# Metaverse Standards Forum
# Avatar Ownership Change

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**Version:** 1.0

| Reviewer | Due Date | Status | Contact |
|---|---|---|---|
| Digital Asset Management Working Group | December 17, 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 16, 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

Avatar Ownership Change

## Use Case Identifier

MSF2024-AOC-001

- Version 1.0
- Year of Release: 2025

## Summary of Use Case

**Description**: This use case describes the process and requirements for transferring ownership of an Avatar from one user to another within the Metaverse. The focus is on minimizing confusion when ownership changes occur, ensuring that the seller's reputation is not impacted by the transfer, and that Reputation is correctly associated with the New Owner.

**Benefits:**

- Ensures secure and Verifiable Ownership Transfer across different Metaverse Platforms.
- Enhances User Trust and engagement by providing a standardized process for Ownership Changes.
- Preserves the seller's Reputation as the Transfer of Ownership is executed, by clearly associating the Avatar's Reputation with the Buyer / New Owner.
- Promotes interoperability by standardizing the Ownership Transfer process, making it easier for different Platforms to adopt and integrate.
- Reduces Ownership confusion for participants that regularly interact with the Avatar.

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## Contributors and Supporters

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

## Keywords

Avatar Ownership, Ownership Transfer, Metaverse Interoperability, Reputation Management, Digital Identity, Avatar Provenance, Cybersecurity, User Trust

## Actors/Entities

- **Sellers:** Current Owners of the Avatar who initiate the ownership transfer process. They must ensure that the transfer complies with platform guidelines and that all necessary data is correctly transferred to the new owner. The assumption is that the entity that owns the avatar and entity that controls the avatar in a Platform is the same entity.
- **Buyers/Collectors:** New Owners who Acquire the Avatar. They are responsible for accepting the terms of transfer and ensuring that their New Ownership is recognized across all relevant Platforms.
- **Avatar:** uniquely identified Digital Persona (including wearables, collectibles, visuals and other traits) whose ownership is being transferred. They are the subject of the transaction, and their associated data, including reputation, must be correctly reassigned.
- **Reputation Data:** Data associated with an Avatar, some of which may be transferred to the Buyer and some of which may stay with the Seller.
- **Marketplaces:** Platforms where Avatars are bought and sold. They facilitate the listing, bidding, and transaction processes, ensuring that ownership changes are properly recorded.
- **Verification Service Provider:** entities responsible for Verifying the Authenticity of the Ownership Transfer, ensuring that the transaction is legitimate and secure.
- **Metaverse Platform Providers:** Platforms that Host the Avatars and represent to participants the avatar and the Current User of the Avatar.
- **Reputation Analytics Tool:** tools used to assess certain Reputation associated with the Avatar, and ensure that the Reputation Metrics are accurately recalibrated post-transfer.

## Detailed Description of Use Case/Scenario

**Preconditions:**

- **Avatar Ownership:** the Seller must have Full Ownership and control of the Avatar.
- **Verified Accounts:** both the Seller and the Buyer must have Verified Accounts on the Metaverse Platform(s) and Marketplaces involved.

- **Data Linkage:** all necessary Reputation Data, if available, must be linked to the Avatar, viewable by Buyer, and be ready for transfer.

**Main Flow:**

1. **Transfer Initiation:** the Seller initiates the Ownership Transfer Process through the Marketplace.
2. **Avatar Verification:** the Marketplace, using a Verification Service Provider, authenticates the Seller's ownership and the validity of the Avatar's data.
3. **Data Availability:** if there is no Reputation Data available for either the Buyer, Seller, or both, this information is communicated to the Buyer.
4. **Transaction Security:** the Marketplace ensures the transaction is Secure.
5. **Ownership Transfer:** once Verification and Security Checks are complete, the Marketplace triggers the Ownership Transfer Process.
6. **Reputation Recalibration:** If Reputation Data is available, a Platform or a Reputation Analytics Tool assesses and reassigns certain metrics to the Buyer, ensuring accurate transfer.
7. **Change Notification:** the Platform communicates to participants that Ownership of the Avatar has changed as well as any Certificates of Authenticity of the Avatar. This can include an Ownership History Log accessible to other participants interacting with the Avatar.
8. **Ownership Confirmation:** the Buyer receives confirmation of the New Ownership, and the Avatar's details are updated across all relevant Platforms.

**Alternative Flow:**

- **Dispute Resolution:** if there is a Dispute over the transaction, the Platform's Support Team intervenes to Resolve the Issue, potentially involving Third-Party Validators.
- **Failed Verification:** if the Verification Service Provider Cannot Authenticate the Ownership, the Transaction is Halted, and the Seller is Notified to provide additional proof.

**Postconditions**

- **Reputation Maintenance:** the Seller's Reputation Remains Intact and is not affected by the transaction.
- **Ownership Rights:** the Buyer's Account now Reflects Ownership of the Avatar, including any associated reputation metrics, if available.
- **Metadata Update:** the Avatar's Metadata is Updated to Indicate Ownership Change, providing a transparent Ownership History Log accessible to other participants.
- **Platform(s) Update:** Platform(s) involved are Updated to Reflect the New Ownership Status.

## Implementations and Demonstrations or Technical Feasibility

**Implementations and Demonstrations**

- **Blockchain-Based Avatar Platforms:**
  - **Example:** Ethereum with ERC-721 and ERC-1155 Standards.
  - **Mechanism:** once Ownership Transfers are executed through Smart Contracts, the Avatar Ownership information is updated on the Blockchain. Executing Ownership

Transfers through Smart Contracts are Secure and creates Immutable Records of Ownership.

- **What are Smart contracts?** Smart Contracts are self-executing contracts with the terms of the agreement directly written into code. They automatically enforce the transfer of avatar ownership upon fulfillment of certain conditions, such as payment confirmation. Platforms like Ethereum use Smart Contracts extensively for avatar transactions, ensuring transparency and security.
- **Ownership Change Indicators:** The Blockchain Ledger serves as a Public Record of Ownership history, accessible to anyone through Blockchain Explorer tools.

- **Token Standards:**
  - **Examples:** ERC-721 and ERC-1155 Tokens
  - **Mechanism:** These standards enable linking each Avatar to its associated metadata using a standardized URI structure. Ownership changes are tracked independently through immutable, on-chain transfer records
  - **What are Token Standards?** Token standards like ERC-721 and ERC-1155 define the rules for creating, managing, and interacting with NFT-Avatars on the blockchain. They ensure consistency in how metadata is linked and how transfers are executed across platforms.
  - **Ownership Change Indicators:** Ownership change is reflected through the blockchain's on-chain transfer log. While metadata typically remains unchanged, Smart Contracts can be designed to allow metadata updates upon transfer. The blockchain also provides a verifiable history of current and previous NFT-Avatar owners.
- **Centralized Metaverse Platforms:**
  - **Examples:** Fortnight, Roblox and Decentraland.
  - **Mechanism:** Ownership Transfers are managed through the Centralized Metaverse Platform's internal database. When a transfer occurs, the Platform updates its records to reflect the New Owner.
  - **What are Centralized Metaverse Platforms?** In the context of Avatar ownership transfer and Reputation Data exchange, are virtual environments developed and controlled by third-party entities that provide integrated services for querying, interpreting, and facilitating the transfer of Avatars along with their associated Reputation Data within a controlled ecosystem. Platforms like Decentraland maintain comprehensive user databases that track avatar ownership and facilitate transfers internally.
  - **Ownership Change Indicators:** User Profiles or Dashboards display the Avatar's Ownership history and current status.
- **Avatar Marketplaces:**
  - **Example:** OpenSea.
  - **Mechanism:** Avatar Marketplaces facilitate the buying and selling of NFT-based Avatars through listings and bidding processes. They use Blockchain technology to Verify and Transfer Ownership.
  - **What are Avatar Marketplaces?** Virtual platforms where owners can buy, sell, and exchange Avatars

  - **Ownership Change Indicators:** Marketplaces display detailed transaction histories for each avatar, showing the sequence of Ownership Changes.
- **Public Ledgers:**
  - **Examples:** Etherscan and BscScan
  - **Mechanism:** Blockchain Explorer Tools like Etherscan or BscScan provide detailed, transparent records of Avatar transactions, enabling full traceability of NFT ownership and activity.
  - **What is a Public Ledger?** A Public Ledger is a blockchain-based system that provides a transparent and immutable record of transactions, including NFT-related Avatar transfers.
  - **Ownership Change Indicators:** any Change in Avatar Ownership can be displayed on Blockchain Explorer Tools, hence enabling anyone to see the history log of an Avatar.
- **User Profiles and Dashboards:**
  - **Example:** OpenSea, Blur and Rarible
  - **Mechanism:** Each Platform uses its User Interface to reflect changes in Avatar ownership based on on-chain data.
  - **What are User Profiles and Dashboards?** These are features on platforms that present key information such as Avatar ownership, transaction history, and in some cases, provenance.
  - **Ownership Change Indicators:** The User Interface displays Ownership status and transaction history, helping Users assess the Authenticity and transfer history of an Avatar.

## Challenges:

- **Interoperability Issues:** different Metaverse Platforms and Marketplaces may have varying standards and protocols for Avatar Ownership and Transfer, making it difficult to ensure seamless Interoperability. This can lead to confusion and complications during the transfer process, potentially causing delays and errors.
- **Security Concerns:** ensuring the Security of the Ownership Transfer Process is crucial to prevent fraud and unauthorized access. This includes protecting sensitive data and verifying the legitimacy of transactions. Any Breach or Lapse in Security Can Lead to Significant Financial and Reputational Damage for Users and Platforms.
- **Reputation Management:** Accurately Transferring Reputation Data associated with an Avatar is challenging, especially if the Platforms involved do not have standardized Reputation Metrics. Incorrect or Incomplete Transfer of Reputation Data Can Affect the Credibility and Trustworthiness of the New Owner.
- **Regulatory Compliance:** Compliance with legal and regulatory requirements across different jurisdictions is necessary to ensure Lawful Transactions and Data Protection. Non-compliance Can Result in Legal Penalties and Loss of User Trust.
- **Technical Limitations:** Variations in Technical Infrastructure and Capabilities between different Platforms Can Hinder the efficient Transfer of Avatar Ownership. This Can Lead to Technical Failures or Inconsistencies during the Transfer Process.

- **Scalability:** the System inability to Handle a large number of transactions Without Degrading Performance. Scalability issues also Can Lead to Delays and Reduced Reliability of the Ownership Transfer Process.

## Requirements:

**Technical and Functional Requirements**

- **Secure Transfer Mechanisms:** develop and implement robust security measures, including Encryption and Multi-factor Authentication, to protect the Ownership Transfer Process. This should enhance security, prevent fraud and unauthorized access.
- **Reputation Data Management:** establish a Standardized Method for transferring reputation data along with avatar ownership. This includes creating a Universal Reputation Metric that can be recognized across Platforms, while ensuring accurate and reliable transfer of reputation, and Maintaining Integrity of both the Seller's and the Buyer's Reputations.
- **Notifications**: deploy real-time alert mechanisms to notify users of ownership changes, such as through updated metadata or transaction logs accessible via user dashboards. This enhances transparency and helps users accurately identify the current owner of an Avatar.
- **Regulatory Compliance Frameworks:** ensure that the Ownership Transfer Processes Comply with relevant Legal and Regulatory Requirements, including Data Protection and Privacy Laws. This would Prevent Legal issues and Enhance User Trust by ensuring lawful transactions.
- **Scalability Solutions:** develop Scalable Solutions that can handle large volumes of Ownership Transfer Transactions without leading to Performance Degradation, while also maintaining reliability and efficiency of the transfer process even as the number of transactions grows.
- **Verification Services:** utilize Verification Service Providers to authenticate the Ownership and Validate the Transaction before completing the transfer. Ensure the legitimacy of the transfer and protect against fraudulent activities.
- **User-Friendly Interfaces:** design Intuitive and User-friendly Interfaces for Initiating and Completing Avatar Ownership Transfers. Improve User Satisfaction and encourage more users to participate in avatar transactions.
- **Audit and Reporting Tools:** Implement Tools for Auditing Transactions and Generating Reports on Ownership Changes. Provide transparency and accountability, helping to resolve disputes and verify transaction integrity.

**Interoperability Requirements:**

- **Standardized Protocols:** implement standardized protocols for Avatar Ownership Transfers to ensure interoperability across different Metaverse Platforms. This would help facilitate seamless and error-free transfers between platforms, reducing confusion and improving user experience.
- **APIs and Data Formats:** support interoperability between various Metaverse Platforms through APIs and standardized data formats. Enhance compatibility and seamless interaction between different systems.

- **Cross-Platform Compatibility:** ensure that Avatars and their associated Metadata can be transferred and recognized across different Metaverse Platforms. Reduce barriers to transfer and promote a more Interconnected Metaverse Ecosystem.
- **Unified Metadata Standards:** develop unified metadata standards that include Ownership History and Reputation Information. Simplify the transfer process and ensure that all relevant information is consistently maintained.

**Other Key Considerations:**

- **Privacy:** secure handling and protection of sensitive Avatar Reputation Data, sharing such information only with concerned parties and strictly with the explicit consent of the Avatar Owner.
- **Cybersecurity:** robust cybersecurity measures to safeguard Avatar Reputation Data against breaches and unauthorized access. This includes encryption, secure access controls, and provision of audit trails for regular security audits.
- **Identity Verification:** ensure reasonable identification and authorization of Owners prior to providing access to Avatar Reputation Data, to verify that their usage aligns with approved Ownership and Transfer Terms.
- **Networking and Latency:** Efficient Transfer of Ownership Mechanisms without latency issues, while ensuring that Avatar Reputation Metadata is accessible in real-time.
- **Ownership:** provide owners with the ability to maintain oversight on their Avatar Data usage, storage and sharing to ensure continuous compliance with the consent they have granted.
- **Digital Ethics:** address ethical considerations by establishing or affiliating with an Ethics Board tasked with providing oversight, including regularly reviewing and guiding the ethical use of Avatar Reputation Data.
- **Provenance:** accurate tracking of data sources and changes to maintain the integrity and trustworthiness of Avatar Reputation Data.
- **Accessibility:** ensuring Avatar Reputation Data is accessible to Owners, with varying levels of technical expertise and accessibility requirements.

## Relevant Domain Working Group (WGs):

- NA

## Relevant Pre-qualified Organizations and Groups (POGs):

- NA

## Relevant Specifications, Publications and Projects (SPPs):

- NA

## Related Use Cases

- Unified Reputation Management for Metaverse Entities (MSF2024-REPUMME-001)
- Cybersecurity Reputation Data Storage Use Case (MSF2024-001-REPCDS)
- Humanity Attestation in Metaverse Environments Use Case (MSF2024-001-POH)
- Shared KYC/AML Verification Use Case (MSF2024-REPSKA-001)

## Additional Comments

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