|  |
| --- |
|  |

|  |
| --- |
| Input Contribution |
| Meeting ID\* | RDM#51 |
| Title:\* | Virtual shop using metaverse |
| Source:\* | JaeSeung Song, KETI, jssong@sejong.ac.krJaeho Kim, KETI, kimjh@sejong.ac.kr Minbyeong Lee, Hyundai Motors, minbyeong.lee@hyundai.com  |
| Date:\* | 2021-09-15 |
| Input related to\* | WI-0105 oneM2M System Enhancement to AI capabilitiesTR-0068 V 0.1.0 |
| Intended purpose ofdocument:\* | [x]  Decision[ ]  Discussion[ ]  Information[ ]  Other <specify> |
| Impacted other TS/TR(s) |  |
| Decision requested or recommendation:\* | Agree for inclusion in TR-0068 |
| Template Version: January 2017 (Do not modify) |

**oneM2M Notice**

The document to which this cover statement is attached is submitted to oneM2M. Participation in, or attendance at, any activity of oneM2M, constitutes acceptance of and agreement to be bound by terms of the Working Procedures and the Partnership Agreement, including the Intellectual Property Rights (IPR) Principles Governing oneM2M Work found in Annex 1 of the Partnership Agreement.

# Introduction

This contribution introduces a new use case for smart virtual shop using metaverse.

### -----------------------Start of change 1-------------------------------------------

## 2.2 Informative references

Clause 2.2 shall only contain informative references which are cited in the document itself.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] Metaverse from Wikipedia (<https://en.wikipedia.org/wiki/Metaverse>)

[i.2] Metarverse is coming and it’s a very big deal from Forbs (<https://www.forbes.com/sites/cathyhackl/2020/07/05/the-metaverse-is-coming--its-a-very-big-deal/?sh=67e8eb52440f>)

### -----------------------End of change 1-------------------------------------------

### -----------------------Start of change 2-------------------------------------------

## 7.2 Use case #x – Last Mile Delivery

*Editor’s Note: The section introduces a AI/ML use case that uses IoT data.*

### 7.2.1 Description

The word "Metaverse" is made up of the prefix "meta" (meaning beyond) and the stem "verse" (a back-formation from "universe"); the term is typically used to describe the concept of a future iteration of the internet, made up of persistent, shared, 3D virtual spaces linked into a perceived virtual universe.[i.1] The metaverse in a broader concept refer to realize virtual worlds using IoT, AI and Augmented Reality(AR)/Virtual Reality(VR) [i.2].

A metaverse-based online store where stores in the real world are created as digital twins in the metaverse virtual space, and users visit a virtual shop in the metaverse space to purchase preferred products. For real-time synchronization between the real-world and the virtual shops in the metaverse, various smart sensors are used to sense real-world shovel products intelligently. The edge node at the real world shop loads a trained AI/ML model and reasons products' information. The retrieved product data is then transferred to the IoT platform for real-time synchronization.

A user can now purchase products from a virtual shop in the meteaverse. The purchase info in the metaverse is notified to the administrator and the purchased product is delivered to the user.

### 7.2.2 Source

### Metaverse is coming and it’s a very big deal [i.2]

### 7.2.3 Actors

* User: a user who shops products in the metaverse virtual shop
* Edge node: an IoT edge node perform machine learning model to retrieve shopping information from sensors deployed in the real world shop.
* AI-enabled IoT platform: An IoT platform synchronizes data between the real-world and virtual shops.

### 7.2.4 Pre-conditions

* The IoT edge node is loaded with a AI/ML model to detect products from the real world.

### 7.2.5 Triggers

* Users do virtual shopping in the metaverse virtual shop and purchase preferred products.

### 7.2.6 Normal Flow

Figure 7.2.9-1 illusrates the high-level flows of the metaverse virtual shop use case, which consists of the following steps:

* Step 1: The Edge node collects data from sensors in the real world shop.
* Step 2: The Edge node infers product information from the collected data.
* Step 3: The Edge node send inferred product data to the IoT platform.
* Step 4: The virtual shop application in the metaverse retrieves information from the IoT platform about the products in the real world.
* Step 5: A user picks up products from the virtual shop. The purchased information is sent to the IoT platform.
* Step 6: An admin application gets a notification for the purchase, and delivers real products to the user.

### 7.2.7 Alternative Flow

None

### 7.2.8 Post-conditions

The AI-enabled IoT platform synchronizes product data in the real world shop and virtual shop.

### 7.2.9 High Level Illustration



Figure 7.2.9-1 Conceptual diagram of metaverse virtual shop

### 7.2.10 Potential Requirements

1. The oneM2M System shall be able to synchronize between real and virtual world devices.
2. The oneM2M Edge node shall be able to run AI/ML models to retrieve information from the real world.

### -----------------------End of change 1-------------------------------------------