

Digital Fashion Wearables for Avatars

Domain Exploratory Group Proposal

FINAL

Approved by Oversight Committee September 28, 2022

1. Proposers

Jack Botvinovski, Gravity Layer
jin OMI, Open Metaverse Interop group
Aditya Mani, YOLOgram Style
Alan Smithson, MetaVRse
Kerem Torun, DeFacto Retail
Robert Nava, Metaverse Wearables, Inc (MOD Studio)
Digvijay Tiwary, Sine Wave Entertainment

2. Exploratory Group Scope

Build consensus and draft a proposed charter for a Wearables for Avatars Domain Working Group. The proposed charter would set out goals and key activities to generate insights into use of Wearables on Avatars.

3. Potential Working Group Goals (and non-Goals) and Deliverables

The goal for this proposal is to focus on Digital Fashion: clothing (including a layering system), shoes, hats, accessories. Special attention would be paid to opportunities for cooperation between multiple initiatives to increase synergy and reduce duplication of effort, gaps, fragmentation and confusion, for the good of the industry.

Research and experiments will be centered around the following main use case. Imagine that the user has an avatar. It may already be dressed. The user gets into a virtual fitting room where a lot of digital wearables are presented just like in real life. The user tries several combinations and finally leaves with a new outfit.

According to proposers the topics should be considered in separate proposals:

- Non-humanoid avatars
- Base (naked) avatar customization including gender, skin color, tattoos, body parameters, and other customizable non-removable parts
- Head customization including face, hair, skin color, tattoos, and other customizable non-removable parts
- Rig (skeleton) system
- Loot wearables: armor, weapons, etc.
- The way of storing 3d asset files (including centralized vs decentralized approaches)
- The process of purchasing wearables (including payment solutions, checkout, etc.)

Early examples of possible activities to be captured in the charter include:

Investigation

- Comparing existing file formats for storing avatars (fbx, gltf/glb, VRM, X3D, usd, etc) - a survey of the current landscape
- Incorporation of the following standards/research
 - Web3D Consortium <https://www.web3d.org/working-groups/humanoid-animation-hanim>
 - IEEE P3141 <https://standards.ieee.org/ieee/3141/10825/>

Avatar customisation: use cases and requirements

- Define body parts for mesh separation/customization
- Define humanoid avatar hierarchy, skeleton, slots and interaction (inc. head, torso, LArm, RArm, Hips, RLeg, LLeg) as a default implementation which can be replaced with other base avatars. Use results from Avatars working group in future.
- Designing a wearables system on top of avatar customization. (This determines the mesh separation system for wearables. For example separating full outfits into top and bottom)
- Use cases for dressing avatars

Wearables

- Define logic for the wearables system (dress up, dress down, and replace options)
- Additional skeleton for accessories (e.g. scarf, handbag)
- Proposals of format specifications particular for wearables in cooperation with other groups studying 3D interoperability (for example, FBX preferred for skeletal mesh, glTF/USD for metaverse)
- Develop a layering/category system for interchangeable wearables (changing parts of outfit) (Headgear, UpperWear, BottomWear, FullBody, Flat Footwear & Heeled Footwear)
- Develop a tier/category system that groups the different metaverses based on similar characteristics. ie. mesh count, poly count, material count, etc.
- Smart wearables containing music, effects, animations, interactivity. (Examples: a wrist watch that you can use to navigate. Headphones that play music when worn.)

Compilation

- Compile humanoid avatar with all wearables as a single object for file transferring
- Meta description of an avatar with wearables from wearables metadata and base avatar metadata

3D file formats

- Possible extension of gltf/USD for describing wearables

Optimization, Analysis and Testing

- Validation tool for avatars (can be made for Blender export validation/ Unity import validation)
- Prototype and test performance in existing game engines, including various material types and shaders for garment representation
- Best practices for mesh/texture optimization/compression

4. Coordination

<Companies, SDOs, and other organizations whose participation would be essential for a meaningful quorum>

- Web3D Consortium <https://www.web3d.org/working-groups/humanoid-animation-hanim>
- IEEE P3141 <https://standards.ieee.org/ieee/3141/10825/>
- VRM Consortium <https://vrm-consortium.org/en/>
- Avatar Interop Group: <https://github.com/M3-org/avatar-interop>
- Open Metaverse Interoperability Group <https://omigroup.org/>
- Metaverse Standards Forum 3D Asset Interoperability Working Group
- MOD Studio <https://www.metaversewearables.info/about-mod-studio>
- Clo3D team
- Marvelous Designer team
- Daz3D team
- Substance 3D Designer team
- Character Creator team
- [Browzwear](#) team

5. Risk Factors

- Lack of resources for prototyping and testing
- Lack of contributions to/adoption by larger industry players

6. Target timeline to create proposed Working Group charter

10 weeks

7. Additional Contributors (Participants contact Main Contact to be added)

<Forum members who wish to **proactively contribute** to this activity>

Ronald Klarenbeek, YOM

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Justin Melillo, Mona

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Isaac Korn

Nelly V. Tacheva, TANGRA



Gurcan Serbest, Negentra
Zeno Saviour, Character Labs
Stephen hauer, Poliigon
Aurélien Vaysset, Emersya

8. References

[Forum Topic Brainstorm Sheet](#), Avatars and Apparels section