Metaverse Standards Forum
NFT Royalties: High Frequency Trading within NFT Marketplaces

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Reviewer	Due Date	Status	Contact
Digital Asset Management Working Group	June 18, 2024	Complete	digital_asset_management @lists.metaverse-standards.org
MSF Domains (Peer Review)	March 05, 2025	Complete	oversight@lists.metaverse-standards.org
Use Case Taskforce	May 06, 2025	Complete	use_case_task_force@lists.metaverse-standards.org

The purpose of this template is to provide a structured framework for collecting and documenting use cases within the Metaverse Standards Forum (MSF). Use cases are essential for understanding real-world scenarios where metaverse technologies are applied and where interoperability challenges may arise. This template guides MSF members in providing a concise yet comprehensive description of a use case, including its title, identifier, and summary. It also encourages contributors to list the benefits of the use case, identify actors or entities involved, and describe the use case scenario in detail, emphasizing interactions, challenges, and requirements. Additionally, it prompts the inclusion of relevant technical information, such as implementations, success metrics, and challenges faced. This template aims to facilitate the gathering of valuable use-case data to inform standards development and foster collaboration within the MSF community.

MSF members and MSF Domain Groups are invited to submit use cases.

NOTE: Organizations such SDOs who want to submit and add a use case would need a sponsor that is an MSF member. This process is established in order to have a contact person in MSF that can handle discussions and resolve open issues within regular meetings.

Eligible submitters:
- MSF Domain Groups
- MSF Members (Principal and Participant)
- External Organizations with Liaison Agreements (with the support of a MSF member that acts as sponsor)

- Standard Development Organizations (with the support of a MSF member that acts as sponsor)

Minimum Requirements for MSF Member Submissions not part of a Domain Group:
- Minimum required number of proposers: 3
- Minimum required number of supporters: 5

NOTE: Use cases submitted by SDOs and Liaison Organizations would also need to fulfill the same requirements (and would need a sponsor) unless they are submitted by a Domain Group.

MSF: Metaverse Standards Forum
POG: Pre-qualified Organizations and Groups
SPP: Standards Related Publications and Projects
DWG: Domain Working Groups
WG: Working Group
SDO: Standards Development Organization

Use Case Title
High Frequency Trading within NFT Marketplaces

Use Case Identifier
MSF2024-001-HFT • Version 1.0 • Year of Release: 2025

Summary of Use Case
Description: This use case explores the realm of royalties in High Frequency Trading (HFT) within Non-Fungible Token (NFT) Marketplaces. It focuses on the rapid and voluminous trading of digital assets, examining the infrastructures and mechanisms that enable quick, multiple transactions. The use case also looks into how these high-volume trades influence market dynamics, liquidity, and pricing strategies in NFT marketplaces. **Benefits of HFT within NFT Marketplaces:** • **Market Efficiency and Liquidity:** High Frequency Trading contributes to market efficiency and liquidity, allowing for rapid price discovery and asset turnover. • **Enhanced Accessibility for Traders and Investors:** facilitates a dynamic trading environment that caters to a variety of traders and investors, including those using automated trading systems.

- **Technological Innovation and Interoperability:** drives innovation in blockchain and trading technology, emphasizing the need for interoperable platforms to support swift and efficient transactions across various marketplaces.

HFT may require unique solutions vs Low Frequency Trading (LFT), which is described in a separate use case (MSF2024-001-LFT).

Contributors and Supporters

- Digital Asset Management Working Group
- MSF Domains (Peer Review)
- Use Case Taskforce

Keywords

High Frequency Trading, NFT Marketplaces, Digital Asset Trading, Automated Trading Systems, Blockchain Technology, Ethereum Blockchain, Smart Contracts, Market Liquidity, Crypto Assets, Trading Algorithms.

Actors/Entities

- **Creator:** entity that originates the NFT, responsible for its initial creation and minting.
- **Secondary Creators/Collaborators:** entities involved in the NFT's creation process or holding contractual rights, such as publishers, distributors, or collection societies.
- **Wallets:** digital wallets facilitating NFT transactions.
- **NFT:** a digital asset governed by an NFT Contract.
- **NFT Contract:** various types of governing smart contracts for NFTs, including those that are immutable, upgradeable, and those representing real-world assets.
- **Blockchain Network:** the foundational technology enabling NFT minting, trading, and royalty distribution.
- **Holders:** includes both Sellers (current NFT owners) and Buyers (collectors, liquidity providers).
- **Marketplace:** digital platforms for the listing and trading of NFTs, inclusive of curators and online galleries.

Detailed Description of Use Case/Scenario

Preconditions:
- NFTs are minted by Creator using System.
- Holders are ready with automated trading systems and strategies.
- The Blockchain Network and Marketplace infrastructure are optimized for high-speed transactions.

Main Flow:

1. NFTs are minted by Creator using System.
2. Holders are ready with automated trading systems and strategies.
3. The Blockchain Network and Marketplace infrastructure are optimized for high-speed transactions.

Postconditions

- The Marketplace reflects the updated state of NFT ownership.
- Holders adjust their strategies based on market behavior and outcomes.
- The Blockchain Network maintains an immutable record of all transactions.

Implementations and Demonstrations or Technical Feasibility

- **Advanced Technological Infrastructure:** they all rely on sophisticated technologies that facilitate rapid processing and execution of transactions. This includes the use of high-speed networks, powerful computing resources, and efficient data handling capabilities.
- **Use of Algorithms:** HFT in these contexts heavily depends on complex algorithms capable of making quick decisions based on market data analysis. These algorithms are designed to identify trading opportunities, execute trades at high speeds, and manage risks in real-time.
- **Blockchain and Decentralization:** in the case of NFTs and Bitcoin-based NFTs, the underlying blockchain technology is a key component. It ensures the security, transparency, and immutability of transactions, which are crucial for maintaining trust in high-frequency trading environments.
- **Co-Location and Cloud-Based Solutions:** for cryptocurrency markets, including NFTs, high-frequency traders often use cloud-based virtual private servers (VPSs) to minimize latency. This is akin to the co-location services used in traditional HFT, where trading systems are located close to or within the same data centers as the exchange servers to gain speed advantages.
- **HFT Marketplace example:** Blur
- **NFT Smart Contract example:** ERC-721
- **Blockchain Network example:** Ethereum

Challenges:

- **Royalty Compliance:** ensuring Marketplaces honor royalties when it is not in their interest to do so from a short term perspective.
- **Royalty Structure:** HFT may require a new royalty structure that does not pay royalties on every secondary sales transaction, or is able to differentiate HFT from LFT transactions.
- **Technological Complexity:** HFT requires sophisticated technology, both in terms of hardware and software. Keeping up with the latest advancements and integrating them

seamlessly into existing systems can be challenging and resource-intensive, especially when royalties are concerned.

- **Market Volatility and Stability:** HFT can lead to increased market volatility due to the rapid execution of large volumes of trades. This could potentially destabilize NFT marketplaces, especially those not designed to handle high-frequency activities. This volatility could affect the stability of royalties.

- **Security Risks:** the high-speed and automated nature of HFT raises significant security concerns. The risk of cyber-attacks, system failures, and data breaches is amplified in an environment where transactions are executed rapidly and in large volumes and could significantly affect royalty payouts.

- **Algorithmic Efficiency and Fairness:** developing algorithms that are not only efficient but also fair is a critical challenge. There is a risk that certain algorithms could manipulate market prices or disadvantage certain market participants.

- **Blockchain Scalability and Performance:** for HFT to be effective in NFT marketplaces, the underlying blockchain technology must be able to handle a high volume of transactions quickly, reliably, and cheaply. Scalability and performance issues with blockchain networks can be a major bottleneck, as well as gas fees

- **Interoperability Between Different Platforms:** ensuring interoperability between various NFT marketplaces and blockchain networks is essential for the seamless execution of HFT strategies. However, achieving this level of interoperability can be complex and challenging.

Requirements:

Technical and Functional Requirements:

- **Advanced and Scalable Blockchain Networks:** HFT within NFT Marketplaces demands blockchain networks that are not only secure but also highly scalable to handle large volumes of transactions rapidly.

- **Robust Algorithmic Frameworks:** algorithms used in HFT must be robust, efficient, and transparent. They should be designed to minimize market manipulation risks and ensure fairness in trading.

- **Transparent and Fair Royalty Distribution:** implementing Smart Contract capabilities, with clear and transparent mechanisms to handle complex royalty calculations and distributions involving multiple creators or right holders, is essential to maintain trust among all parties involved.

- **Infrastructure for High-Speed Data Processing:** investment in high-speed data processing infrastructure, including high-performance computing systems and fast network connections, is critical to support the rapid execution of trades.

- **Compliance with Regulatory Standards:** as the regulatory landscape evolves, HFT systems must be adaptable to comply with new regulations and standards, especially those concerning market integrity and consumer protection.

- **Effective Risk Management Tools:** tools and systems for managing the unique risks associated with HFT, such as market volatility and systemic risks, are essential. This includes mechanisms for real-time risk assessment and contingency planning. HFT on

NFTs might push regulators to classify them as securities, adding complexity to other use cases as well.

Interoperability Requirements:

- **Standardized Trading Protocols:** developing and implementing standardized trading protocols and APIs across different NFT marketplaces is necessary to facilitate interoperability and efficient market operations.

Other Key Considerations:

- **Privacy:** ensure that the HFT process respects user privacy, with mechanisms in place to protect personal information from unauthorized access or exposure.

- **Cybersecurity:** given the high volume and speed of transactions in HFT, applying enhanced security measures is crucial. This includes advanced encryption methods, secure trading protocols, and real-time monitoring systems to prevent cyber threats.

- **Identity Verification:** develop reliable identity verification processes for buyers and sellers to prevent fraud and ensure trustworthiness within the ecosystem.

- **Networking and Latency:** optimize network performance to handle the transactions and interactions involved in HFT without significant delays or downtime.

- **Ownership:** clearly define and enforce the ownership rights of parties to the exchanged digital assets, ensuring they retain full control over their buying and selling activities.

- **Digital Ethics:** address ethical considerations related to HFT, including digital assets exchange, equitable access, and responsible trade of digital assets.

- **Provenance:** maintain accurate and transparent records of digital assets provenance, including trading log / history, to ensure authenticity and ownership history.

- **Accessibility:** make HFT platforms and services accessible to a wide range of users, including those with disabilities, to promote inclusivity within the digital economy.

Relevant Domain Working Group (WGs):

- NA

Relevant Pre-qualified Organizations and Groups (POGs):

- NA

Relevant Specifications, Publications and Projects (SPPs):

- NA

Related Use Cases

- Low Frequency Trading within NFT Marketplaces (MSF2024-001-LFT)

Additional Comments

- This document is a living artifact and may be subject to revisions on a periodic basis to reflect the future state of NFT Royalties, and or based on feedback received from MSF stakeholders that warrants an update in the future.