

Real/Virtual World Integration Domain Working Group Charter **FINAL**

Approved by Oversight Committee February 8, 2023

1. Status and Change History

| Date | Editor | Summary | Version |
|------------|---------------------------------------|--|---------|
| 2023.01.01 | Jackson | Initial text | 0.5.0 |
| 2023.01.22 | Jackson, Smyth | Updates per review comments | 0.6.05 |
| 2023.01.25 | Jackson, Smyth | Updates per review comments, removal of extraneous text. | 0.8.0 |
| 2023.02.08 | Approved by Oversight Committee | No changes from 0.8.0. Saved as PDF. | 1.0.0 |

2. Officers

Chairs Pro Tem (Appointed chairs until first election):

- Responsible chair: James Jackson, Open AR Cloud (OARC)
- Vice chair: Steve Smyth, OpenSitePlan, Open Geospatial Consortium (OGC)
- Vice chair: Rob Watts, Intel

Other Officer positions may be created as needed under Forum Domain Working Group Processes.

3. Motivation and Goals (and NON-Goals)

The universal Working Group processes of the Metaverse Standards Forum (MSF), (the Forum) apply, including but not limited to all the relevant values of openness, transparency and inclusion.

The motivations for the creation of a Real/Virtual World Integration Domain Working Group (Working Group) include:

- Open/interoperable technology enabling augmented reality or similar metaverse experiences where virtual components are merged with the physical world. Project areas:
 - Open Collaborative Mapping - Crowd-sourced 3D mapping to support positioning and reality model creation/update.
 - Open/Interoperable Visual Positioning Service, Spatial Anchors, Markers - Real-world positioning (GeoPose) and anchors/markers to support connectivity of experiences.

- Pub/Sub Broker - Broker for real-world sensor (or derived) data.
- Reality Model - Structured real-world model (digital twin) including 3D geometry, semantic representations, sensor data.
- Service Discovery - Discovery of real-world spatial enablers (ex. mapping positioning, broker, reality model, experience discovery).
- Experience Discovery - Discovery of virtual content, experiences or applications (AR) in the real world or real-world twin i.e automatic, continuous, contextual search.
- Decentralized Fabric - Decentralized fabric for real-world enablers.

NON-Goals

MSF is not an Standards Development Organization (SDO). This WG will not develop standards.

4. Project Deliverables and Requirements

- Development of high-level requirements and use-cases associated with project areas.
- Implementation of open prototypes to realize one or more use-cases and demonstrate the use of existing and needed standards.
 - Initial end-to-end use-case: [Ride-hailing AR experience](#)
- Project area sub-deliverables (** required for ride-hailing use-case i.e. high priority):
 - **Open Collaborative Mapping**
 - Sparse point cloud framework (creation/registration/geo-alignment) and APIs. For APIs, start by evaluating GeoPose Protocol from Open AR Cloud. **
 - **Open/Interoperable Visual Positioning Service, Spatial Anchors, Markers**
 - Visual positioning (determining GeoPose via cameras) and APIs using data from open collaborative mapping. For APIs, start by evaluating GeoPose Protocol from Open AR Cloud. **
 - Spatial anchors using data from open collaborative mapping.
 - Model data for model-based tracking (ex. image targets, textured object targets, textureless CAD model targets).
 - **Pub/Sub Broker**
 - Sensor stream pub/sub broker. **
 - **Reality Model**
 - Structured geo-aligned 3D geometry representation and retrieval APIs (basic). **
 - Reality Modeling Language and APIs for collaborative model management (advanced).
 - Automated generation of structured 3D geometry with semantic labeling of entities and their component parts (ex. sparse point cloud → dense point cloud → CityGML).
 - Real-world (or real-world twin) URI scheme (ex. link to real-world static/moving objects).
 - *Note: Many future opportunities here (ex. simulation/physics, scene understanding, visual affordance).*
 - **Service Discovery**
 - Service discovery API/prototype (start by evaluating existing service discovery from Open AR Cloud). **
 - **Experience Discovery**
 - Experience discovery API/prototype (start by evaluating existing experience discovery from Open AR Cloud).
 - **Decentralized Fabric**
 - Decentralized fabric to support open collaborative mapping, open/interoperable visual positioning service/spatial anchors/markers, pub/sub broker, reality model, service discovery, experience discovery etc.

5. Milestone Plan

The following table defines the Domain Working Group’s planned schedule.

| Phase | Description | Milestone | Duration | Elapsed Time |
|-------|--|--|-----------|------------------|
| 1 | High-level requirements and use-cases | Requirements and Use Cases defined and accepted. | 3 months | 3 months |
| 2 | Plan for initial prototypes | Plan written and accepted. | 2 months | 5 months |
| 3 | Oversight approval and funding/resources | Approval received and funding committed. | 1 month | 6 months |
| 4 | Prototype designs | One or more designs completed and accepted. | 2 months | 8 months |
| 5 | Prototype implementations | One or more implementations completed. | 6 months | 1 year, 2 months |
| 6 | Forum member feedback | Feedback received. | 1 month | 1 year, 3 months |
| 7 | Feedback-driven updates | Prototype(s) updated. | Quarterly | + 3 months |

6. Coordination

The Domain Working Group will coordinate with other Forum Domain Working Groups, and organizations external to the Forum.

- Coordination with other MSF working groups, SDOs, and related open projects.
 - Define potential integration points with MSF shared services or frameworks ex. service discovery, privacy.
 - Define potential integration points with other MSF working groups (non-shared services or frameworks) ex. 3D asset to real-world connectivity.
 - Identify new standards activities and engage with respective SDOs (ex. OGC, ETSI ARF, W3C).
 - Collaborate with related open projects ex.
 - OARC Open Spatial Computing Platform (OSCP) and Testbeds
 - Open Geospatial Consortium (OGC) Testbeds
 - Overture Maps Foundation
- Informational reports at plenary meetings of relevant SDOs and other organizations.

7. Communication Plan

The Domain Working Group will report to the Oversight Committee, to other Domain Working Groups, to Forum membership, and to coordination partners and the public.

- The Working Group officers will provide quarterly updates to the Forum Oversight Committee, Forum membership, coordination partners and public, or when major milestones are achieved.
- The Working Group will solicit subject matter experts to present to the Working Group members on specific topics.

8. Risk Factors

The Domain Working group considers the following to be the most important risk factors:

- Limited resources/funding for prototype development.
- Limited real-world open data.
- Limited contribution/adoption by larger industry players.

9. Working Group Renewal

The Domain Working Group will seek renewal approval two years from the date of approval of the charter.

10. Project Funding and Resources

Requests for funding and/or resources will be submitted to the Forum Oversight Committee for approval once the detailed project plan is completed in Phase 1.