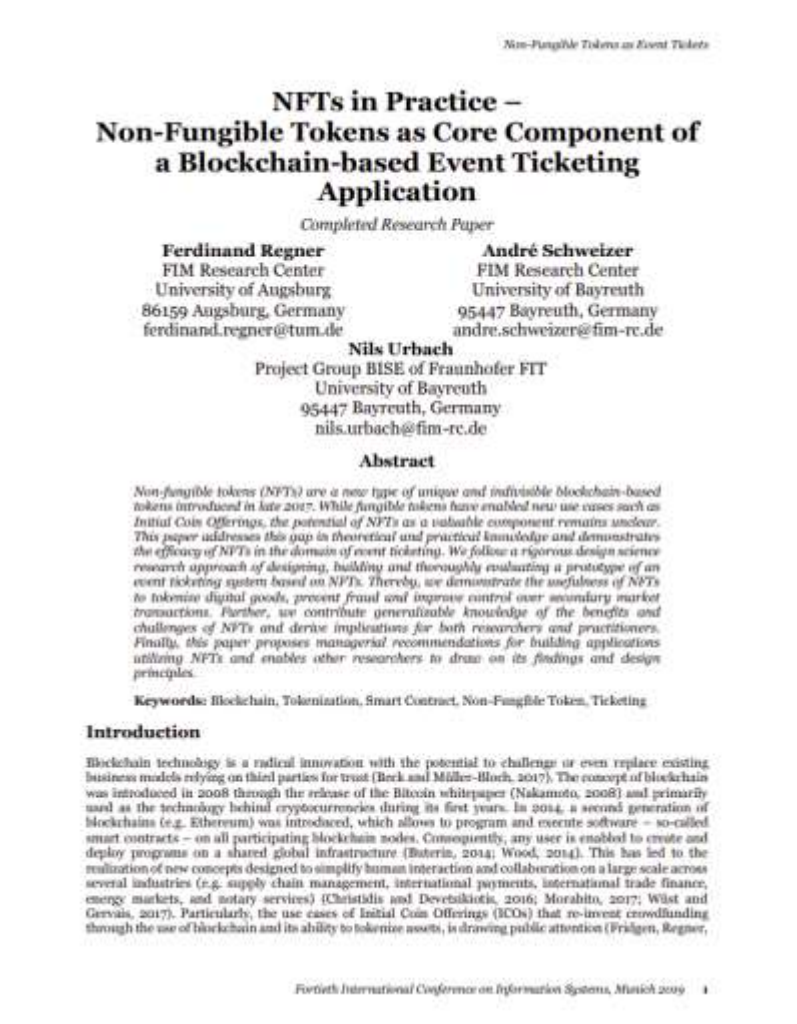
Using NFTs for Event Ticketing



NFTs in Practice – Non-Fungible Tokens as Core Component of a Blockchain-based Event Ticketing Application

Completed Research Paper

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Abstract

Non-fungible tokens (NFTs) are a new type of unique and indivisible blockchain-based tokens introduced in late 2017. While fungible tokens have enabled new use cases such as Initial Coin Offerings, the potential of NFTs as a valuable component remains unclear. This paper addresses this gap in theoretical and practical knowledge and demonstrates the efficacy of NFTs in the domain of event ticketing. We follow a rigorous design science research approach of designing, building and thoroughly evaluating a prototype of an event ticketing system based on NFTs. Thereby, we demonstrate the usefulness of NFTs to tokenize digital goods, prevent fraud and improve control over secondary market transactions. Further, we contribute generalizable knowledge of the benefits and challenges of NFTs and derive implications for both researchers and practitioners. Finally, this paper proposes managerial recommendations for building applications utilizing NFTs and enables other researchers to draw on its findings and design principles.

Keywords: Blockchain, Tokenization, Smart Contract, Non-Fungible Token, Ticketing

Introduction

Blockchain technology is a radical innovation with the potential to challenge or even replace existing business models relying on third parties for trust (Beck and Müller-Bloch, 2017). The concept of blockchain was introduced in 2008 through the release of the Bitcoin whitepaper (Nakamoto, 2008) and primarily used as the technology behind cryptocurrencies during its first years. In 2014, a second generation of blockchains (e.g. Ethereum) was introduced, which allows to program and execute software – so-called smart contracts – on all participating blockchain nodes. Consequently, any user is enabled to create and deploy programs on a shared global infrastructure (Buterin, 2014; Wood, 2014). This has led to the realization of new concepts designed to simplify human interaction and collaboration on a large scale across several industries (e.g. supply chain management, international payments, international trade finance, energy markets, and notary services) (Christidis and Devetsikiotis, 2016; Morabito, 2017; Wüst and Gervais, 2017). Particularly, the use cases of Initial Coin Offerings (ICOs) that re-invent crowdfunding through the use of blockchain and its ability to tokenize assets, is drawing public attention (Fridgen, Regner,

Regner, F.; Urbach, N.; Schweizer, A.

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Introduction to NFTs and NFT Ticketing

Non-Fungible Tokens (NFTs)

- Developed on ERC-721 standard
- Represent unique ownership of an asset
- Deployed via smart contracts
- Total trading volume of $10.67 billion US in Q3 2021 (Source: Decrypt)
- Volume of one day of trading in 2021 was more than the entire trading volume of 2020 (Source: Decrypt)

This artwork by Beeple was sold as an NFT for $69 million US

Properties:

- Verification of ownership
- Cannot be manipulated
- Secure peer to peer trading
- Royalties paid to creators from secondary market trades
- Can set maximum resale prices

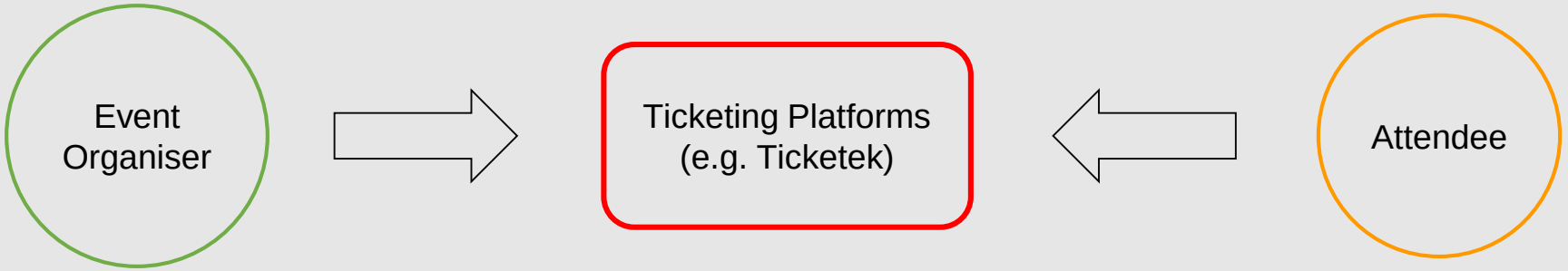
Cryptokitties are considered the first main form of NFTs which appeared

NFTs For Event Ticketing

Current Issues:

- Fraudulent transactions
- Ticket scalping and counterfeiting
- Limited control over secondary markets
- Strong reliance on third parties (ticketing platforms/distributors)

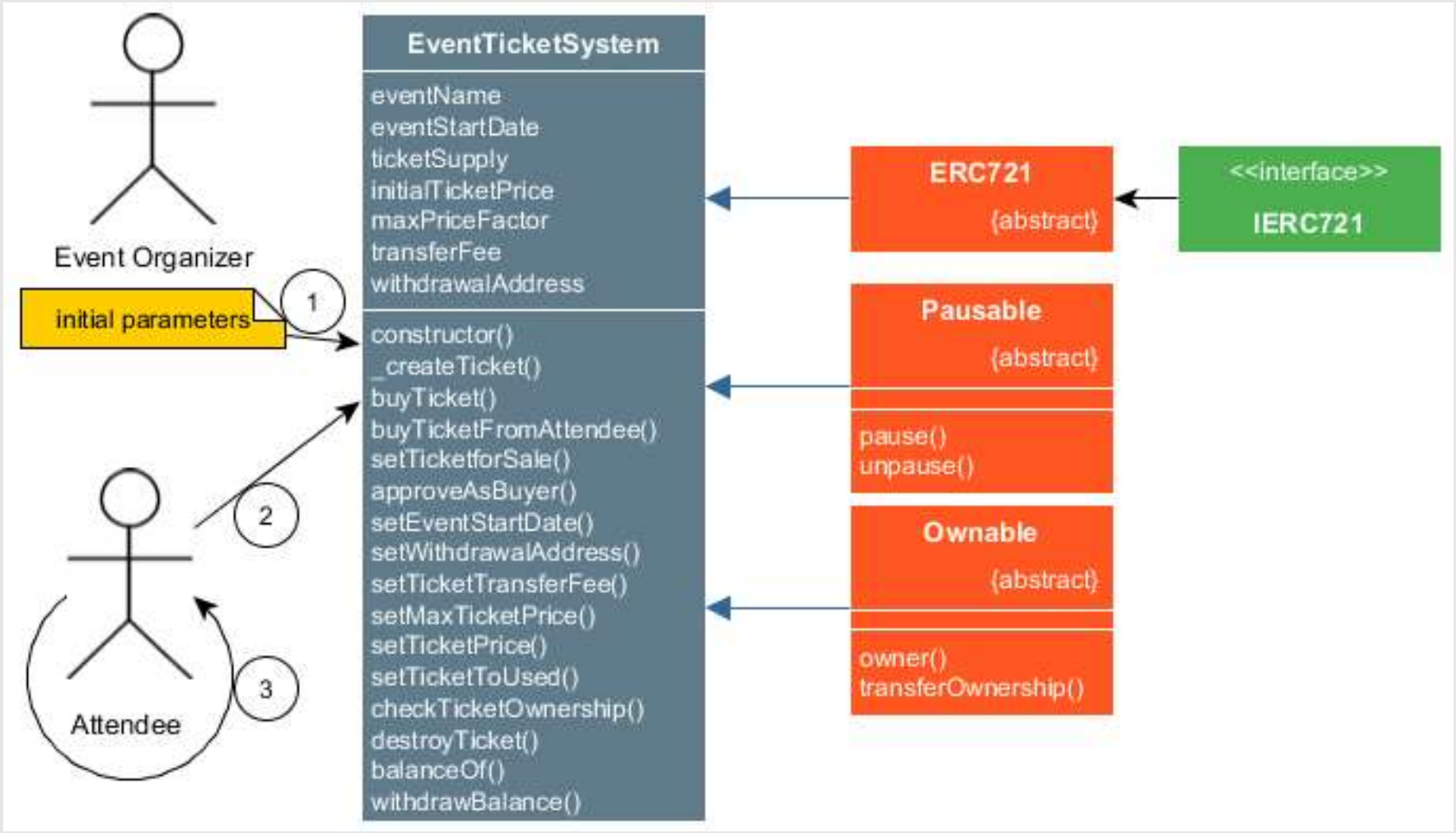
- About 12% of people buying tickets get scammed (Source: CNBC)
- Global secondary ticket market is valued at $1.5 billion US (Source: All The Research)



Current methods rely heavily on interactions with a third party

NFT Ticketing Prototype

UML Diagram of the Prototype



(Source: Regner, F.; Urbach, N.; Schweizer, A. (2019))

Summary of Design

Stage 1: Setup Phase - Smart Contract is deployed by the event organiser, setting the initial parameters

- Event name
- Ticket price
- Start time and date
- Number of tickets available
- Max price factor of tickets
- Transfer fee

Stage 2: Primary Market - Attendees buy tickets from event organiser

Stage 3: Secondary Market - Users can sell tickets and a royalty from the transactions is held for the event organiser to claim

When the event begins no tickets can be bought or transferred

Prerequisite: The event organisers and attendees must have Ethereum accounts loaded with Ether

Open Source Project with all code available on Github here

NFT pros and cons

Benefits

- Unique
- Easy Validation
- No more middleman
- Transparency
- Secure

Disadvantages

- Knowledge of technology
- Deployment of contract
- Additional costs
- Resale limit is unrealistic
- Already own Ethereum
- Market Manipulation
- Slow transactions
- Scams

Current Implementations

Outdated Build

- Paper released in 2019
- Various library developments over time
- Proposed design & architecture still prevalent

GET Protocol

- Launched in 2017 in the Netherlands
- Still acts as an intermediary
- Layer 2 Solution - runs on Polygon
- Protocol Token with $26M market cap

NFT BETA

polygon

Secondary Market

- Target Opensea & Rarible as secondary market
- Royalties go to event organisers or performers
- Many different business model opportunities & strategies
- Season Pass model - allows customers + company to profit

Doesn't directly inherit from ERC-721 standard

```
887
888 contract BaseGET is FoundationContract {
889
890     bool public onChainEconomics;
891     uint256 private refactorSwapIndex;
892
893     function __BaseGETNFT_init_unchained() internal initializer {
894         onChainEconomics = false;
895     }
896
897     function __BaseGETNFT_init(
898         address _configurationAddress
899     ) public initializer {
900         __Context_init();
901         __FoundationContract_init(
902             _configurationAddress);
903         __BaseGETNFT_init_unchained();
904     }
905
```

Expert Evaluations - Independence

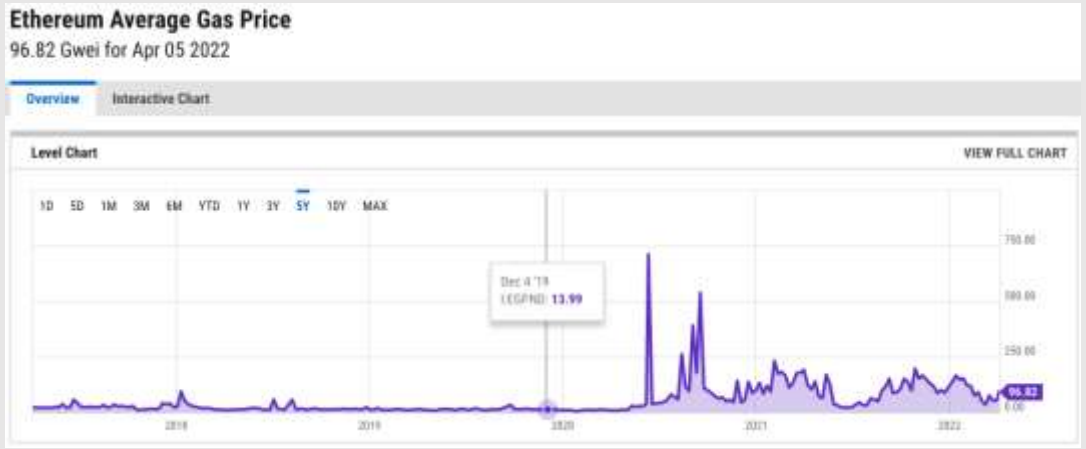
- Evaluated topics including Digitization, Secondary Markets, Independence, Security
- Service provider will always act as an intermediary
- Ticketmaster is starting to implement NFTs and tickets
- KYC measures may still be necessary

ticketmaster

+

NFT

Expert Evaluations - Cost Efficiency



- Increasing Ether price = Increasing gas prices
- Increased network traffic = slower transaction times + higher gas price
- Current solution is Layer 2 platforms
- ~900% increase in gas price since 2019

Graph souce: https://ycharts.com/indicators/ethereum_average_gas_price