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Session 11

Representing Off-chain Objects with NFTs

META-511: Non-Fungible Tokens (NFTs) and the Metaverse

We are here

Week 11 ⟶

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Understanding the concept of off-chain NFTs

o Understand off-chain physical claims embedded in NFTs and relevant challenges and opportunities

o Review potential use cases for NFTs and off-chain claims, and how they could be used in various industries.

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This is an educational course only

o   We will discuss various projects, individuals or NFTs in this course

o   These projects, tokens or the individuals associated with them, are only referenced for educational purposes

o   Nothing in this course should be taken as a recommendation to buy or sell an NFT or token or any other financial instrument or security

o   More generally, cryptoassets are extraordinarily volatile investments. Please take care if you are buying cryptoassets

o   The information provided during this session does not, and is not intended to, constitute legal advice.

o   Instead, all information, content, and materials made available is intended for general educational purposes only.

Session 11: Representing off-chain objects with NFTs

1. Physical Claims and NFTs

NFTs can reference a physical/off-chain "claim"

o NFTs can represent anything, including arbitrary physical goods or services. Some examples:

- Clothing

- Real estate

- Precious stones

o A claim in this regard could be related to:

- Ownership

- Rental

- Access

- Redemption

- Blended Objects (for example, art with a physical component)

Physical claims require a trusted counterparty

o A basic premise of public permissionless blockchains is that you do not take on counterparty risk when transacting with *natively digital* assets.

o On the contrary, claims on *physical assets* require trust in a counterparty who will deliver the physical good or service. Potential trusted counterparties could be:

- The issuer of the claim directly

- A centralized custodian

- A distributed set of custodians

o The responsibility of the counterparty is to ensure that:

- The claim is executed

- The authenticity of the provided claim is ensured

- Quality assurance is maintained

The major economic opportunity is moving from databases to markets
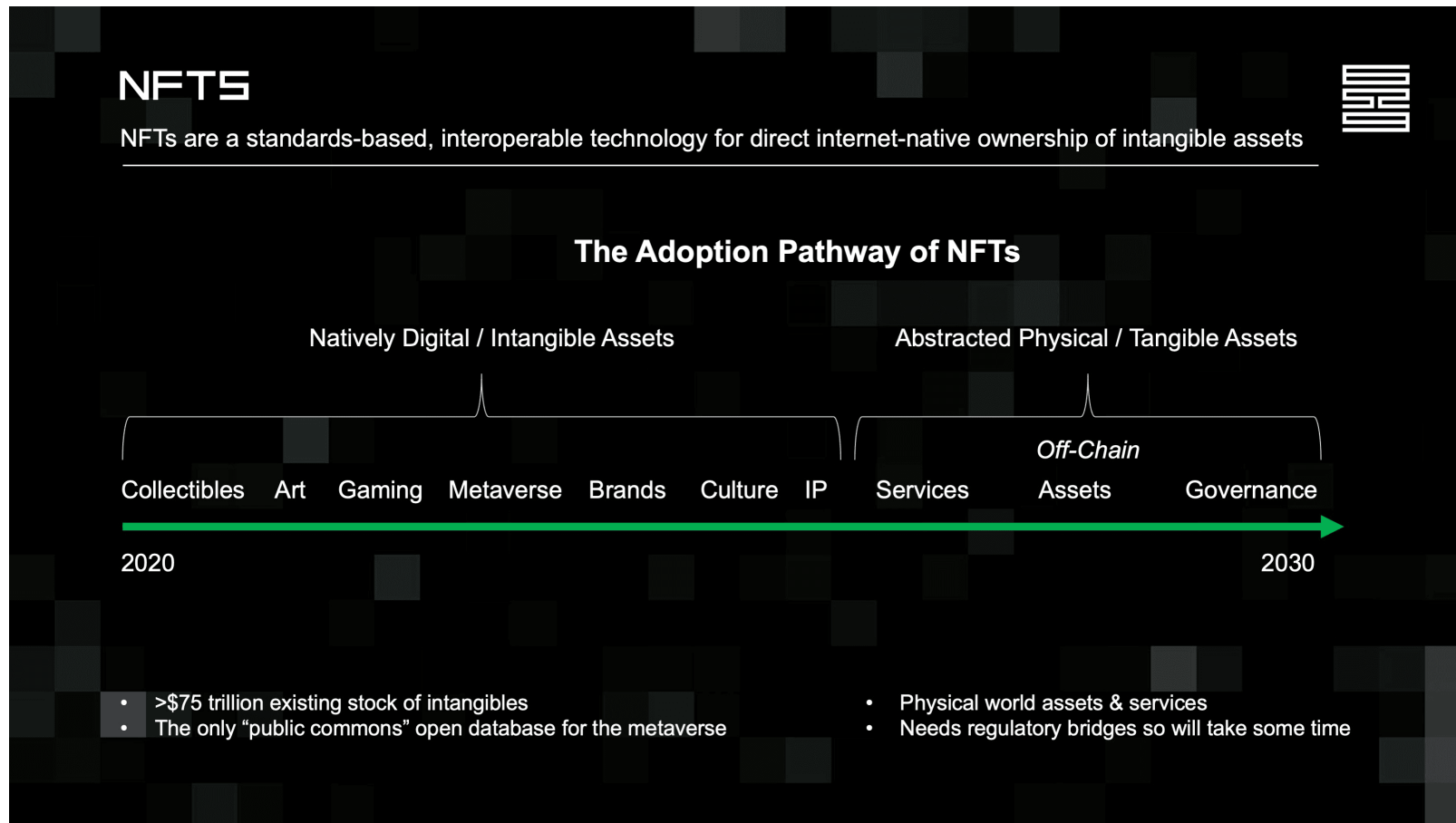
Fragmented
Primary Sales
Databases
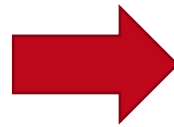
Global Primary and Secondary
Orderbook / Marketplace

Imagine being able to place a city-wide bid on a hotel night in NYC on Jan 23rd, that anyone, including existing reservation holders, can accept

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Challenges

o Legal frameworks / legally binding contracts (particularly in real estate and other regulated professions)

o Physical/permanent linkages between physical goods and the associated NFTs

o Traditional physical challenges: shipping, insurance, damages, authenticity

o General immaturity of the concept – this area will develop more slowly at first than digitally native tokens, though theoretically in the long-run it is a larger addressable market

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Overall, adoption is likely to accelerate in the 2nd half of the decade

NFT5

NFTs are a standards-based, interoperable technology for direct internet-native ownership of intangible assets

The Adoption Pathway of NFTs

Natively Digital / Intangible Assets   Abstracted Physical / Tangible Assets

Off-Chain

Collectibles   Art   Gaming   Metaverse   Brands   Culture   IP   Services   Assets   Governance

2020   2030

- >$75 trillion existing stock of intangibles
- The only "public commons" open database for the metaverse

- Physical world assets & services
- Needs regulatory bridges so will take some time

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2. Current Examples

9dcc

o Certificate of Authenticity

- Digital/Physical link with NFC tech that uses pull technology

o Composable Storage

- Optionality to take physical delivery or vault at a custodial partner

o Gamification of IRL experiences

- Collect a POAP from every 9dcc piece you see

Source: 9dcc.xyz

Mattereum

- Aims to provide a legal and technological framework for the creation and trade of NFTs

- Built on the Ethereum blockchain

- Vision:
  - Create an infrastructure that makes it easy for creators and buyers to securely, transparently and legally transact NFTs
  - Legal entities to be able to manage the legal rights and obligations of the tokens and the assets they represent.

- Real-world assets such as real estate, art and collectibles are being tokenized as NFTs; Mattereum wants to ensure a clear way to handle their legal rights and obligations.

4K Protocol

o First decentralized protocol that enables anyone to bring physical assets on-chain as a physically-backed token

o 4K Protocol allows anyone to mint a collection of physical assets as NFTs

o Focused on games and virtual worlds, such as in-game items and virtual real estate

o NFTs are minted when items are received by 4K's decentralized network of storage guardians

o 4K handles the legal, physical, and logistical parts

Source: 1. 4k.com

Courtyard NFT

- ○ Courtyard:
  - Stores physical collectibles (trading cards, sneakers, watches, etc.) in secured vaults
  - Creates 3D representations of these assets, and mints them on the blockchain as **Connected Collectible NFTs**
    - a digital certificate of a physical asset in the form of a Non-Fungible Token (NFT)

- ○ Collectors/ Users can:
  - **Trade** the Connected Collectible on any NFT marketplace (e.g., Opensea)
  - **Hold** their collectibles as NFTs
  - **Burn** their NFTs (Connected Collectibles) to redeem the exact physical asset
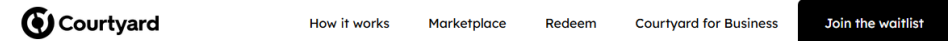
Sell your collectibles and earn passive income

Turn your trading cards, sneakers, watches, and more into tradable Connected Collectibles and earn 1% on every future sale.

Join the waitlist   Stay in the loop

Backed by

NEA   Y Combinator   CHERRY   BRINKS   MoonPay   OpenSea   VAYNERFUND

Source: 1. Courtyard.io

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Americana.io

○ The first marketplace to buy and sell physical things as NFTs

○ Open platform for creators and collectors to showcase and trade their digital assets, like art, collectibles, virtual real estate, and more

○ Leverages the power of the Ethereum blockchain to ensure the authenticity and scarcity of the NFTs on its platform

○ Provides tools for creators to mint and manage their NFTs, as well as tools for collectors to discover, bid on, and manage their collections
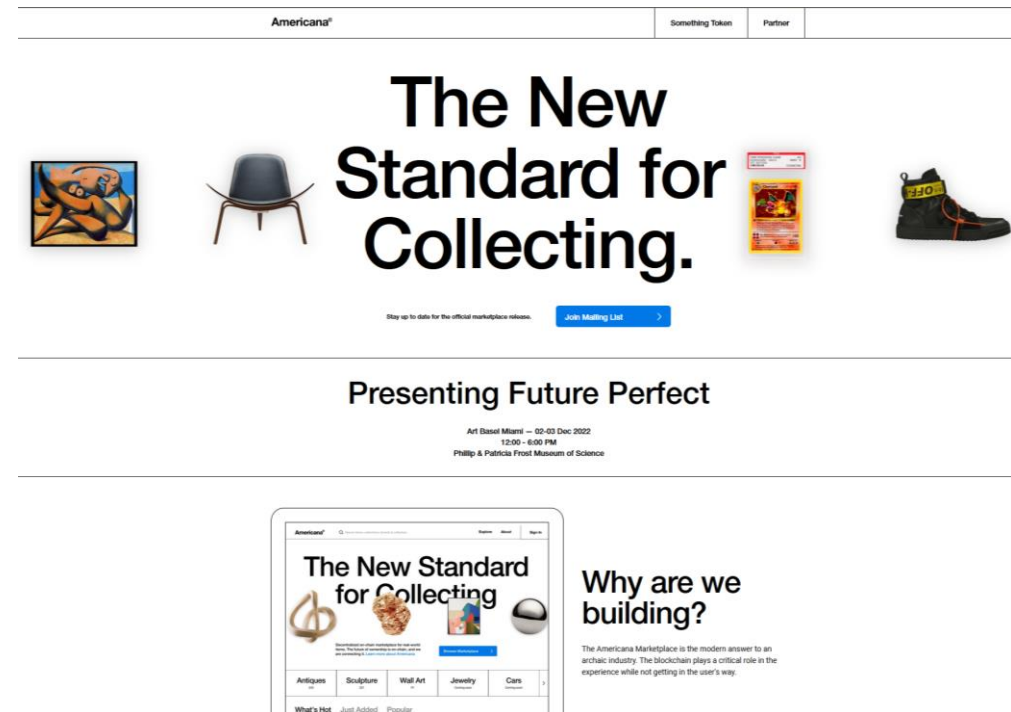
RTFKT/Nike Sneakers

o **Cryptokicks iRL** collection – brings together the worlds of physical and virtual sneakers

- features a limited number of physical Nike sneakers, each of which is paired with a corresponding NFT
- allows sneaker enthusiasts to own both a physical and virtual representation of their favourite kicks

o RTFKT sneaker NFTs

- represent the ownership of the physical sneakers and can be used to prove authenticity and rarity
- include exclusive digital content such as 3D animations, music, and videos
- can be bought, sold, and traded on the open market, just like the physical sneakers they represent

Source: 1. Voguebusiness.com

IYK

o IYK inspires people to live in the moment by bridging immersive physical and digital experiences

o Help brands, artists, and creators bridge the physical and digital worlds

o Linking clothes to NFTs; hope to superpower culture across the 'verses in a meaningful way

o IYK envision a world where buying merch from favorite artist not only allows people to flex their fandom, but it also grants them access to:

- an exclusive launch party,

- airdropped social tokens,

- and gives your digital avatar access to the same piece of clothing.

Source: 1. iyk.app

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4. Conclusions

Takeaways from week 11

o   NFTs can represent any physical product or service claims

o   Physical world claims need to be executed by a trusted counterparty (issuer, custodian or network)

o   The major benefit of representing physical claims as NFTs will be moving to marketplace models (separately, there may be some social benefits)

o   Legal and operational friction will delay broad adoption of physical claims NFTs to the latter part of the 2020s

o   Interesting experiments are currently happening in fashion, collectibles and precious goods

Further reading

o <u>Mattereum Protocol:</u> The summarized white paper of Mattereum protocol which attempts to force law behind smart contracts binging real word assets under the full legal control of the blockchain.

o <u>Mattereum Working Paper:</u> The full guide explaining in detail the Mattereum protocol including plan and business model.

o <u>Courtyard:</u> Wiki presenting what Courtyard is and how it works

o <u>RTKFT Sneakers:</u> An article presenting the RTFKT Cryptokicks iRL collection in collaboration with Nike which features a limited number of physical Nike sneakers, each of which is paired with a corresponding NFT

o <u>4K Protocol:</u> The whitepaper describing the 4K protocol

o <u>A Blockchain-Based Approach for the Creation of Digital Twins:</u> An article proposing a blockchain-based creation process of Digital Twins (DTs) to guarantee secure and trusted traceability, accessibility, and immutability of transactions, logs, and data provenance.

Further reading

o <u>Physical Assets Tokenization for Blockchain Market:</u> A research work that presents an architecture to support physical assets tokenization for digital markets.

o <u>Blockchain for Digital Twins - Recent Advances and Future Research Challenges:</u> An article that envisages how blockchain can reshape and transform DTs to bring about secure manufacturing that guarantees traceability, compliance, authenticity, quality, and safety. We discuss several benefits of employing blockchain in DTs

o <u>Applying Digital Twins in Metaverse - User Interface, Security and Privacy Challenges:</u> Research presenting definitions, applications, and general challenges of DT and Metaverse.

o <u>Secure Combination of IoT and Blockchain by Physically Binding IoT Devices to Smart Non-Fungible Tokens Using PUFs:</u> A research work that demonstrates a way of using smart NFTs to represent IoT devices, which are physical smart assets.

o <u>Tokenization of Real Estate Using Blockchain Technology:</u> A research work that describes Ethereum blockchain-based solutions to make the existing Real Estate investment system much more efficient

Questions?

Contact Us:

Twitter: **@unicmetaverse**
Course Support (Discord): **discord.gg/joinUNIC**
Course Support (Email): **metaverse@unic.ac.cy**