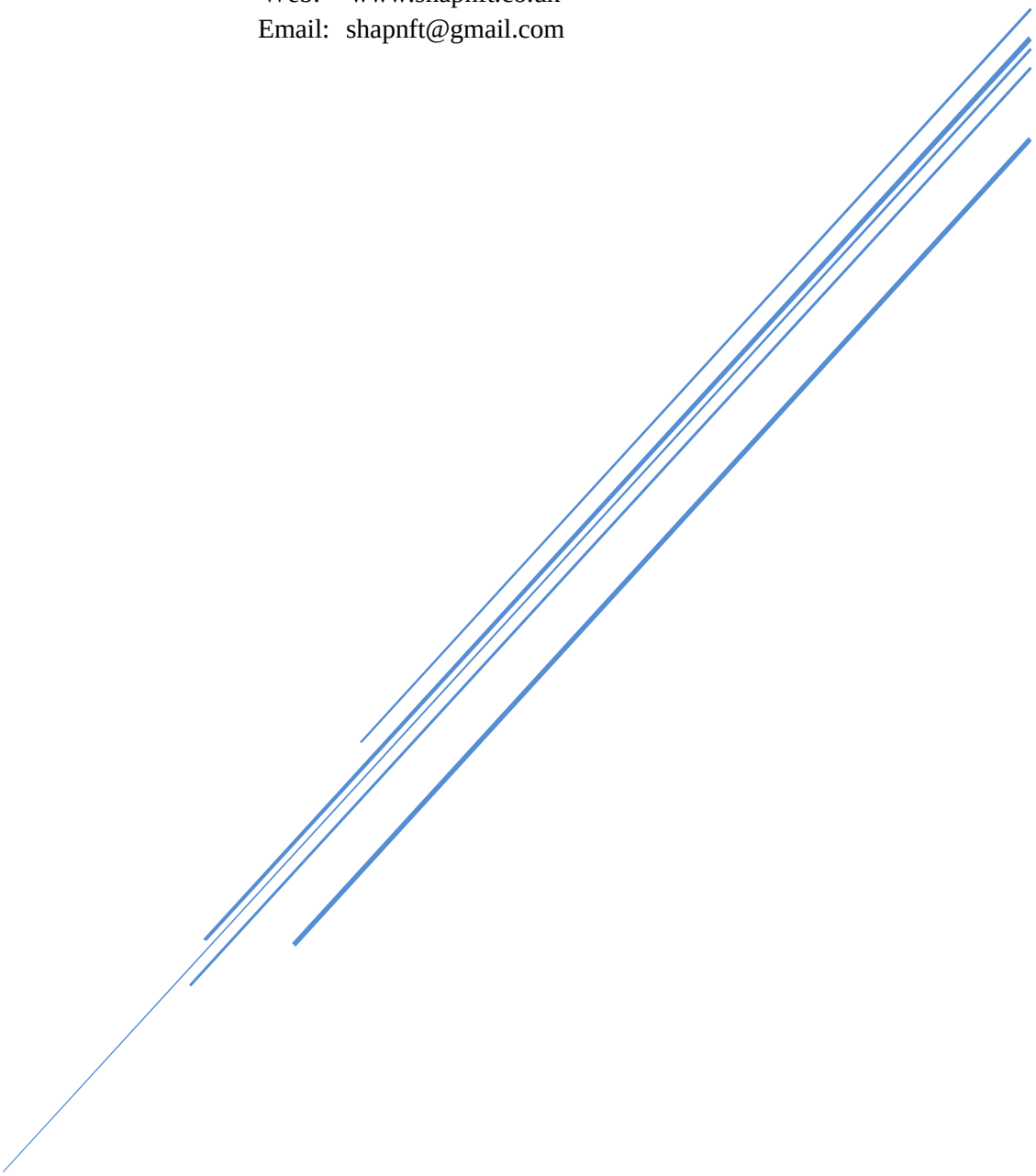

Non-Fungible Tokens (NFTs) were first introduced into the cryptocurrency space in May of 2014 **[1]**. These are one-of-a-kind images that can be bought, sold, owned, and have codable meta-data. They allow artists to easily monetise work, as well as giving the owner the artistic rights to the NFT they possess. In 2022, the NFT marketplace is worth roughly $3,000,000,000 **[2]**. The vast majority of NFTs are images, yet it is possible to mint an 'audio NFTs'. In this whitepaper, the idea of audio NFTs and the different possibilities are explored, and our plan to dominate this potentially multi-billion-dollar market is outlined.

Inspiration

Founders of SHAP NFT, Sabian Hibbs and Ayden Polley of Hibbs & Polley PLC, both have backgrounds in music technology. During a business meeting, the question was raised as to why NFTs are purely visual, and whether the file could instead be an audio file. The music industry has long been plagued by unclear copyright laws, exploitative record labels, and artists struggling claim ownership as well as monetise their work. Creating 'ownable audio' can significantly change the hierarchal structure of a rivalrous music industry.

Vision (Problems & Their Solutions)

What if musicians could 'own' their own music? How about sound designers? How would an audio industry operate without the need for copyrights, or record labels? These are questions asked by people within this industry, and blockchain is an ideal candidate for the solution.

For example, imagine, a lesser-known musician makes a song. They don't have a large record label behind them to promote it, and they don't know how to properly take advantage of copyright laws. Blockchain technology has the solution to both of these issues. Let's start with copyright law. Copyright is a 'blanket' law, it covers everything as long as you can prove two things. These are: time and date, and that the piece of work was made at that time, by the creator such as yourself. This is where blockchain comes in. When a transaction is made on the blockchain, it is publicly available for everyone to see, including who sent the transaction, what has been sent, the destination, and fees. Therefor, if a musician mints their SHAP NFT, using the finished audio, this is then all recorded on the blockchain for everyone to see. Then, they are able to claim copyright over their creation.

The second problem that SHAP NFT solves is the need for investment from a record label. When an artist mints their NFT, it contains the partial rights to that song. They are able to sell this to any investor, whether individual or corporate. This then gives money directly to the artist, who can use that to grow their following and gain publicity. The more interest in that artist, the more value the rights to their song has, which benefits the investor. It could seem to be a disadvantage for the artist to sell the rights to their song, however, because of meta-data coding, the NFT can have contracts written in. These may include royalty deals from streaming services, or even a percentage cut of what the NFT sells for if it is re-sold on the open market.

How it works:

The following description of mathematical operations aims to take in an uncompressed audio signal (16 bits @ 44.1 kHz) and convert it to pixel grayscale values within a PNG image. The mapping from one-dimensional audio to two-dimensional image is done using linear mapping (rather than scrambling the location of audio samples within the image's pixels – which could be a future option for security). The audio data is preceded in the image by metadata. An audio data header (in the form of a binary string) will be placed after the metadata to indicate the location of the audio data. Note that this step is not necessarily required if the length of the metadata (in samples/pixels) is specified within the metadata itself.

> Note that the following mathematics assumes that the first array index for all data is 0 (not 1). It is assumed that the incoming audio file has been appropriately resampled to 16 bit @ 44.1 kHz prior to carrying out this process.

Variables:

$A_P(x\,,y) =$	Grayscale value (16 bit) at pixel location $(x\,,y)$ where x represents width (left to right) and y represents height (top to bottom).
$A_s(m\,,n) =$	Audio amplitude (16 bit) at the m^{th} sample and n^{th} audio channel.
$M =$	Length of audio data (in samples).
$N =$	Number of channels in the audio file.
$P =$	PNG image square dimension (as defined by Equation 1).
$d =$	Array of metadata.
$D =$	Length of array of metadata, d.
$h =$	Audio data header.
$H =$	Length of audio data header, h.

Equation 1: Define image square dimension (equal width and height) in pixels.

$$P = \left\lceil \sqrt{D + H + NM - 1} \right\rceil$$

(Note that the half square brackets represent a rounding up function).

Equation 2: Mapping of 2D pixel location to 1D pixel location for current pixel index $(x\,,y)$.

$$z = x + yP$$

Equation 3: Map the current pixel at location $(x\,,y)$ to the relevant audio sample index $m(x\,,y)$.

$$m(x\,,y) = \big(z - (D + H)\big)\%M$$

(Note that % represents a modulo operation).

Equation 4: Map the current pixel at location $(x\,,y)$ to the relevant audio channel $n(x\,,y)$.

$$n(x\,,y) = \left\lceil \frac{z - (D + H)}{M} \right\rceil$$

(Note that the half square brackets represent a rounding up function).

Equation 5: Define the PNG pixel grayscale values for the metadata, audio header and audio data.

$$A_p(x\,,y) = f(x) = f(x) = \begin{cases} d(z), & for\ z < D \\ h(z - D), & for\ D \le z < D + H \\ A_s\big(m(x,y).n(x,y)\big), & for\ D + H \le z < D + H + NM \\ 0, & for\ z \ge D + H + NM \end{cases}$$

Dr Adam Hill – University Of Derby (06-22)

Token Economics

As it stands, mid 2022, the SHAP token has net yet been implemented. However, in future developments it will be deployed as a reward token to participants who uphold the running of our purpose-built ownable audio blockchain. In keeping with the times, it is unlikely to be a proof-of-work system. These require significantly higher electrical input than its counterpart; proof-of-stake, which is much more environmentally aware and often faster.

Breakdown of Token Allocation Before Launch:

Total Supply: 1.5 billion (1,500,000,000)

Founders: 16%

Early Investors: 5%

Exchanges: 20%

Company Funding: 20%

Timeline & Future Plans:

Hibbs & Polley have three major stages in the timeline for SHAP NFT, with specific plans to achieve these. The first of these stages is the ***working concept stage.*** Several steps precede this. First, the tokenomics is to be created and implemented. This includes distribution of tokens to initial investors and founders, as well as allocation for exchanges as a means of public investment and fund raising. Second, social media pages must be created to keep public interest up to date with developments and news. As this is being developed, so is the website. The website is where the first working concept will be available for use to the general public. Once the first iteration of the SHAP NFT creator is implemented, this would then mark stage one as complete. The first iteration of SHAP NFT allows people to convert their audio to NFTs, using BNB fees on the Binance Smart Chain.

Stage two is the ***implemented token stage***. This stage consists of one major goal: the implementation of the SHAP token to the NFT creator. Users will be able to trade in their tokens to convert audio to NFT, streamlining the process and making it simple to operate.

The third stage is the very reason SHAP NFT was created. Once all other stages are completed, work will start on creating a purpose-made blockchain for the transfer and ownership of audio. Therefore, it is the ***blockchain stage.*** Until this is completed, the Audio to NFT converter will be operating on another project's blockchain. Though this isn't optimal, it is an essential first step to gathering market data and analysis. The blockchain stage is where the company will have the highest rate of returns, sped up recouperation of invested capital, and produce profits.

Revenue Projections:

Revenue Streams:

- Creation of Ownable Audio Image	0.50
- Exchange Sale Transaction Dividend	1% of Sale (to be modelled)
- Token Transaction Dividend	0.5%
- Blockchain Transaction Fees	0.5%

Creation of Ownable Audio Image (SHAP NFT)

22,000,000 songs are added to Spotify every year. If you look at the total market share that Cryptocurrency has on the traditional financial markets; it is currently around 1%. So, by extrapolation, if we capture 1% of the Spotify market, there will be around 220,000 SHAP NFTs created per year. At £1 per transaction, £220,000 in revenue will be generated annually from creation of NFTs.

Exchange Sale Transaction Dividend

SHAP NFT will have dividend meta-data coded into each NFT. This will ensure that any of these NFTs sold on a marketplace will return 1% of the sale price to the company wallet. The average price of an NFT was $2000 in 2021, with 50% of NFTs transferring a year, this would equate to a minimum of £2,200,000 in revenue yearly, which would increase exponentially with the increase of NFTs being created. A low range estimate for yearly revenue in 5 years from transactions alone would be £10,000,000.

Token Transaction Dividend

As previously stated, to streamline and optimize the process of creating a SHAP NFT, the SHAP token will be implemented in stage two. When a transaction is made using this token, a percentage of this total transaction value will be redistributed to the company wallet. No official figure has been stated yet, however, assuming a percentage of 0.5%, revenue from this source can be estimated. Assuming a daily volume of £1,000,000; yearly revenue can be estimated at £1,825,000 for this income stream.

Blockchain Transaction Fees

Transaction fees on a blockchain can vary significantly, however, a good target should be at around 0.5%. If we assume this is achieved, 50% goes to contributors of the network, and the rest to the company for maintenance and development. Therefore 0.25% of all transaction volume will be redistributed to revenue. Trading volume on NFT marketplace Opensea reached $14bn (roughly £11bn) in transaction volume in 2021 **[3].** Again, if just 1% of this market volume was to be captured, transaction volume on the blockchain would generate £2,750,000 in revenue. Potentially significantly more, as the exchange quoted (Opensea) charges 2.5% transaction fee (5x more).

Stages and Their Predicted Revenue Targets:

Considering; time progressed, NFTs made, transaction volume, transaction size, blockchain fees etc. These are possible figures for revenue.

Stage One – Working Concept Stage
£4,270,000

Stage Two – Implemented Token Stage
£6,445,000

Stage Three – Blockchain Stage
£10,850,000

Expenses are likely to exceed 150,000 to 200,000 per year for stage one. 300,000-400,000 per year for stage two. Then 500,000+ for stage three. These can be deducted from the estimated stage revenues to give profits:

Stage One – Working Concept Stage
£4,070,000 - £4,120,000

Stage Two – Implemented Token Stage
£6,045,000 - £6,145,000

Stage Three – Blockchain Stage
£10,350,000 +/- £200,000

References

[1] *Cascone, S., 2021. Sotheby's Is Selling the First NFT Ever Minted—and Bidding Starts at $100 | Artnet News. [online] Artnet News. Available at: <https://news.artnet.com/market/sothebys-is-hosting-its-first-curated-nft-sale-featuring-the-very-first-nft-ever-minted-1966003> [Accessed 14 June 2022].*

[2] *Finance.yahoo.com. 2022. The global NFT market size is expected to grow from USD 3.0 billion in 2022 to USD 13.6 billion by 2027, at a Compound Annual Growth Rate (CAGR) of 35.0% from 2022 to 2027. [online] Available at: <https://finance.yahoo.com/news/global-nft-market-size-expected-115400664.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAABDuPeoqknaWmKgFP9K8Wv_Z_WwBVMa9to4IH9r1gOOdpGbdDgk1XQc-zFFUvYuDAyhPX3H2yIpNso5zMGUFPNfX44Ixwm62zryYLiaL7kXw7OWqIDGqc1R3BK6RSphcbmWGToqKgViNBvMCtoqOAX-A6SV5AiTLeTl-Ae2Bl9o3> [Accessed 14 June 2022].*

[3] *Craig, T., 2021. OpenSea Saw a 646x Increase in Trading Volume in 2021. [online] Crypto Briefing. Available at: <https://cryptobriefing.com/opensea-saw-a-646x-increase-in-trading-volume-in-2021/#:~:text=OpenSea%20will%20finish%20the%20year,to%20data%20from%20Token%20Terminal>.*