



# MediaVerse

A universe of media assets  
and co-creation opportunities

## D2.1

### Use Cases and User Requirements

|                          |                                   |
|--------------------------|-----------------------------------|
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|                 |  |
|-----------------|--|
| <b>Abstract</b> | This document describes the Use Cases, Usage Scenarios and Technical Requirements delivered in the first part of the MediaVerse project. |
| <b>Keywords</b> | Media, Usage Scenarios, Use Cases, User Requirements   |

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## Glossary

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| ABBREVIATION | MEANING  |
|--------------|--|
| 2D video     | Conventional two-dimensional video, as opposed to 360° video |
| AD           | Audio Description  |
| AR           | Augmented Reality  |
| CC           | Closed Captions  |
| CGI          | Computer Generated Imagery                                   |
| CJ           | Citizen Journalism / C                                       |
| DoA          | Description of Action  |
| GA           | Grant Agreement  |
| HMD          | Head Mounted Display   |
| MV           | MediaVerse   |
| SL           | Sign Language  |
| SN           | Social Network(s)  |
| TRL          | Technology Readiness Level                                   |
| UGC          | User-generated content                                       |
| UI           | User Interface   |
| UX           | User Experience  |
| WP           | Work Package   |

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## Executive Summary

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This document is a public deliverable of the MediaVerse Innovation Action. The project's overarching goal is to create a multimedia co-creation platform that will enable all sorts of content creators, from traditional publishers and freelance creators or artists to anyone who wants to share their ideas, to create and share their media, while keeping control of their intellectual property rights. In the following, we will describe the use cases<sup>1</sup> that have been designed to demonstrate and evaluate the platform in its many aspects.

Use Case 1 focuses on Citizen Journalists and freelancers who will use the platform to create media content (standard 2D as well as immersive 360° experiences), make it accessible, e.g., by adding subtitles, set their individual rules for further usage, including all data relevant for monetisation, etc.

Use Case 2 aims to support social workers in creating interactive and accessible immersive experiences that will help people with cognitive disabilities in decision-making processes.

Use Case 3 will integrate different MediaVerse components in an AR experience, allowing the users to co-create and re-publish their own versions of the content, recording the copyrights of everyone involved in the creative process.

The document begins with a description of the scenario development process before describing in detail the individual scenarios selected for the first period. Finally, the resulting user requirements are listed in section 4.

These are the results of a first major step in the iterative process of specifying the technical requirements. There will be updates during the process and a final version will be published in November 2022.

---

<sup>1</sup> See the Introduction section below for the use of the term in this project.



# 1 Introduction

---

This is the first deliverable of Workpackage (WP) 2 of the MediaVerse project. The aim of this WP is to describe scenarios for the three Use Cases, derive technical requirements from these scenarios and, in a later phase, to design a conceptual framework for the MediaVerse system. As described in the Description of Action (DoA), the original work plan, the MediaVerse platform will consist of multiple MediaVerse *nodes* (also referred to as *instances*). This document does not cover technical requirements that describe the backend components or the data flow between these nodes. It rather focuses on the three Use Cases, the 10 scenarios that have been discussed for these Use Cases, including detailed descriptions, and the process that led to these. The last chapter lists all user requirements. NB: In MediaVerse the term “Use Case” stands for an “area of application” rather than a specific granular description of the application of a certain feature, as it is often used.

The Use Cases are driving the technical development in the MediaVerse project as they provide the motivation as well as the detailed descriptions of the technical developments by specifying the user requirements. The WP will only end in January 2023 but this deliverable is a first important outcome as it marks the end of a first major effort and officially hands over from an ideation and specification phase to developing solutions.

Use Case 1 is provided by partners STXT and DW who represent the professional media publishing market. A strong focus, therefore, is on copyright management and monetisation of the content produced and exchanged in MediaVerse, but accessibility also plays an important role.

Use Case 2, developed by UAB, has a strong focus on accessibility and societal impact. It aims to enable social workers as well as prosumers with a personal interest to create accessible immersive experiences that will cater for various needs of different target groups, e.g., elderly people, young migrants, and people with disabilities.

Use Case 3 consists of five artistic experiments that will integrate different MediaVerse components in an AR experience, with a focus on artistic participation of users as well as innovative ways to support the rights management and monetisation of everyone involved in the creative process.

Each Use Case targets at least two groups of future users, those who create and those who consume content. While this dichotomy is still valid to some extent, all three Use Cases have a greater or lesser tendency to turn the consumers into prosumers by involving them in the creative process.

The first Use Case and Scenario development phase started with a creative ideation phase, providing Scenarios in the form of storylines of what creators and consumers should be able to do, with and on the platform (see section 2.1). This was followed by specifying the individual steps of content co-creation in User Journeys (see 2.3) and visualising the process in Scenario Diagrams (2.5). Based on all available information 63 concrete user requirements were specified as described in section 2.4.

Following an elaborated process on how the Use Cases and requirements were specified, the three Use Cases are described in detail in section 3, before the resulting requirements are presented in section 4.

## 2 The Iterative Process of Scenario Development in MediaVerse

As it happens often in interdisciplinary cooperation projects, despite a relatively clear roadmap with explicit goals and objectives, the participants experience a hen-and-egg problem: While use case and scenario design should be as open-minded and creative as possible, the project plan and the competencies of the consortium partners already lay out certain boundaries. A common challenge stems from the fact that the use case partners try to fit their ideas into these predefined boundaries (while at the same time struggling to find out what exactly these boundaries are), while the developing partners try to understand what exactly the use case partners or, more precisely, their target users actually need and want.

The main task in the first weeks of this WP (“MediaVerse Use Cases, User-driven Requirements and Conceptual Framework Design”) was to foster a dynamic and fruitful exchange between the Use Case partners and the Technology Partners and define an iterative process that enables all partners to use the utmost of their potential which they brought into this consortium.

Based on the three use cases and the set of technologies described in the Grant Agreement, the Use Case partners were asked to revisit their more general use cases and provide more concrete Scenarios. To support this process, WP Leader DW provided a guideline for formulating Usage Scenarios and specifying User Requirements, and also led individual talks with the teams of the Use Case partners. As soon as it became clear that the Use Case partners needed more specific explanations of what the Technology Partners and their technologies can actually enable, cross-workpackage workshops were organised providing introductions to these technologies and demonstrations of the available tools in their current states. Several technologies were already at rather high technology-readiness levels (TRL).

This created a new starting point for our iterative development cycle which will be described below. The following diagram simplifies the process as the steps often went in parallel and were closely interwoven.

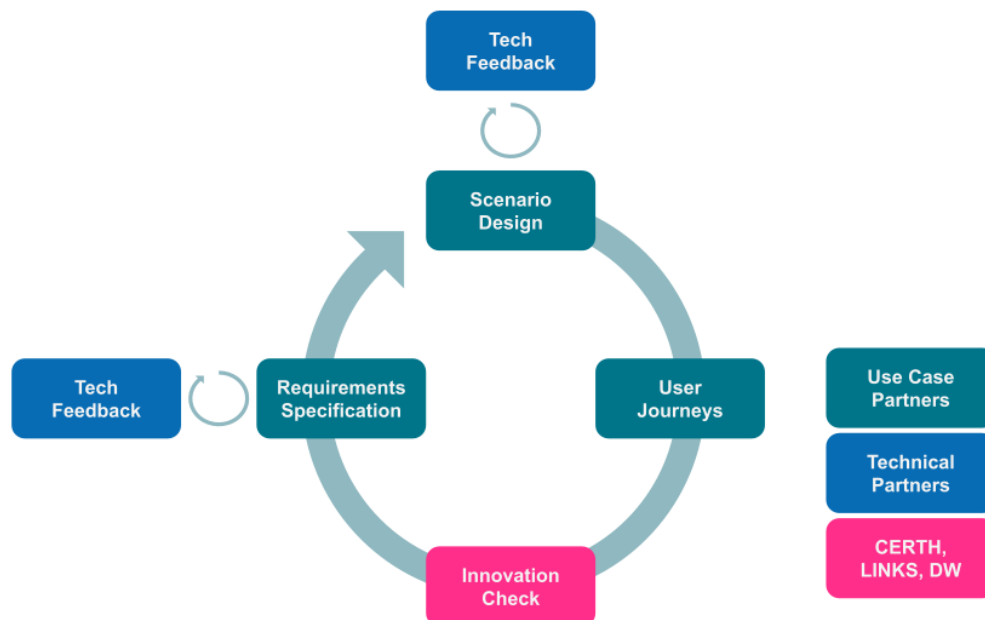


Figure 1: Diagram summarising the iterative use case development cycle

The Use Case Partners started with short stories (see 2.1) describing the target users, their needs and wishes and how MediaVerse supports reaching those.

In biweekly calls the partners involved in this process came together to discuss and improve these Usage Scenarios.

When the first versions of all Scenarios were done, they went through an Innovation Check (see 2.2). A matrix was created to evaluate how innovative the Scenarios were on a very detailed level of actual tools being used.

Meanwhile, the Scenarios were specified based on the feedback received from all the partners. The storylines of the Scenarios were specified in User Journeys (see 2.3) where individual steps of the general paths were described in more detail. These were again discussed with the Technical Partners to ensure that all partners shared a common understanding.

The increased detail of the User Journeys made it possible then to formulate exact requirements in the different areas of the value chain in the MediaVerse ecosystem (see 2.4) and, eventually, all the steps of these journeys were visualised in sequential Scenario Diagrams (see 2.5).

The following subchapters describe these steps in further detail.

## 2.1 Scenario Design

---

A usage scenario is a method to describe a user experience. It often involves imaginary personas through the lens of which the usage scenario is described. We chose a storytelling approach for the first iteration as it inspires both the writer and the reader (see below). The resulting story is meant to help the developer to understand the needs of the target user(s), but it can also be used to explain the idea of a product or service to customers.

Much more than being a tool, the writing of such a story is a creative process. It helps to set a mood, and through the eyes of the target users the scenario author and readers virtually experience the situation for which the scenario is meant to bring an improvement.

There were a few guiding principles for the writing of these scenarios:

1. Start with the target group:
  - a. Who will benefit from your use case?
  - b. Who will be the future customer of the service(s) and tool(s) developed?
2. What are the pains and gains?
  - a. Why do they want “it”?
  - b. How does it make their life better?
3. Questions, not answers!
  - a. Don’t describe solutions, describe problems
  - b. If you already know problems that existing solutions cause, do mention them.

## 2.2 Innovation Matrix

As the authors of the scenarios had been told not to base their stories on what they think the technology partners and their tools can or cannot provide, the check-up had to be done by someone else or at a different time. In order to monitor the relations between the scenarios and the tools and features that had been described in the Grant Agreement, DW suggested a matrix that would evaluate and visualise the following aspects:

- Which aspects of the original work plan are (not) covered by the MediaVerse Scenarios?
- Which tools or features may have to be added that had not yet been explicitly mentioned in the work plan?
- Which aspects of the MediaVerse Use Cases may already be covered by the partners' tools at their current TRL/state of development?
  - In that case Technology Partners were encouraged to make suggestions and thereby inspire the scenario design process
- Which requirements may not be clear to the Technology Partners?
- Which available options may not be clear to Use Case Partners?

In order to cover all these aspects, the Innovation Matrix, which was maintained as an internal live document, had the structure illustrated in Figure 2 and specified in Table 1.

| A                  | B   | C                       | D             | E            | F                          | G          | H                            | I          |
|--------------------|---|-------------------------|---------------|--------------|----------------------------|------------|------------------------------|------------|
|                    |   |                         |               |              | Sc. 1.1 Citizen Journalism |            | Sc. 1.2 Immersive Journalism |            |
| Specific Objective | Requirement   | available tool          | resp. Partner | comment      | Priority                   | INNOVATION | Priority                     | INNOVATION |
| SO1                | Interconnected Asset Management Systems   |                         |               | Maybe AT     | essential                  | high       | important                    |            |
| SO1                | Streaming   |                         | ATOS          | This can be  | essential                  | high       | essential                    |            |
| SO1                | unified environment for configuration of nodes                                  |                         |               |              | important                  | high       | important                    |            |
| SO1                | Communication between nodes   | missing                 | ATOS          | T6.2         | essential                  | high       | essential                    |            |
| SO1                | Data Sharing  |                         |               |              | essential                  |            | essential                    |            |
| SO1                | Query-driven management   |                         |               |              | needs clarification        |            | nice to have                 |            |
| SO1                | Media recommender system (editing process)                                      |                         |               |              | nice to have               |            | nice to have                 |            |
| SO1                | Content Adaptation Services   | undecided               | ATOS          | T3.3         | important                  |            | important                    |            |
| SO1                | Local Settings per MV Node  | missing                 | ATOS          | T6.4         | important                  |            | nice to have                 |            |
| SO1                | Broker Interface for content retrieval, adaptation and exchange                 | missing                 | ATOS          | T6.4         | essential                  |            | essential                    |            |
| SO2                | content has metadata and rights information                                     |                         |               | I think this | essential                  |            | important                    |            |
| SO2                | protected transactions  | undecided               | FIN           | I believe v  | important                  |            | important                    |            |
| SO2                | increased visibility of content ownership and copyright                         |                         |               | This is fog  | important                  |            | important                    |            |
| SO2                | automated negotiations  | missing                 | ATOS          | This shoul   | important                  |            | important                    |            |
| SO2                | near duplicate multimedia detection   | Near duplicate detectio | CERTH         |              | nice to have               | medium     | nice to have                 |            |
| SO2                | procedures to claim ownership   |                         |               | Not clear,   | important                  |            | important                    |            |
| SO2                | provide licence suggestions for users uploading content                         |                         |               | I think this | essential                  |            | essential                    |            |
| SO2                | automatic collection of multimedia items from the internet                      | Social Tracker          | CERTH         |              | nice to have               |            | low                          |            |
| SO3                | flagging inappropriate content  |                         | CERTH         |              | important                  |            | nice to have                 |            |
| SO3                | fragmentation of emerging and new media formats                                 |                         |               |              | needs clarification        |            | important                    |            |
| SO3                | understanding of emerging media formats (360, 3D, CGI)                          | missing                 | CERTH         | We will re   | important                  |            | important                    |            |
| SO3                | understanding of new media formats (gifs, memes, short videos, emoticons, etc.) | missing                 | CERTH         |              | nice to have               |            | nice to have                 |            |

Figure 2: Screenshot of Innovation Matrix

Table 1: Descriptions of the fields in the Innovation Matrix

| COLUMN    | COLUMN TITLE       | DESCRIPTION   |
|-----------|--------------------|---|
| A         | Specific Objective | <ul style="list-style-type: none"> <li>The Abbreviations of the eight Specific Objectives specified in the Grant Agreement (SO1, SO2, SO3, etc.)</li> </ul>   |
| B         | Requirement        | <ul style="list-style-type: none"> <li>Requirements defined under this Specific Objective, e.g., “Interconnected Asset Management”. These were listed before the specification of requirements as described in section 4.</li> <li>Those that had not been explicitly mentioned in the Grant Agreement were highlighted in light grey (e.g., cell B04: “Streaming”)</li> </ul>  |
| C         | available tool     | <ul style="list-style-type: none"> <li>A dropdown menu gave a list of tools provided by the Technology Partners</li> <li>the menu also had the options “undecided” for situations that were still under discussion and “missing” for the case where the partners did not yet have a tool that would cover this situation</li> </ul>   |
| D         | resp. Partner      | <ul style="list-style-type: none"> <li>The partner responsible for providing or integrating the tool or service</li> </ul>  |
| E         | comment            | <ul style="list-style-type: none"> <li>Free space for exchange</li> </ul>   |
| F, H, ... | Priority           | <ul style="list-style-type: none"> <li>Here Use Case Partners specified how important this feature would be for each of their scenarios</li> <li>The dropdown menu offered the following options: <i>essential, important, nice to have, low, none, and needs clarification</i></li> <li>Columns F and H specified the priorities of the two Scenarios for Use Case 1, columns J, L, and N were for the Scenarios of Use Case 2, and columns P, R, T, V, and X were for the Use Case 3 Scenarios</li> </ul> |
| G, I, ... | Innovation         | <ul style="list-style-type: none"> <li>In these columns the Technology Partners evaluated the innovation level of the features as described in the Scenarios</li> <li>The dropdown menu offered the following options: <i>high, medium, low and not clear</i></li> <li>Columns G and I specified the priorities of the two Scenarios for Use Case 1, columns K, M, and O were for the Scenarios of Use Case 2, and columns Q, S, U, W, and Y were for the Use Case 3 Scenarios</li> </ul>                   |

The exercise of filling in this matrix supported the process in various ways. It helped to

- Identify the priority of certain features (or aspects described in the Description of Action (DoA) Specific Objectives) per Scenario
- Identify where aspects of certain tools were not clear to the Use Case partners
- Identify where the innovation potential of certain tools is not reflected in the Scenarios to the extent possible
- Identify requirements for which we don’t have a solution or a tool in the consortium yet

Eventually, it turned out that this exercise was useful to support the exchange between the partners but the matrix was not an appropriate tool to visualise the extent of innovation that certain requirements would demand with respect to specific tools and features. The discussion about different levels of innovation and how to ensure that MediaVerse results will be innovative and market-relevant was handed back to Task 1.2 Scientific and innovation management.

An adapted version of the matrix may be used to mark the priorities of these features per Scenario so as to support decision-making processes in the technical work packages.

## 2.3 User Journeys

---

The User Journey, especially in marketing often referred to as Customer Journey, is a step-by-step description of what a user experiences when using a service. During the ideation and system specification process it is used as a tool to describe each step of the “journey” and in order to keep it systematic, the description is ordered according to generic steps. For the MediaVerse Use Cases we slightly adapted the structure of templates<sup>2</sup> we found in online sources, so that all areas of MediaVerse were covered. The Use Case Partners picked one of their Scenarios each and for this iteration they focused on the content creation process, neglecting for now the user experience of the consumers. The general idea is to describe all the steps of a “journey”, i.e., the future user's path they would take, e.g., in creating media with MediaVerse tools.

The User Journey Template was provided to the Use Case partners in the form of a spreadsheet. The template had comments to explain what kind of information was expected. The columns in this sheet represent certain phases of the workflow of (co-)creating media in MediaVerse.

- "AWARENESS" is the first step, actually almost a step BEFORE the actual creation process: How do people get to know of MediaVerse or the project/content that is to be created?
- "ONBOARDING" stands for “how do people join the team?”
- "TOPIC SELECTION": before you start creating, especially as a team, you would usually decide on a topic/subject.
- "CONTENT CREATION" consists of multiple steps here: Uploading/Using, Editing content but also communication among co-creators and decision-making in case different people involved have different ideas and preferences.
- "ACCESSIBILITY" is seen as a part of “CONTENT CREATION” but may require extra focus and different questions and answers, therefore we gave it extra space.
- "PUBLISHING" includes the process of adding licensing information, but also the action of actually making content available: To whom? Under which conditions? How do they get to know there is new content?
- "MONITORING" may include steps like keeping an eye on what users do with your content, including re-use as well as comments ("Content Moderation"), but also measuring the success of your post, i.e., visits, interactions, downloads, etc.

The lines in this sheet stand for different questions regarding each of these stages

- "Step" is equivalent to a step on the path of this journey. A Phase may consist of multiple steps, e.g., Content Creation has four steps in the example below.
- "User goals" is a brief description of what this step is about
- "User actions" is the part that is individual for each Scenario! Here we describe what people want to do and maybe explain their motivations, too
- "Issues": For every step, some risks or difficulties may already be predictable. It is worth mentioning them so that we can take action before these things actually happen!
- "Ideas": means ideas how to react to such “Issues”

---

<sup>2</sup> This template was inspired by uxpressia (<https://uxpressia.com/templates/digital>).

The following tables give a detailed view of the stages and the guidelines for the authors of the user journeys. The Use Case partners adapted these templates according to their specific needs.

*Table 2: First Stages: Awareness, Onboarding, Topic Selection*

| PHASE        | AWARENESS  | ONBOARDING           | TOPIC SELECTION  |
|--------------|--|----------------------|--|
| Step         | JOIN MEDIAVERSE CO-CREATION PROCESS  | JOIN MEDIAVERSE      | SELECT TOPIC FOR NEW MEDIA ITEM  |
| User goals   | Encourage new user to (co-)create content in MediaVerse  | Registration, Log-In | Find/choose/agree on topic for a new MediaVerse "project"  |
| User actions | <ul style="list-style-type: none"> <li>* Is the future co-creator invited? How?</li> <li>* Have they joined MediaVerse before? Can someone be invited to join MV? How?</li> <li>* How else would they get to know about the possibility to (co-)create with MV?</li> </ul> |                      | <ul style="list-style-type: none"> <li>* Is there a list of trending topics?</li> <li>* Is the creator being asked/commissioned to work on a certain topic?</li> <li>* Do co-creators begin by communicating, suggesting, discussing possible topics?</li> </ul> |
| Issues       | <ul style="list-style-type: none"> <li>* What could keep people from joining?</li> <li>** Trust? Language? Accessibility issues?</li> </ul>  |                      |  |
| Ideas        | * How could these issues be overcome?  |                      |  |

Table 3: Stage 4: Content Creation

| PHASE        | CONTENT CREATION  |  |   |  |
|--------------|---|--|---|--|
| Step         | UPLOAD NEW CONTENT  | USE EXISTING CONTENT   | EDIT CONTENT  | MAKE EDITING DECISIONS   |
| User goals   | Make content available for own use / use by others  | Search and retrieve content in MediaVerse or Social Media accounts   | Adapt, enhance, annotate content to the needs of this project   | Communicate and decide about possible changes  |
| User actions | <ul style="list-style-type: none"> <li>* specify restrictions for use/visibility: for all, only for me, only for friends</li> </ul> | <ul style="list-style-type: none"> <li>* where do you want to take content from?</li> <li>* what search filters do you want to apply?</li> </ul> | <ul style="list-style-type: none"> <li>* do you intend to use retrieved media "as they are" or do you foresee editing them?</li> <li>* what sorts of editing do you foresee?</li> <li>** clip video, crop image, mute/add audio track,...?</li> </ul> | <ul style="list-style-type: none"> <li>* How do involved creators/authors communicate? ** chat, comment,...?</li> <li>* How can I suggest a change?</li> <li>* Do all editors/creators have equal rights, e.g., to overwrite or decide?</li> </ul> |

Table 4: Last 3 Stages: Accessibility, Publishing, Monitoring

| PHASE        | ACCESSIBILITY  | PUBLISHING   |   | MONITORING  |
|--------------|--|--|---|---|
| Step         |  | ADD LICENSING INFORMATION  | MAKE CONTENT AVAILABLE  | USAGE ANALYSIS  |
| User goals   | Make content accessible  | Specify usage permission, cost model   | Offer content to users/customers  | Monitor and track usage of content  |
| User actions | <ul style="list-style-type: none"> <li>* Add translation</li> <li>* Add subtitles</li> <li>* ...?</li> </ul> | <ul style="list-style-type: none"> <li>* Who do you give permission to see or use your content?</li> <li>* Under which conditions?</li> <li>* If you have specific models or rules in mind, mention them here</li> </ul> | <ul style="list-style-type: none"> <li>* How do the people (for which you have specified permissions) get to know that your content is available now?</li> <li>* Will it be available only on your MV node? Searchable for others?</li> <li>* Do you envisage export to/sharing via /distribution via other platforms?</li> </ul> | <ul style="list-style-type: none"> <li>* What happens after releasing the content?</li> <li>* Can you see who used your content in their productions?</li> <li>* Can you see how many users viewed your content?</li> </ul> |



The User Journey template helped to specify the Usage Scenarios in more detail, following the pre-defined stages. All partners, the Use Case partners included, had a clearer picture of the content creation process when these tables were filled. Not only was it easier to extract actual and concrete requirements from these descriptions, but it was also a lot easier to harmonise the descriptions, as everyone had followed the same structure.

## 2.4 User Requirements

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From the beginning of the project WP leader DW had collected requirement-related notes during discussions of features and requirements in various calls of different work packages. All the aspects and features described in the User Journeys were now added to this document and shared with the consortium.

These functional and non-functional requirements supported by comments and ideas were reviewed and commented by all partners and discussed in a WP call. In the process of discussing their Scenarios and pilot ideas in a cross-fertilisation meeting with H2020 projects TRACTION and SOCLOSE<sup>3</sup>, UAB came up with an additional list of requirements specifically focusing on copyrights in co-creative environments. These were incorporated into the requirements list after they had been discussed in a specific WP4 workshop on copyright management.

For the specification of the MediaVerse User Requirements we have chosen the format of Suzanne and James Robertson's "Atomic Requirement Shell"<sup>4</sup> (see tables 5 & 6 on the following pages ) which we slightly adapted after a dedicated WP call where we found that we would need some more project-specific details to be covered in the Requirement Cards.

In order to be able to define requirements in a way that would be clear and easy to understand, or rather so clear that they would be hard to misunderstand, Suzanne and James Robertson developed the Atomic Requirement Cards<sup>5</sup>. "You can think of the atomic requirements as the lowest level requirements. In fact, the collection of atomic requirements specifies everything we require the solution to do."<sup>6</sup>

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<sup>3</sup> Read more about the collaboration in the MediaVerse blog: <https://mediaverse-project.eu/2020/12/16/cross-fertilisation-h2020/>

<sup>4</sup> Robertson, S. & Robertson, J. (2012): Mastering the Requirements Process: Getting Requirements Right. Addison-Wesley Professional, Boston, MA.

<sup>5</sup> Robertson and Robertson also use the terms "Volere Cards" and "Snow Cards". We decided to keep the wording consistent here in order to avoid confusion.

<sup>6</sup> From an article where the authors describe the advantages of their "Volere" method on their own website: <https://www.volere.org/wp-content/uploads/2018/12/06-Atomic-Requirements.pdf>

Table 5: Structure of the Atomic Requirement Card

| Requirement #: Unique ID |   | Req. Type: Non-/Functional |   | Event/Use Case Number: |  |
|--------------------------|---|----------------------------|---|------------------------|--|
| Description              | A one sentence statement of the intention of the requirement  |                            |   |                        |  |
| Rationale                | A justification of the requirement  |                            |   |                        |  |
| Fit Criterion            | A measurement of the requirement such that it is possible to test if the solution matches the original requirement.                   |                            |   |                        |  |
| Supporting Materials     | Documents that may hold further information, such as more detailed descriptions of the requirements, or other connected information   |                            |   |                        |  |
| User Satisfaction        | Degree of stakeholder happiness if this requirement is successfully implemented (Scale from 1= uninterested to 5 = extremely pleased) | User Dissatisfaction       | Measure of stakeholder unhappiness if this requirement is not part of the final product (Scale from 1 = hardly matters to 5 = extremely displeased) |                        |  |
| Dependencies             | A list of other requirements that have some dependency on this one  |                            |   |                        |  |
| Conflicts                | Other requirements that cannot be implemented if this one is  |                            |   |                        |  |
| History                  | Creation changes, deletion, etc.  |                            |   |                        |  |

The concept was explained in a WP call and after a detailed discussion with the consortium the cards were adapted as in Table 6.

Table 6: Structure of the adapted MediaVerse Requirement Card

| Requirement #: Unique ID |   | Req Type: Non-/Functional |   | Use Case(s): Numbers of MediaVerse Use Cases that require this |  |
|--------------------------|---|---------------------------|---|--|--|
| Source                   | Who raised this requirement?  |                           |   |  |  |
| Description              | A one sentence statement of the intention of the requirement  |                           |   |  |  |
| Rationale                | A justification of the requirement  |                           |   |  |  |
| Fit Criterion            | A measurement of the requirement such that it is possible to test if the solution matches the original requirement                    |                           |   |  |  |
| Supporting Materials     | Documents that may hold further information, such as more detailed descriptions of the requirements, or other connected information   |                           |   |  |  |
| User Satisfaction        | Degree of stakeholder happiness if this requirement is successfully implemented (Scale from 1= uninterested to 5 = extremely pleased) | User Dissatisfaction      | Measure of stakeholder unhappiness if this requirement is not part of the final product (Scale from 1 = hardly matters to 5 = extremely displeased) |  |  |
| Existing                 | Name component which can already cover this (from in- or outside the consortium)  | To be developed           | Name component (by consortium partner) which can cover this in the future   |  |  |
| Related Task             | Task in the MediaVerse workplan   | Responsible Partner       | Partner(s) responsible for realising this feature   |  |  |
| Dependencies             | A list of other requirements that have some dependency on this one  |                           |   |  |  |
| Conflicts                | Other requirements that cannot be implemented if this one is  |                           |   |  |  |
| History                  | Creation changes, deletion, etc.  |                           |   |  |  |
| Further details          | Comments that may help understanding this requirement   |                           |   |  |  |

Once the structure was agreed, all requirements were transferred into a new shared document where all partners could add, adapt, comment, and clarify the requirements. They were grouped according to the various development goals of the project.

At the end of this process, we had a document gathering 63 requirements organised in 14 categories. This list was then handed over to the Technical Manager and the leaders of the technical work packages.

An overview of the requirements will be featured in section 4 Requirements. The complete requirement cards with all details will be maintained and updated during the whole iterative requirement specification process.

## 2.5 Scenario Diagrams

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Following up on the discussions around the Innovation Matrix (see section 2.2), the Innovation Manager asked the Use Case Partners for a visualisation of the Scenario production chain, marking also which MediaVerse components will be used for the individual steps. In an iterative process and with the help of the technical partners, the Use Case Partners created flow charts also indicating the use of different devices.

These simplified diagrams show sequences of actions that are coloured according to the users and devices involved. There are four different blocks in these diagrams depicting the following usage variants: 1) Content Creators using a mobile phone (dark blue), 2) Content Creators at a desk (pink), 3) Content Creators either using a mobile phone or a computer (yellow), 4) Prosumers (blue).



*Figure 3: Diagram blocks depicting the four usage variants*

Next to these blocks representing the steps of the process, you will find hexagons (in the colour petrol) that show which MediaVerse component will support these steps.



*Figure 4: Elements visualising the MediaVerse components*

The details of these diagrams will be described in the Use Case section.

## 3 Use Cases

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This chapter will describe the actual Use Cases with their Scenarios and User Journeys, but before that we would like to clarify some general aspects, especially who would use the platform and for what, on a very general level.

### 3.1 User Roles

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One major area where the specification of the scenarios helped clarify user requirements was a core question: who will use the system? The many areas of the MediaVerse platform will serve and support the needs of different user groups.

First and most obviously there will be A) users who create and manage content on the one hand, and B) people who consume the media content created on the platform on the other. However, as described in the Use Cases, consumers may become creators (prosumers) and also the first group (A) will have varying needs and interests as the following paragraphs aim to explain.

The group A of people who create and manage content covers a range of tasks that may result in different usage rights. When two or more people create content together there will be at least one person who starts the process which may include assembling the team, creating a project, and eventually publishing. We call this first role “Project Owner”. Everyone who contributes to the creation of content will belong to the second group of “Content Creator”. Both groups will participate in the content rights, but only project owners will have the right to publish or unpublish the content.

At the other end of the media production chain would be the “Consumer”. According to the current state of the discussion, Project Owners can publish content on the MediaVerse platform or export it to other platforms outside MediaVerse. What is published on MediaVerse can be viewed or experienced by any visitor of the platform without the need to register or log in. As soon as someone wants to participate in the process of content creation, which, for instance, would be an essential aspect of Use Case 3, they would have to register so that their rights can be tracked, and their contributions monetised.

On the system level, there will have to be a person who can set up and configure a MediaVerse instance and grant users’ access to the system. This role we call “Admin”. Similar to the above, it may be possible that users invite other users and grant them access. The exact definition of this process, i.e., whether users can actually grant each other users’ access and publishing rights, is also in progress. For example, as the area of Content Moderation still needs to be specified more closely, there will also be an agreement on how to handle MediaVerse projects in which inappropriate content was found. The consortium has not yet agreed whether there should be an option to block or ban users or content, e.g., in the case of someone publishing inappropriate or harmful content or in other cases of inappropriate behaviour, e.g., towards other users. The concept of a decentralised system may conflict with the idea of banning users or content from the platform. This area will certainly involve a discussion on legal and ethical questions and some strategic decisions.

### 3.2 Use Case 1: Citizen Journalism

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“Citizen journalism is a concept in media that refers to journalistic activities of ordinary people. It means citizens themselves report the issues confronting them. Citizen journalism has enabled people to raise their voice on what they feel needs attention.”

Citizen Journalism (CJ) as described above is gaining importance. Political and economic crises around the world, and the need of internet users to get news more quickly than ever, have increased the dynamics of reporting. Whether it is police brutality against peaceful “Black Lives Matter” protesters, marches against authoritarian regimes like the ones in Hong Kong in 2019/20, or manifestations against the COVID-19 measures, “ordinary people” on location are now able to report easily and quickly.

A CJ can upload their contribution to MediaVerse through the MediaVerse STXT node so that all the material provided by citizen journalists can be distributed within the network of nodes. MediaVerse authoring tools allow creative editing of CJ videos, and accessibility features ensure that subtitles can be added (automatically, but with a human in the loop). A social analytics engine will report the impact and performance of media assets sent through the network of nodes and also provide information on trending topics and themes.

In the first scenario we tell the story of a freelance journalist working for SWI<sup>7</sup> as the international unit of the Swiss Broadcasting Corporation in Great Britain. He uses the mobile phone to record an interview with a participant in a demonstration and publishes it in a MediaVerse node.

The second Scenario is basically complementary to Scenario 1, i.e., they can be read as one but will also work individually.

*Table 7: Overlapping and diverging aspects of the UC1 Scenarios*

| SCENARIO | TITLE                   | METHODOLOGY                  | FORMATS                                 | DEVICES  | ACCESSIBILITY | USERS INVOLVED                           |
|----------|-------------------------|------------------------------|---|--|---------------|--|
| 1        | Citizen Journalism      | User generated content (UGC) | 2D Videos, Images                       | mobile devices, digital cameras, computers               | CC, Subtitles | Citizen Journalist, Freelancer, Prosumer |
| 2        | CJ Immersive Journalism | User generated content (UGC) | Interactive 360° video, Digital objects | 360° cameras, mobile devices, digital cameras, computers | CC, Subtitles | Citizen Journalist, Freelancer, Prosumer |

### Content Creator

Today, it is important that news content can be produced on site, any time, and on mobile devices. The technology makes that possible and does at the same time mean low production costs. This enables fast and uncomplicated reporting from crisis areas, for example during violent demonstrations or in war zones. In these contexts, the possibility of anonymising content is also vital to protect the journalist.

These materials are best suited for online distribution, for example also by professional journalists supplying materials online.

<sup>7</sup> <https://www.swissinfo.ch/eng>



Figure 5: Citizen Journalist at work

### Target users

The target groups listed below are intended to give an overview of who adds content with which connections to a MediaVerse node. This list can be extended as required in the course of the project:

- Citizen journalists, freelancers
- Journalists working in crisis areas
- Professional journalists who supply materials online

The following list shows, in relation to the role, the possible dependencies in terms of content creator and content owner. Based on these relationships, different licensing models or monetisation methods governing content use will be required.

Table 8: Content creator and owner relationship

| ROLE                    | PRODUCER                          | RELATIONSHIP                                  | CONTENT OWNER                      | LICENCE AGREEMENT                                | MONETIZATION                   |
|-------------------------|-----------------------------------|---|------------------------------------|--|--------------------------------|
| Citizen Journalist      | Produces content for him-/herself | No dependencies                               | CJ                                 | The purpose of use is determined by hi-m/herself | Not predefined, Multiple modes |
| Professional Journalist | On contract of his/her customer   | Customer (Public) Broadcasters, e.g., SWI, DW | Customer (Publisher e.g., SWI, DW) | The right to the content belongs to the customer | Commission basis or Free       |

### Content consumer

Media companies that can expand their offer with more content, this applies to both public broadcasters and private media. Usually, the rights to the content belong to the broadcaster. The use of the content is regulated in separate usage rights. In Switzerland, for example, there has been a regulation since 2018<sup>8</sup> that makes that possible. The public broadcaster shares their content on the so-called Shared Content platform<sup>9</sup> that can be accessed and re-used by the private media. Today there are 68 such private publishers that use this option. The usage and republishing of the content are free of charge.

### Media companies

- Public Broadcasters
- Private Media Publisher

In the case of Switzerland, private media can re-use the contents produced by the public broadcasters.

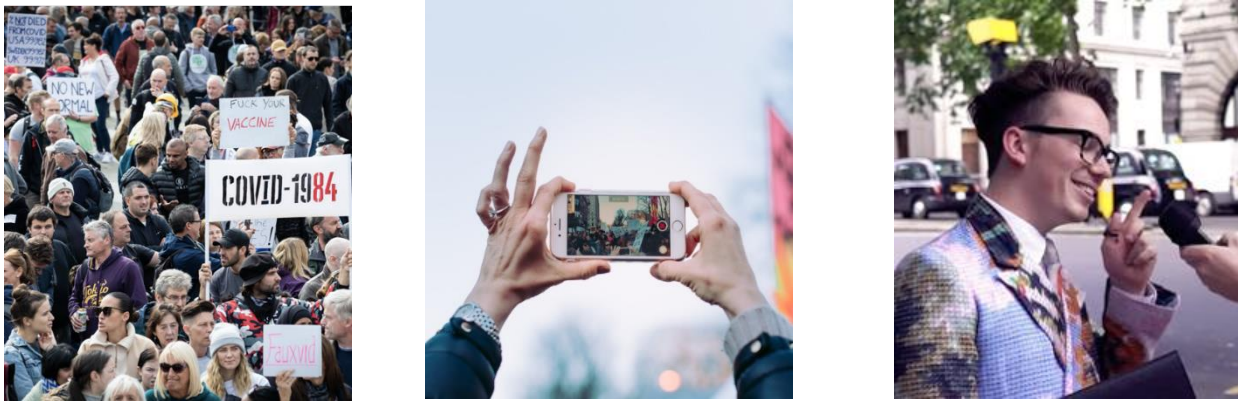
<sup>8</sup> <https://www.srgssr.ch/de/news-medien/news/oeffnung-der-archive-der-srg-ssr-fuer-schweizer-medienhaeuser-ueber-die-shared-content-plattform>

<sup>9</sup> <https://sharedcontent.srgssr.ch/>



### 3.2.1 Scenario 1.1: Citizen Journalism

We are looking at the Scenario of Henry (42), a freelance journalist who films a Swiss protester in London.



*Figure 6: Mobile recording of content at a live demo*

"Stopped die falschi Corona-Politik - Stop the wrong Corona politics" Henry (42) hears one of the protesters shouting. He is amazed to hear Swiss German in the middle of London. Henry, a Swiss-English dual citizen, works as a freelance journalist in Great Britain, Germany, and Switzerland. Henry mainly writes for SWI swissinfo.ch - the International Channel of the Swiss Public Broadcaster in English. He does not want to miss the opportunity of filming a Swiss-German protester in the streets of London. That is why he pulls out his smartphone and starts filming. The man becomes aware of Henry and comes to speak to him.

In the conversation that follows, which the journalist also records, the protester tells his touching story: Due to the current international Corona policies, he cannot visit his mother in Switzerland, who is in hospital with COVID-19. With the recording of this conversation and the video of the demonstration, Henry has filmed enough material to prepare a clip. He was able to do this with just his mobile phone and without any expensive camera equipment.

Henry publishes his clip on SWI. He knows that the video material is also made available on the SRG Shared Content platform called MediaHub using the Citizen Journalism app and the platform in the background where he uploaded the clip. MediaHub (as a stand-alone workflow-based system connected with MediaVerse through an API) provides closed captions for the uploaded video contributions to make the content accessible for the hard-of-hearing but also automatically generates subtitles in English. Sometimes Henry improves the subtitles manually directly via a web editor to ensure the quality of the closed captions and subtitles. The system afterwards automatically generates subtitles in German, French and Italian. Henry does not need to worry about the quality of the additional subtitles generated in this way because he knows that someone from the SWI editorial department will re-check them and adjust them if necessary. In addition, the SWI editors can also edit his articles again directly on the platform.

Private publishers in Switzerland also have access to the platform and can use Henry's content free of charge, thanks to a political initiative. The platform is based on Blockchain technology, so Henry's content is stored in the decentralised system and can be clearly attributed to him. Thanks to Smart Contracts in the Blockchain, the rights of use of the content are clearly defined and he can even be paid for his content in crypto currencies.

Henry likes the idea behind the shared content platform which is also linked to other platforms like the MediaVerse (a network of similar platforms). Thanks to this content hub, media houses throughout Europe have access to the content Henry has published. MediaVerse also supports blockchain technology and therefore offers the same conditions as the Shared Content platform. In addition, a freely accessible programming interface of all hubs is available. This allows software engineers and SMEs throughout Europe to work on its further development.

Back in London, Swiss expatriate Betty listens to the latest news from SWI in Switzerland via her Google Home™ Smart Speaker. She has subscribed to Henry's news channel. A friend of Henry's is a software developer and has programmed this Smart Speaker channel. He has teamed up with a few colleagues during a hackathon, which was made possible thanks to the freely accessible programming interfaces (National API of PSB). Betty is struck by the protester's moving story. In the evening, she watches the news on the BBC1 and sees a report on demonstrations in London. Interesting: She thinks she has already heard some of this. Indeed, thanks to MediaVerse, even the BBC has used Henry's video footage for its report.

3.2.1.1 UC 1 Scenario Diagram

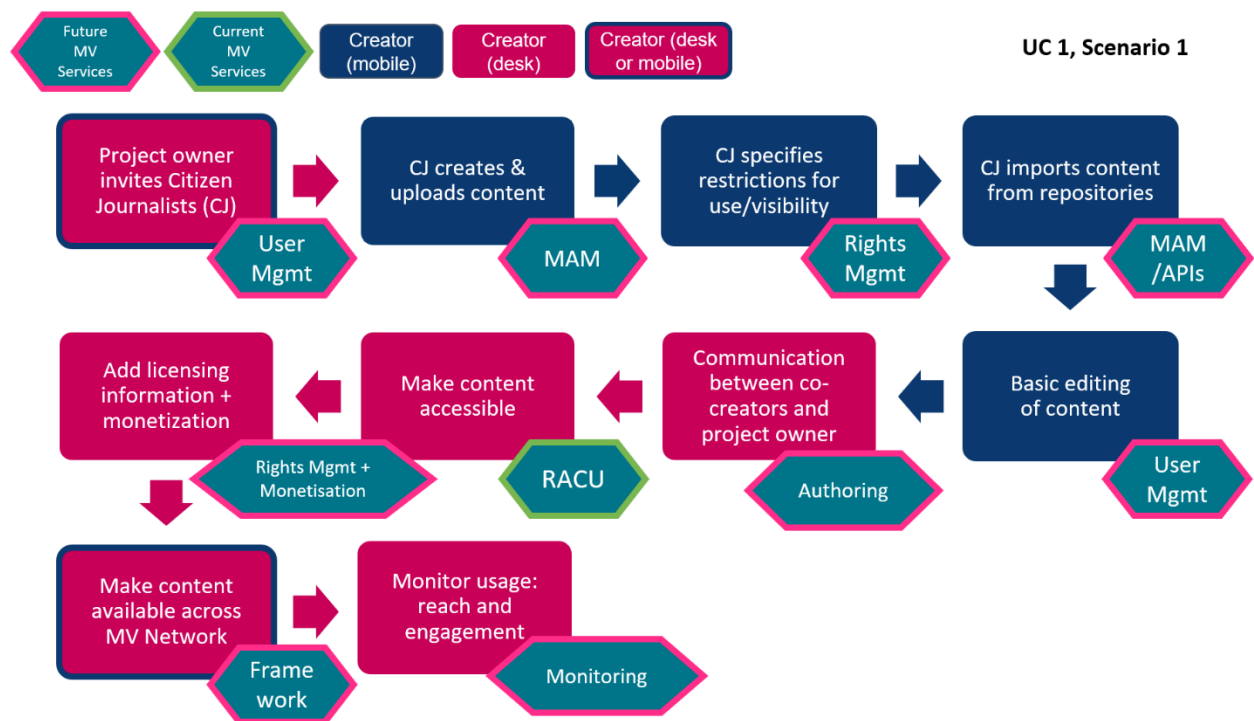


Figure 7: Flow Diagram for Scenario 1.1

The tables below describe the steps of the User Journey. UC 1 starts with two scenarios, the following actions are derived from scenario one.



## 3.2.1.2 UC 1 User Journey

Table 9: First Stages: On-Boarding, Topic Selection

| PHASE        | AWARENESS  | ONBOARDING   | TOPIC SELECTION   |
|--------------|--|--|---|
| Step         | <b>JOIN MEDIAVERSE CO-CREATION PROCESS</b>   | <b>JOIN MEDIAVERSE</b>   | <b>SELECT TOPIC FOR NEW MEDIA ITEM</b>  |
| User goals   | Encourage new user to (co-)create content in MediaVerse  | Registration, Log-In   | Find/choose/agree on topic for a new MediaVerse "project"   |
| User actions | <p>A CJ should/can be invited by his contractor (broadcaster/publisher) to use MV via double opt-in invitation.</p> <p>There would need to be an administration of users, the administrator can block individual users in case of abuse.</p> <p>Role-based user management should be possible</p> <p>MV could be used as a kind of label and could also be promoted and established under it</p> | A CJ should be able to show his qualifications, e.g., press card, or similar to an accreditation for journalists                     | <p>Most topics are driven by daily things that happen, social issues or political events.</p> <p>A CJ may be mandated by its editor to work on a specific topic</p> <p>Co-creators can begin to communicate, suggest, discuss possible topics</p> |
| Issues       | <p>Lack of credibility</p> <p>no trustworthy partners</p> <p>Diversity of offers</p> <p>Lack of added value</p> <p>Poor handling</p>   | When using certain content, such as that of public service broadcasters, it is important to ensure that the conditions are respected |   |
| Ideas        | MV could be used as a kind of label and could also be promoted and established under it  | A simple and effective verification of the user is needed (e.g., comparison with an existing user database)                          |   |

Table 10: Content Creation

| PHASE        | CONTENT CREATION  |   |  |   |
|--------------|---|---|--|---|
| Step         | UPLOAD NEW CONTENT  | USE EXISTING CONTENT  | EDIT CONTENT   | MAKE EDITING DECISIONS  |
| User goals   | Make content available for own use / use by others  | Search and retrieve content from other MV Nodes or Social Media accounts  | Adapt, enhance, annotate content to the needs of this project  | Communicate and decide about possible changes   |
| User actions | <p>Specify restrictions for use/visibility:</p> <p>It should be possible to provide this information for each use</p> | <p>Search Social Media channels and image (Video) databases</p> <p>Filters:<br/>Categories (Politics, News, People, etc)<br/>Relevance<br/>New (date)<br/>Downloaded<br/>Popular<br/>Medium (Video, Image etc)<br/>Journalist / Editor<br/>Country / Region</p> <p>Type of use (free, licence type)</p> | <p>Edit media, e.g.:</p> <ul style="list-style-type: none"> <li>- Add overlay (text, stickers, picture, )</li> <li>- Cut Scene</li> <li>- Crop</li> <li>- Add scene</li> <li>- Thumbnail selection/changing</li> </ul> | <p>Chat functions could be instant chat for short and immediate messages. It may also be necessary to communicate by email, as an email can also contain information about the type of use.</p> <p>The rights to modify the work should be made known by the creator of the original by specifying the intended use (Creative Commons).</p> |
| Ideas        |   | <p>Filters should be flexibly expandable</p> <p>Personalisable filters</p> <p>"my Filter</p> <p>Free text filter</p> <p>Connection of OSS image and video data banks would still offer added value</p>  | Export from one ratio to another. e.g., for 4:5 / 9:16 for an IGTV format  |   |

Table 11: Accessibility, Publishing, Monitoring

| PHASE        | ACCESSIBILITY   | PUBLISHING   |  | MONITORING  |
|--------------|---|--|--|---|
| Step         |   | ADD LICENSING INFORMATION  | MAKE CONTENT AVAILABLE   | USAGE ANALYSIS  |
| User goals   | Make content accessible                                       | Specify usage permission, cost model   | Offer content to users/customers   | Monitor and track usage of content  |
| User actions | add:<br>- Subtitles<br>- Translations<br><br>- Closed Caption | All MV Users should see the content. The use of the content is regulated with the licensing after the rules of for instance "Creative Commons"       | Search across all MediaVerse Nodes.  | Get information about where the content has been used in order to determine the reach, or engagement  |
| Ideas        |   | It would be useful to use the content in accordance with Creative Commons. The use of content should be regulated and controlled by using blockchain | A User needs to know how much is the reuse or publishing fee for a specific content (Monetisation) | How many people have viewed or used the content is important information and should be measured like conversions View/Use<br><br>Reach:<br>- Impressions<br>- Reach<br><br>Engagement:<br>- Comments<br>- Shares<br>- Favourite<br>- Clicks |

### 3.2.2 Scenario 1.2: Immersive Journalism

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The demonstration has reached Trafalgar Square and people are gathering here, slowly filling the square. Henry has placed himself on top of the steps near the statue of King George IV to get a better view. So many things happen around him that he has a hard time deciding where to point the camera. This is a great opportunity to use his 360 degree camera: it points in all directions at once and the journalist can enhance the scenes later. The camera is put in a suitable place to take a 360 degree film which Henry uploads to his MediaVerse library (the storage for his media content).

Henry selects one of the XR authoring tool's handy templates, "Mass Event", which provides some very useful best practice tips as to how to best enhance his basic image with relevant additional media and information. He follows these tips and adds 2D images, audio sequences, text banners, and plates to help his audience grasp the atmosphere of this demonstration. Within minutes he has produced quite a decent first version which he shares with the editors who can then check and publish.

His editor, Mary, doesn't want to waste time as the viewers are craving for information on this controversial demonstration. She publishes a link to the 360° film to the main website where the demonstration is featured as a top article. An event like this is both hot news and an important event for so many Londoners that Mary starts preparing a high end version in parallel. Based on Henry's first "quick and dirty" version, Mary and her team add further footage and images of demonstrators, police, and bystanders, interviews that were taken after Henry's first upload, and even posts on social media. As these additions need to be treated with care concerning personal rights and intellectual property, Mary and her team add the required rights information for each asset, and only after they have cleared the rights following their usual workflows.

Graham and Laura have been following the news in their home in Muswell Hill. Now they feel the need to join the demonstrators, and they keep scanning the media on their way into town to make sure they don't get caught in any violence. They are relieved when Laura receives a chat message from her friend Carol that contains a link to a 360° video. "Look at this! Looks fairly safe, I think!" It shows that the demonstration on Trafalgar Square, while there are lots of people, is quite peaceful. Holding the smartphone at arm's length and turning all ways Graham and Laura almost feel like they are already in the midst of the action. Clicking on the hotspots to hear interviews with police officers on site or listening to the relative silence on the square reassures them further.

Meanwhile they have arrived at Charing Cross and they can hardly push through the massive crowd. Graham takes a short video of the crowd of what are clearly peaceful demonstrators, though many of them without masks. Laura encourages Harry to upload the video to the website they saw. She had seen a red banner there asking users to share their recordings. Graham thinks this may be important information for other people like them and he uploads the clip, adding his name, and a short caption ("peaceful protesters at Charing Cross") and clicks the "free to use" checkbox.

Back at the studio, Mary receives an "incoming content" alert, checks the video, likes it, contacts the contributors in a short message and adds their content as soon as all rights are cleared.

### 3.3 Use Case 2: Co-creation of New Media Formats

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The initial scenario described by UAB during the proposal was targeting a summer camp that takes place every year at UAB. This summer camp is oriented to around 400 teenagers with ages between 14 and 16 years. Due to the COVID-19 outbreak, this summer camp together with many other similar activities in Spain have been cancelled or postponed until health conditions offer a safe space to execute them. As a result, UAB envisaged three alternative scenarios for MediaVerse, where the initial concepts (co-creation of new media formats and accessibility) are kept. To develop these new scenarios, different entities and freelance professionals working with vulnerable groups (i.e., elderly, young migrants, people with cognitive disabilities) were contacted. Interviews were conducted in order to gather initial requirements. The inputs provided identified situations and problems, most of them augmented due to the COVID-19 pandemic, for which MediaVerse could offer possible solutions. Three Scenarios were proposed to guide the development of the Use Case. All three scenarios target different types of users, media formats, and co-creation methodologies, and accessibility features. In the current iteration of user requirements (D2.1), a first scenario has been prioritised and fully developed due to the initial interest shown by UAB's stakeholders and its potential impact. Two other scenarios will be further developed with new groups of stakeholders before the piloting phase. Therefore, so far, it is only possible to provide a first concept description for scenarios 2 and 3.

In the table below, there is a summary of the three scenarios. For each scenario, the following aspects are explained: the co-creation methodology, the media formats that will be used, what accessibility services are considered and what users will be involved (as consumers, content creators, or both).

The methodology basically refers to the content creation workflow. In general, it is expected to start with basic co-creation features, to evolve towards more distributed and complex co-creation scenarios. The formats column presents the media formats that are expected to be used, depending on the authoring tools available at each stage of the project. In terms of accessibility services and content, the scenario will explore what opportunities the MediaVerse platform will offer. The last column describes potential users identified for each scenario. Their roles are detailed in the following sections of this deliverable.

Table 11: Overview of UAB Scenarios

| SCENARIO | TITLE                              | METHODOLOGY                                 | FORMATS                                     | DEVICES   | ACCESSIBILITY                                       | USERS INVOLVED <sup>10</sup>   |
|----------|------------------------------------|---|---|---|---|--|
| 1        | Interactive Immersive storytelling | Co-creation in small teams                  | Interactive 360, Digital objects            | 360° cameras, mobile devices, digital cameras, computers                    | CC, AD, SL embedded in 2D videos within 360° scenes | People with cognitive disabilities, young migrants, elderly and their families, facilitators |
| 2        | Co-creative storytelling           | Distributed co-creation                     | 2D videos                                   | mobile devices, digital cameras, computers                                  | Co-created CC <sup>11</sup>                         | Young migrants, facilitators   |
| 3        | Distributed performances           | Distributed co-creation involving creatives | 360° videos, regular videos, virtual spaces | 360° cameras, mobile devices, digital cameras, computers, HMD <sup>12</sup> | Tbd   | People with cognitive disabilities, familiars, and facilitators                              |

The focus of the three scenarios is on co-creation processes using MediaVerse’s authoring tools for new media formats and accessibility.

**Co-creation of new media formats:** How could new media formats (i.e., interactive immersive storytelling) support overcoming some social challenges vulnerable communities are facing? This is a question for which UAB will seek answers in this Use Case. This is of special interest in order to explore alternative ways of using media content and making new formats available for a wider range of users (i.e., accessible, easy to create). This can be strategic to accelerate the market adoption of formats like 360° videos in sectors like mental health and social integration. It is important to highlight that not only the content created is relevant, but also the process of creating it. Involving vulnerable collectives of people in the creation process could contribute to its empowering, stimulate creativity and autonomy.

**Accessibility:** This Use Case, together with UC1, will focus the accessibility services and functionalities offered, both for traditional and immersive formats. In the latter, research will be conducted focusing on the addition of closed captions. Accessibility is foreseen from two different perspectives: creation of accessible content and consumption of accessible content. As detailed in Table 12 below, users are different. Creation and distribution of accessible content will be mainly oriented to facilitators, people with no particular accessibility needs that work with vulnerable users. On the other hand, users with accessibility barriers (i.e., people with cognitive disabilities or language barriers) will be able to access and consume content through accessible user interfaces designed and implemented following existing standards.

<sup>10</sup> Users for these scenarios might change as the project evolves and the piloting phase is further defined.

<sup>11</sup> Includes automatic translation into several languages.

<sup>12</sup> The relevance of Head-Mounted Displays (HMD) for this Use Case can be explored

Table 12: Overview of scenarios, accessibility tools, features, and users<sup>13</sup>

|                                       | SCENARIO 1   | SCENARIO 2  | SCENARIO 3  |
|---------------------------------------|--|---|---|
| Accessible content creators           | Facilitators   | Young migrants, facilitators  | Facilitators  |
| Accessibility tools                   | CC, AD, SL for traditional video,<br><br>Automatic CC generation system                                | CC, AD, SL for traditional video,<br><br>Automatic CC generation system,<br><br>Distributed accessible content management | CC, AD, SL for traditional video,<br><br>Automatic CC generation system,<br><br>Distributed accessible content management     |
| Accessible content consumers          | People with cognitive disabilities, general society  | Young migrants and general society <sup>14</sup>  | Young migrants, people with cognitive disabilities, elderly, and general society  |
| Media players accessibility features. | Accessible UI to navigate accessible content,<br><br>CC, AD, SL rendered in regular videos/360° videos | Accessible UI to navigate accessible content.<br><br>CC, AD, SL rendered in regular videos                                | Accessible UI to navigate accessible content,<br><br>CC, AD, SL rendered in regular videos,<br><br>CC rendered in 360° videos |

### Target Groups

Vulnerable people are at the centre of this Use Case. The scope is to have a wide range of vulnerable groups represented, including either vulnerable people, or professionals working with them (i.e., facilitators). Users' associations representing vulnerable groups, like [Som Fundació](https://www.somfundacio.org/en/)<sup>15</sup>, have already been approached and engaged in the project. Their participation is critical to contribute with their experience and the needs of their users (i.e., people with cognitive disabilities). This entity, among others, together with their users will be also involved in the piloting phase. Som Fundació's *"main objective is to provide the necessary support for the decision-making to people with intellectual disabilities so that we defend their rights and ensure their welfare, accompany them in their integral development, and their social inclusion."*<sup>16</sup> At the moment of preparing this deliverable, other similar entities are being contacted and engaged to participate in a similar way. UAB has been invited to participate in a creative residence called Faberllull<sup>17</sup> in mid-April. During this residence, different activities organised by UAB will explore the potential of the MediaVerse concepts. These activities will involve different types of users (i.e., young migrants, social workers, music therapists, creatives, NGOs) to discuss and experiment in a practical way how MediaVerse's authoring tools can contribute to social and individual development. It is expected that new requirements will be gathered to enrich the definition of all three scenarios and contribute to the definition of the pilot.

<sup>13</sup> Users for scenario 2 and 3 might be adjusted in the future.

<sup>14</sup> Understanding that people from foreign countries have to deal with language barriers.

<sup>15</sup> <https://www.somfundacio.org/en/>

<sup>16</sup> <https://www.somfundacio.org/en/supports/>

<sup>17</sup> <https://faberllull.cat/en/residencia.cfm?id=39154&url=science-technology-and-humanities-or-science-and-digital-humanities-.htm>

### 3.3.1 Scenario 2.1: Interactive immersive storytelling

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The objective in scenario 1 is to create an immersive experience, enhanced with interactive elements, that follows a storyline. For example, users with cognitive disabilities from Som Fundació (SF users) face daily activities like cooking, or taking the metro, that can be challenging to them (e.g., where to purchase the ticket for the metro when travelling alone, how to heat your dinner up, how to do recycling). Content generated can be used as training material for users with low levels of autonomy, increasing their capacity for decision-making in certain contexts. This scenario describes a group of prosumers that team-up to generate this training experience. This prosumers' profiles span from facilitators, psychologists, to users with cognitive disabilities. All together will identify challenging situations in their daily life and will create a decision-making experience within a 360° immersive narrative, like a video game. Other users with similar needs (i.e., people with cognitive disabilities) will be able to enjoy the experience, and learn in a very interactive and innovative way, how to solve situations that might be new or difficult for them to solve. The immersive content will combine 360° videos, with regular 2D videos and images. Content will be made accessible using MediaVerse accessibility tools. It will be also part of the scenario how users will consume it through MediaVerse and its user interfaces (UI).

The overall process starts with a group of facilitators (e.g., Raul and Anna) at SF agreeing on a project idea (i.e., “How to manage a metro trip in Barcelona on your own”). The team assembles and creates a project within the MediaVerse platform. There will be a project owner (Anna) who will invite other peers (Alexia and Maria who are facilitators as well) to join. An on-boarding sequence will guide new users on how to proceed and get familiar with the interface. Anna, the project owner will be able to assign roles within MediaVerse (e.g., Raul is project owner, but Alexia and Maria are only contributors with editor rights). All of them together will sketch the overall structure of the project (e.g., the scenes). When co-creating, it is important to have a common understanding of what is expected to be achieved and to foster discussion among participants. Thanks to MediaVerse, the team that normally does not work on the same physical space, is capable to kick-start this project together in a very easy and participatory manner.

All facilitators agree to involve some of their users as “actors” and “content creators”. Alexia and Maria will meet with two of their users, Marc and Toni, to explain them the project idea. They are very excited to do something creative and related with video and cinema. The whole team, including Marc and Toni, will meet and go together to start recording using different devices (e.g., smartphones, 360° cameras, digital cameras, etc.). Anna and Victor will be indicating what has to be recorded, Alexia will support Marc and Toni during the shooting and act. The first scene they will shoot is where to purchase the ticket. Toni will be at the centre of the scene suggesting doubts on where to go. Another scene will follow showing the moment to decide what stairs to take in order to reach the right metro line. Once recording is done, content will then be ingested into MediaVerse. Once shooting is over and they are happy with the content, the project will now continue online using MediaVerse.

From the MediaVerse media library facilitators and SF users will select the best footage to be included as part of their project. Most editing will be done by facilitators (Alexia and Maria have more expertise in doing it), and will take place using third party tools (e.g., Insta360™ software, Adobe Premiere™). The overall project creation will take place within the MediaVerse platform (e.g., using the XR authoring tool FADER). Participants of the project will be adjusting the project and its content in a distributed manner, each one taking care of a task assigned: Raul and Anna will generate hotspots with interactive content and for the navigation through scenes. Alexia creates interactive scenes based on the edited content and the indication provided by Raul. Alexia will generate and edit accessible content. Raul will insert 2D static content and regular video, whilst Anna will manage copyrights and supervise the overall project. If anything is not clear or needs some additional work, Anna will add comments in the scene for the others. The project will grow organically, with users interacting, editing, and co-creating both in and outside the MediaVerse platform. It is very natural for them to work in that way: Exchanging opinions



using traditional communication tools like Whatsapp, adding notes to reference pending modifications in MediaVerse. The process is very smooth and changes can be seen in real time, thus collaboration is very easy. Using the copyright management tool, all users involved will be listed and recognised. They do not expect to exploit the content now, but they ensure that no one will use their videos without permission or for any other purpose.

Finally, the project is ready, and it is exported in different formats. Automatically, MediaVerse will generate adapted video teasers for the most common social networks (Instagram, Whatsapp, Facebook, TikTok). The full experience content will only be available in MediaVerse. Anna and Raul will send the link to the exported asset to SF's users to consume it on tablets, smartphones, and laptops. At SF facilities some users will be able to use cardboards to enjoy the experience. Raul, as head of communication at SF, also shares the teasers via their social networks (SN) to disseminate the experience.

The current version of this scenario has evolved from the initial concept, moving from a basic co-creation scenario to a more complex and elaborated structure. In the current scenario description, the main focus is on remote co-creation processes and to explore as many possibilities as possible. Another important modification from the original version is that interactive and immersive features are considered, and the main format used is 360° video.

3.3.1.1 UC 2 Scenario Diagram

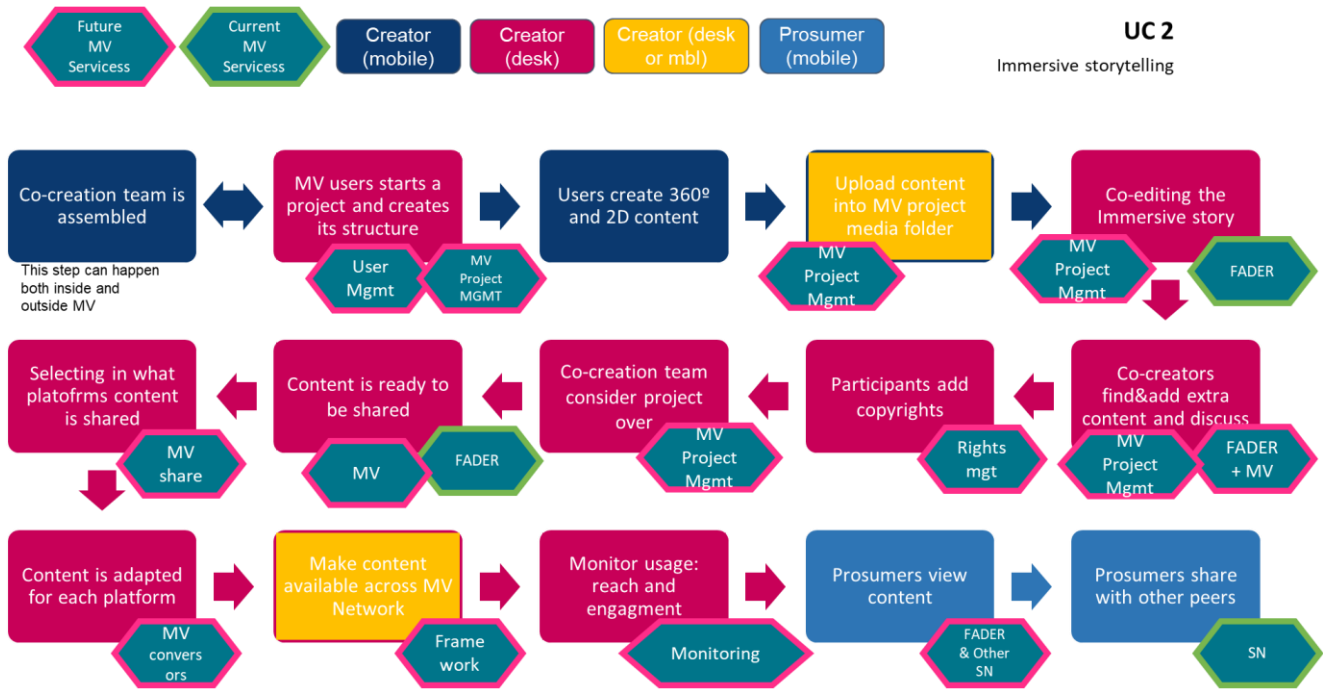


Figure 8: Flow Diagram for Scenario 2.1

The tables below will describe the steps of the User Journey. As this Scenario involves multiple roles with different tasks along the process, we added two more rows to describe “user actions” of these roles. In order to describe the process in further detail, we also added columns within the different steps which describe what users will do in this Use Case.

### 3.3.1.2 UC 2 User Journey

Table 13: First Stages: Onboarding, Project Selection and Management

| PHASE   | ONBOARDING /<br>TEAM ASSEMBLING   | PROJECT<br>SELECTION  | PROJECT MANAGEMENT   |   |
|---|---|---|--|---|
| Step  | JOIN MEDIAVERSE   | PARTICIPATE IN A PROJECT  | SEE PROJECT STATUS AND<br>PARTICIPANTS   | JOIN DISCUSSION<br>BOARD  |
| User goals  | Registration, Log-In,<br>Understand platform  | Create or join an<br>existing project   | See users involved in<br>the project,<br>discussions, latest<br>updates, project<br>content library  | Join the task<br>management<br>board, check<br>pending tasks and<br>chat with active<br>users   |
| User actions:<br>project leader                                     | When the users<br>register, they can get a<br>tour that shows the<br>highlights and main<br>screens.<br>The user can skip it or<br>watch it again, if<br>necessary.   | There is a screen<br>where projects can be<br>selected, or a new one<br>can be created. The<br>opening screen offers<br>different options:<br>"regular video", 360<br>experience, VR. We<br>select 360 experience.<br>I will also be advised<br>of what platforms I<br>will be able to export<br>the project created in<br>MV, facing limitations<br>like | Once the project is<br>created, there is a<br>dashboard where I<br>can select several<br>options: invite<br>external users, link<br>previous projects and<br>media assets, make it<br>public or private, a<br>description, add a<br>discussion chat, add<br>task management. | As project leader I<br>can create a few<br>tasks to some of<br>the participants I<br>have invited, and<br>we can also have a<br>"slack" system to<br>discuss on content<br>available and<br>validate it or<br>suggest<br>modifications. |
| User actions: co-<br>creators (app<br>installed/user<br>registered) | I receive an invitation<br>to join a project. I can<br>see who invited me and<br>info about the project. I<br>can accept or reject. If I<br>have doubts, I have a<br>help section to see how<br>to participate.   | I accept the invitation<br>and can see my roles<br>and all the<br>information that I<br>have been granted<br>access to.   | The project is added<br>in my dashboard and<br>I can interact with<br>other users.   | As user, I can<br>participate as far as<br>I have permissions<br>to "discuss" or "add<br>comments".   |
| User actions: co-<br>creators (new<br>user)                         | I receive and invitation<br>to join MV. It is<br>explained what the<br>project is and who<br>invited me (a personal<br>message can be added<br>by the "inviter"). I can<br>also see info about MV<br>and how to become a<br>member (what steps<br>are necessary and how<br>it works). |   |  |   |

Table 14: Content creation stages (part I)

| PHASE   | CONTENT CREATION  |  |   |   |
|---|---|--|---|---|
| Step  | ADD NEW CONTENT<br>(360+2D+PHOTOS)  | NAVIGATION TREE  | BROWSE CONTENT  | DISCUSS CONTENT   |
| User goals  | Generate content and upload it into a personal or shared repository. This can be done from a mobile device, or in case files are large, directly connecting a mobile device (360 camera, smartphone) to a laptop.   | Create the project structure in an easy and visual way.  | Browse existing content, preview it. Metadata related to the asset can also be visualised.                          | Media assets can be discussed and commented among users.  |
| User actions:<br>project leader                                 | I have my shooting kit (360 camera + mobile phone, microphone + tripod) with what I record content. I send it from my camera (360 or smartphone camera) into the mobile phone and from there into my "media library" in MV. If the file is too big, then I have to wait until I get home or connected to a WIFI to upload the content. I can also add access permissions. | I can sketch the overall project structure.  | I can browse and search using keywords to find existing content (web or app) created by other peers and preview it. | I can add comments to the existing content and mention other users. Can we have a chat? Can we have an asynchronous communication channel (i.e., Comments?) |
| User actions:<br>co-creators<br>(app installed/user registered) |   |  |   |   |
| User actions:<br>co-creators<br>(new user)                      |   |  |   |   |
| Issues  |   | For non-linear stories, navigation trees can be complex. It would be necessary to generate a visual interface to help users understand the overall navigation. | coherent UI where users can explore all content and use it in the different authoring tools.                        |   |
| Ideas   |   |  |   | In general, for chats and communication tools perhaps it would be good to integrate existing tools.   |

Table 15: Content creation stages (part II)

| PHASE   | CONTENT CREATION  |  |  |   |
|---|---|--|--|---|
| Step  | MANAGE CONTENT  | SCENE CREATION   | HOTSPOTS   | CONTENT EDITING   |
| User goals  | Organise content in folders, shared it with other partners/project participants, download it for offline editing  | Create interactive scenes combining different content formats.   | Add hotspots with interactive properties.  | Edit media assets of different formats to be adjusted. (i.e., Trim, cut, split, add audio, titles, adjust size or speed, etc.)  |
| User actions: project leader                              | I can delete or add content to a specific folder to structure it (in scenes for example). I can also modify properties (access rights) or the file info (metadata including copyrights). I can also assign tasks to that content (trim it, make it longer, etc.). | I can create new scenes or modify existing ones. This is particularly relevant for 360. What about regular videos? | Create hotspots in an interactive scene. Possible required actions: click and bring me to another scene, display content (2D overlayed on a 360 scene). Can we add additional hotspots within a hotspot? Position of hotspots (fix on a scene, or relative to the viewer perspective). | I can use MV tools or external tools to edit content. If it is external, then it would be good to automatic synch my MV folders/content with the content I edit with the external tool. (plugin style?) |
| User actions: co-creators (app installed/user registered) |   |  |  |   |
| User actions: co-creators (new user)                      |   |  |  |   |
| Issues  |   |  |  | Will there be an android or iOS MediaVerse app? How to make the workflow between MV and external tools smooth?  |
| Ideas   | it would be good to quickly identify existing users.  | Current UI could be more intuitive. Locating objects/assets should be done using drag'n'drop.                      | Hotspots should include new features. One idea is that within a hotspot, additional hotspots can be created.   |   |

Table 16: Copyright management and accessibility layers

| PHASE                        | COPYRIGHT  | ACCESSIBILITY  |
|------------------------------|--|--|
| Step                         | CREDITS/COPYRIGHTS   | ADD ACCESSIBILITY LAYERS   |
| User goals                   | Add participants and externals into the credits (@copyrights section management)   | Add accessibility layer to be displayed in an accessible media player.   |
| User actions: project leader | Creation of a database of participants and copyrights assigned to each role. Copyrights can be also assigned to objects or external content (imported from external collections, etc.) | Add accessibility to 2D video (CC, AD, SL - pic-by-pic)<br>Add accessibility to 360° video (CC overlayed in 2D video). Integrate workflow with RACU, FADER and 2D video player accepting .srt files. Users should be allowed to select different languages and have automatic translation. Capacity to edit already created CC to ensure accuracy. We should also overlay AD and SL, at least, in the 2D videos. |
| Issues                       | Incoming requirements from external projects that might apply to our UC, basically because they have been working on it for a year and have already found the problems.                |  |
| Ideas                        | Try to automatise this process as much as possible.  |  |

Table 17: Publishing and content consumption

| PHASE                                | PUBLISH  |   | CONSUME CONTENT AND SHARE  |
|--------------------------------------|--|---|--|
| Step                                 | PUBLISHING OPTIONS & CONTENT ADAPTATION  | RECOMMENDER/ WARNINGS   | VIEW AND SHARING OPTIONS/CHANNELS.   |
| User goals                           |  |   | View the content (including accessible content) and share in social media. My network of contacts in the SN can also re-share my content.  |
| User actions: project leader         | I can automatically select in a screen where I would like to publish the content. The content is automatically adapted for each one of the selected platforms. | Warnings related to content alterations due to adapting it for publishing into a specific platform. | I can choose how to view the content and in which device. I can select several channels and social media to share (within the MV environment and outside). Select accessible content features in an accessible UI. |
| User actions: co-creators            |  |   | I can choose the device to consume the content and share it in the MV environment and in social media. Select accessible content features in an accessible UI.   |
| User actions: co-creators (new user) |  |   | I can view the content and share it in social media. Select accessible content features in an accessible UI.   |
| Issues                               | Complexity to adapt 1 content to several social media networks. Think of workarounds that at least could facilitate linking MV and the SMN.                    |   |  |
| Ideas                                | Social media icons to select the channel where you want to publish?  |   |  |

### 3.3.2 Scenario 2.2: Co-creative storytelling

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The objective for scenario 2 is to research more on distributed content creation (e.g., users creating content from different locations and using different devices), using more common media formats, and participatory accessible content generation. The workflow in this scenario is complementary with scenario 1 but prioritising more on the flexibility in the distributed creation of content and exploring possible collaborative generation of accessible content. In this case, the main media format will be traditional videos, and a stronger need to create, edit, and assemble the content “on the go”, i.e., some basic content editing, and content exchange happens in mobile devices and without the need to have powerful laptops. This scenario involves to a greater extent the use of MV nodes backbone as a mechanism to discover and acquire content in a distributed fashion.

Another relevant aspect considered in this scenario is how to make content accessible with users contributing with low accessibility knowledge, based on MediaVerse available tools and services. After content is accessible, it will be necessary that users can consume that content according to their needs. This means that the UI and media players have to be accessible. This scenario will be further developed, and it is also complementary to UC1.

### 3.3.3 Scenario 2.3: Virtual Performances

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The objective for the third scenario is to extend the two previous scenarios adding artistic perspectives. Taking as starting point the concept of distributed performances<sup>18</sup>, this third scenario will explore how MediaVerse can contribute to generating artistic performances (e.g., a theatre play) involving vulnerable groups. In this third scenario, it is also foreseen to explore capabilities beyond the authoring tools. Copyright management in distributed performances, blending CGI with recorded content, visualisation in virtual spaces, are some concepts that might get included in this scenario.

There are several groups that support people with physical and cognitive conditions integration through artistic and cultural activities. Due to COVID-19 most of these groups cannot meet. Together with MediaVerse, some of these groups can help explore how to co-create a short theatre play or musical, going beyond traditional formats. Involving prosumers with different skills, they will create a script that will later guide content creation. Each one of the participants can generate content from their own homes or favourite locations, using different media formats (360, regular video, digital objects, CGI, etc.). Together, they can create an artistic representation, that later can be presented in different ways (e.g., in a virtual exhibition or virtual theatre). Accessibility and opportunities for monetising the content created will also be considered.

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<sup>18</sup> [https://www.digitalmeetsculture.net/wp-content/uploads/2016/04/rch\\_thinkpapers\\_02.pdf](https://www.digitalmeetsculture.net/wp-content/uploads/2016/04/rch_thinkpapers_02.pdf)



### 3.4 Use Case 3: Hybrid Intelligence – Experimental Artworks Series

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Hybrid Intelligence is an artistic reaction to the notion of *Hybrid Threats*. According to NATO:

“Hybrid threats combine military and non-military as well as covert and overt means, including disinformation, cyber attacks, economic pressure, deployment of irregular armed groups and use of regular forces.”<sup>19</sup>

The definition above clearly states the contemporary hybridization of military and civilian contexts that, after World War II and until the strong penetration of audiovisual media in societies, were to a certain extent, stable, well defined and in separated fields. That process of hybridization was accelerated with the introduction of digital media.

This proposal for a series of artistic experiments comes in natural sequence with a number of activities that ARTSHARE (AS) has been developing about this very important process of hybridization. In a discussion organized by AS in the European Parliament, in December 2018, the hybridization of military and civilian grounds was debated<sup>20</sup>. In this round-table about cybersecurity of the Internet of Things, artist Jaromil Rojo<sup>21</sup> brought up the need of revisiting the notion of cybernetics, as originally proposed by Norbert Wiener<sup>22</sup> and further developed by Roy Ascott<sup>23</sup>, director of studies of both Jaromil Rojo and Luis Miguel Girão (the artist in residence in MediaVerse) during their philosophical doctoral studies.

Therefore, Hybrid Intelligence aims at designing, refining and implementing a cybernetic loop as the result of human interaction with Artificial Intelligence. The MediaVerse project is strongly based on the notion of automated processes (or Artificial Intelligence) as an enabler and performance enhancer of both general media users and media professionals. This Use Case 3 is willing to push to its limits the possibilities made available by MediaVerse and, by doing so, to inspire all MediaVerse participants (partners, users, and prosumers) to question the purpose of their own actions in general and more specifically of their engagement with social media. That is the authentic role of art in society: to transform consciousness of the ones being exposed to it.<sup>24</sup>

The role of media in the above referred hybridization processes is central. The fact that US President Donald Trump was banned from Twitter and Facebook, not only exemplifies the current crucial role of (social) media, but as well emphasizes the power of media in modern conflict. That specific ban was due to the alleged use of social media to incite mass population manifestations. However, it is just not a matter of the content transmitted but also, and possibly more relevantly, of the mediums used to do so. In this precise case, instant access to content allowed by social media had a tremendous importance in the whole event, to the second.

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<sup>19</sup> [https://www.nato.int/cps/en/natohq/topics\\_156338.htm](https://www.nato.int/cps/en/natohq/topics_156338.htm)

<sup>20</sup> <https://www.youtube.com/watch?v=EmkVHuyI0d0>

<sup>21</sup> <https://jaromil.dyne.org/>

<sup>22</sup> [https://en.wikipedia.org/wiki/Norbert\\_Wiener](https://en.wikipedia.org/wiki/Norbert_Wiener)

<sup>23</sup> [https://en.wikipedia.org/wiki/Roy\\_Ascott](https://en.wikipedia.org/wiki/Roy_Ascott)

<sup>24</sup> <https://pearl.plymouth.ac.uk/handle/10026.1/14748>

*“The medium is the message”, Marshall McLuhan<sup>25</sup>.*

Marshall McLuhan had a very important contribution to this paradigm shift in the way media is perceived. The notion that the way a message is communicated is more important than the message itself is indispensable in understanding how media is evolving nowadays. Media, the medium of transmission of content, determines to a large extent the lives of human beings nowadays. For example, to the ones that were not infected by COVID-19 or do not personally know anyone else that was, it is still something that has been made real by media only, the news. So much so, that a relevant part of the global population think it is all a big conspiracy theory<sup>26</sup>.

Adam Curtis<sup>27</sup>, the famous BBC documentaries director, in his masterwork *HyperNormalisation*, reiterates the idea that reality is indeed a construction by the ones perceiving it. Curtis presents the example of how Vladislav Surkov<sup>28</sup>, previously advisor of President Vladimir Putin of Russia, transposed contemporary theatre techniques into hybrid civilian-military operations<sup>29</sup>, namely during the Annexation of Crimea by the Russian Federation<sup>30</sup>. The techniques utilized, which strongly involve media, were targeted to create such a confusion in public perception of facts, that made of almost any possibility of action a potential real fact. At the same time, such blurring of public perception made it very difficult to clearly understand what really happened and who originated it.

In scope of this notion, Use Case 3 is composed of five artistic experiments running for four months each. They have at their technological core a group of components of the MV node backbone. One important aspect that is highlighted by the experiments is that being a passive consumer in our digital society today is not possible. The connection between consumers and producers is interlinked in the cycle of content creation and distribution. The experiments will address the following themes: the notion of *truth in (social) media*; the notion of *fragmented narrative*; the character of *media bots* and recent *transformations in broadcasting*.

It is also relevant to state that nowadays there are a considerable number of artists who use their computational skills to create their artwork<sup>31</sup>. This means, for instance, that those artists code their own programs and build their own electronics. That is the case of the artist in residence in MediaVerse, Luis Miguel Girão. Luis programs in several languages including C++ and Java, and he builds his own electronics.

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<sup>25</sup> [https://en.wikipedia.org/wiki/The\\_medium\\_is\\_the\\_message](https://en.wikipedia.org/wiki/The_medium_is_the_message)

<sup>26</sup> <https://allianceforscience.cornell.edu/blog/2020/04/covid-top-10-current-conspiracy-theories/>

<sup>27</sup> <https://www.youtube.com/watch?v=Y5ubluwNkqg>

<sup>28</sup> [https://en.wikipedia.org/wiki/Vladislav\\_Surkov](https://en.wikipedia.org/wiki/Vladislav_Surkov)

<sup>29</sup> <https://www.youtube.com/watch?v=Y5ubluwNkqg>

<sup>30</sup> [https://en.wikipedia.org/wiki/Annexation\\_of\\_Crimea\\_by\\_the\\_Russian\\_Federation](https://en.wikipedia.org/wiki/Annexation_of_Crimea_by_the_Russian_Federation)

<sup>31</sup> <https://github.com/openframeworks/openFrameworks/graphs/contributors>

for processing.



Figure 9: The Eco-OS Workshop – Ecoid Prototype and one of its deployment places in Nagoya, Japan.

For example, Luis developed the Ecoid Prototype<sup>32</sup> out of which Artshare produced 100 units to be used in the Confluence project<sup>33</sup>. The Confluence project basically consisted of deploying the Ecoid sensors throughout Devon's Biosphere and use the data produced to create artistic visualizations. Those visualizations were created by students of schools within the biosphere coordinated by other visual artists.

The following paragraphs will give a short overview of the five experiments planned, followed by an elaboration of the first Scenario of this Use Case. These five experiments will be created by Luis in collaboration with other artists who will be testing MV capabilities. Needless to say, that, as artistic processes are emergent and exploratory processes, being able to concretely experiment with MV components is of extreme importance. Concrete ideas will only emerge through the process of experimentation.

### Experiment 1: The notion of truth in (social) media

The experimental artwork about *truth* brings forward and questions the notion of truth and how user-driven systems have a profound role in its construction. The main aspect of this experiment is to showcase content creation and manipulation through a co-creative environment within the context of MediaVerse. The original content created by the artist will be the subject of change through prosumer's interaction with the content. The notion of truth derives from its relation to other propositions and the extent to which it coheres with other propositions. (works based on the initial content). This experiment will explore the following MV components:

- Image Verification Assistant;
- Truly Media collaborative verification environment;

<sup>32</sup> <https://i-dat.org/eco-os-workshop-ecoid-prototype/>

<sup>33</sup> <https://i-dat.org/confluence-project/>

- TruthNest Twitter analytics tool
- Near Duplicate detection component.

#### **Experiment 2: The notion of fragmented narrative**

The experimental artwork about *fragmented narratives* will explore the fact that nowadays one perceives or rather constructs reality by aggregating information that is acquired in different unrelated ways. Our construction of reality depends on the connections between the information we gather along the way. What are the consequences of this? This experiment will explore the following MV components:

- Content Understanding;
- Sequence Aware Recommender System
- Annotation Tool for closed captions.

#### **Experiment 3: The character of media bots**

The experimental artwork about *bots* addresses *the notion of bots* as an extension of the individual or collective human mind. As the iPhone was considered by Chalmers as part of the Extended mind<sup>34</sup>, how does the notion apply to bots and what are the implications of such a perspective in concrete application terms? This experiment will explore the following MV components:

- RACU - Automatic ASR Orchestration with Human post editing tool;
- Truly Media collaborative verification environment and
- TruthNest Twitter analytics tool.

#### **Experiment 4: Recent transformations in broadcasting**

An experimental artwork about recent *transformations in broadcasting* addressing the role media nowadays play in shaping our perception of reality. The experimentation will imply this perception of the media and its crucial role in shaping different realities, the number of which is according to the number of people in the world: each one creates their own reality.

#### **Experiment 5: Recent transformations in broadcasting 2**

Experiment 5 is based on the same concept and approach as Experiment 4.

### **3.4.1 Scenario 1: Creating and Deploying an Hybrid Intelligence Experiment**

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This modular scenario is based on an experiment Artshare is developing at the moment of these writings. It aims at making clear how the sequence of steps described in the UC3 flow diagram is to be re-iterated in each of the proposed five experiments. This scenario is based on a concrete client action to happen (the Municipality of Aveiro), with more or less adjustments, before the end of the year of 2021. If the MV functions referred will not be ready when needed they will be substituted by available alternatives.

Portugal will host a European Capital of Culture in 2027. 10 Portuguese municipalities are competing to become the selected one. The Municipality of Aveiro is one of the competitors.<sup>35</sup> Artshare, and more specifically Luis Miguel Girão, artist in residence of MediaVerse, is the artistic coordinator and director of the program of Science,

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<sup>34</sup> <https://www.nyu.edu/gsas/dept/philo/courses/concepts/clark.html>

<sup>35</sup> <http://aveiro2027.pt/en/>

Technology, Industry and the Arts of European Capital bid. The bid is based on a number of concrete actions that are being implemented. The described scenario is one of those actions.

“Because when I looked, with all my rationality as an Engineer, for all the other options, Aveiro has something that sets it apart from all the others. Aveiro has this difference, which is the extraordinary link it has between art, science and innovation. [...]

During my five years [as Commissioner], the cities that I saw that innovate the most, cities and sites, companies, laboratories that innovate the most, are those that intercept art, science, innovation and technology.”

Carlos Moedas, President of the Honour Committee of the bid Aveiro European Capital of Culture of 2027.<sup>36</sup>

Mayra Andrade<sup>37</sup> will be invited to compose and perform a song about disinformation put forward by conspiracy theories on how 5G is the origin of COVID-19.<sup>38</sup> Mayra Andrade has 495,326 monthly listeners in Spotify. On the same platform, Mayra’s top song was listened to more than 6 million times.<sup>39</sup>

Aveiro is the only Portuguese test-bed of 5G technologies.<sup>40</sup> 5G technologies enable real-time music interaction.<sup>41</sup> Curiously enough, and nurturing the imagination of conspiracy theories, the actual 5G experimental laboratory in Aveiro is now fully sponsored by Huawei, the famous Chinese corporation.<sup>42</sup> This context, with all its aspects, is then perfect for the exploitation of the proposed ideas of hybridization of reality, of constructed realities in UC3.

In order to do so, Mayra will work with a co-composer/music producer and a visual artist. As an inspirational activity, the three of them would go through videos and images available online about 5G conspiracies and COVID-19. They would use MV verification tools, in order to understand the degree of disinformation of those sources. Based on that, they will compose a song which they will record with other musicians to be distributed throughout Aveiro. Since these audiovisual recordings will be testing 5G capabilities on real-time music production, performers will have to be placed within the range of 5G antennae in Aveiro.<sup>43</sup> Those recordings will be made with mobile devices and would be instantly uploaded to their own MV accounts. They would only be made available to others upon authorization of the authors.

Meanwhile, the video artist would have selected parts of videos and images available in MV to be used in the visual art of the action. Each bit of every component of this action would be constrained by a blockchain smart contract – based on blockchain Fungible Tokens - which, upon authorization from the owner and depending on the portion of content used, would allow for automatic monetization transactions.

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<sup>36</sup> <https://youtu.be/tT1rtGh6lC8?t=3251>

<sup>37</sup> [https://en.wikipedia.org/wiki/Mayra\\_Andrade](https://en.wikipedia.org/wiki/Mayra_Andrade)

<sup>38</sup> <https://www.bbc.com/news/53191523>

<sup>39</sup> <https://open.spotify.com/artist/7uriYlc9ETgOg8VPFbndnE?autoplay=true>

<sup>40</sup> <https://www.5g-vinni.eu/portugal-experimentation-facility-site/>

<sup>41</sup> <https://www.ericsson.com/en/cases/2020/a-real-time-5g-music-collaboration>

<sup>42</sup> <https://www.ua.pt/en/noticias/11/63358>

<sup>43</sup> Section 2.1 of the following document:

[https://www.aveirotechcity.pt/application/files/7115/7467/5434/Aveiro5GChallenges\\_TechnicalSheet\\_AveiroTechCity\\_EN.pdf](https://www.aveirotechcity.pt/application/files/7115/7467/5434/Aveiro5GChallenges_TechnicalSheet_AveiroTechCity_EN.pdf)

They will then work on permutational possibilities of how the song can be played randomly either in a tablet application or on a webpage. The permutational combinations need to be done in such a fashion that all possible combinations are aesthetically proper, according to its authors. They will be creating an artistic basis for creative participation of prosumers.

Next step is to design, in close cooperation with Artshare, the user experience for tablet. A sculpture in the city of Aveiro will be chosen around which the tablet experience will take place. Using MediaVerse's 3D capabilities the visual artists will select or upload 3D objects to be used in the Augmented Reality part of the tablet experience. Participants of the tablet experience will be able to play a permutation of the song's video clip by interacting with the sculpture via AR features of the tablet program. Depending on their subscription of MV services, participants of the tablet experiences could select their own permuted version of the song and its video clip and publish it on their own social media accounts. These versions would only be possible to be accessed through a direct link to the correspondent MV server, in which the necessary monitoring would take place in order to track publishings and views. This tracking would be essential in the automatic management of the smart contracts associated to all media used in the publications.

Furthermore, other permuted versions of the video clip would be possible to be created via web browser, by any user of the MV network/market.

Subtitling and automatic translation features made available by MV would be essential as the context is a potential European Capital of Culture.

### 3.4.1.1 UC 3 Scenario Diagram

All the five artistic experiments are based on the same workflow as described in the following sections.

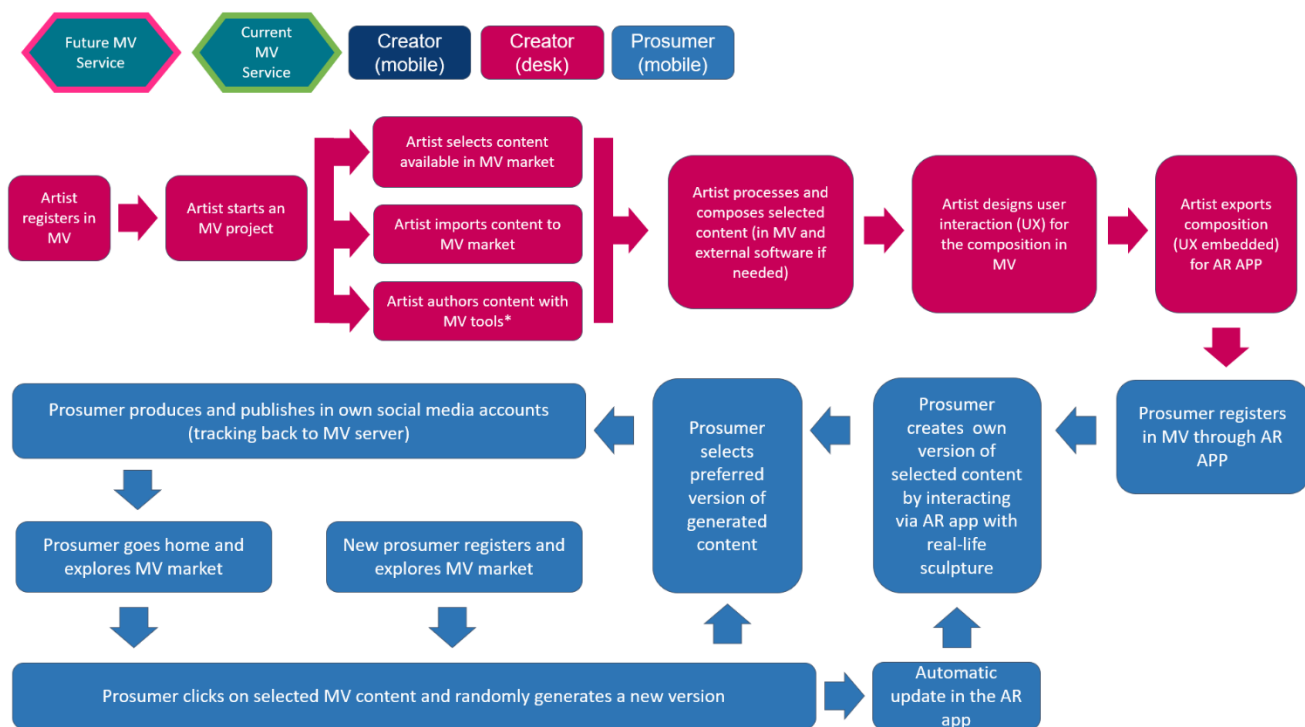


Figure 10: Steps in the five Scenarios of Use Case 3



### 3.4.1.2 UC 3 User Journey

The tables below describe the steps of the User Journey. As This Scenario involves multiple roles with different tasks along the process, we added two more rows to describe “user actions” of these roles. We condensed the process to the main steps in this Use Case.

Table 18: First Stages: Awareness, Onboarding, Topic Selection

| PHASE        | AWARENESS  | ONBOARDING   | TOPIC SELECTION   |
|--------------|--|--|---|
| Step         | <b>JOIN MEDIAVERSE CO-CREATION PROCESS</b>   | <b>JOIN MEDIAVERSE</b>   | <b>SELECT TOPIC FOR NEW MEDIA ITEM</b>  |
| User goals   | Encourage new user to (co-)create content in MediaVerse  | Registration, Log-In   | Find/choose/agree on topic for a new MediaVerse "project"   |
| User actions | Artists are invited to work on an experiment utilizing MV.<br>Prosumers get acquainted with MV by interacting with the experience artists created.<br>Prosumers get acquainted with MV through communication campaigns associated with the experiment and consequent public experiences. | Artists create their user account.<br>Prosumers create their user account.                 | The main searching of content is to be done by artists during prosumers experience design phase. Chosen themes will determine the keywords used by searchers. Prosumers will be exposed to content previously selected by the artists. Hopefully, the experience will stimulate them to keep searching for content when they 'go home'. |
| Issues       | People could not join MV because they can find the same possibilities in some other, well established platforms.<br>Communication campaigns are not strong enough  | Very complex and user unfriendly first step to join in can put potential user away.        | Content search might not deliver interesting results. Search process can be complex and put people away.  |
| Ideas        | Make clear to potential users that MV is unique in what it offers: a place where different media formats can be created and combined as it is not possible anywhere else.<br>Invest in better communication campaigns  | Minimize and simplify first steps of registration to allow users to go straight to action. | Make sure the algorithm for searching also present results of other keywords associated with the keyword input by the user. When many keywords are inserted make sure that results of all possible combinations are presented   |

Table 19: Stage 4: Content Creation

| PHASE        | CONTENT CREATION                                   |  |   |  |
|--------------|--|--|---|--|
| Step         | UPLOAD NEW CONTENT                                 | USE EXISTING CONTENT   | EDIT CONTENT  | MAKE EDITING DECISIONS   |
| User goals   | Make content available for own use / use by others | Search and retrieve content in MediaVerse or Social Media accounts   | Adapt, enhance, annotate content to the needs of this project   | Communicate and decide about possible changes  |
| User actions | All uploaded content will be available to all.     | Content to be used should be available in MediaVerse only. Any other content should be uploaded to MediaVerse. Filters to be applied should be about content but also about visual and audible characteristics, i.e., diverse metadata | Editing is of extreme importance in this use case, mainly in the combination of different types of media, for example: 3D with 360° images. | The editing of media is done individually. No collective editing of the same media takes place. The co-creation part is in the usage and combination of shared media |

Table 20: Last 3 Stages: Accessibility, Publishing, Monitoring

| PHASE        | ACCESSIBILITY   | PUBLISHING   |  | MONITORING   |
|--------------|---|--|--|--|
| Step         |   | ADD LICENSING INFORMATION  | MAKE CONTENT AVAILABLE   | USAGE ANALYSIS   |
| User goals   | Make content accessible   | Specify usage permission, cost model   | Offer content to users/customers   | Monitor and track usage of content   |
| User actions | Translation and subtitles are indispensable<br>In blockchain the property is automatically shared (microcontract for spending and revenue for the initial content producer) | In blockchain the property is automatically shared (microcontract for spending and revenue for the initial content producer) | Users are constantly creating and redistributing the content, including in social media. | Content needs to be constantly tracked and monitored for distributed monetization process – fungible tokens.<br>Tracking of views and re-usage of content. |



## 4 MediaVerse User Requirements

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All requirements derived from the detailed specifications of the Usage Scenarios were clustered according to different areas of technical development. The 14 cluster areas are:

1. User Management
2. User Experience
3. Co-Creation
4. Media Player
5. Content Brokering
6. Authoring
7. XR Authoring
8. Translation
9. Copyright Management
10. Search and Retrieval
11. Content Annotation
12. Content Moderation
13. Publishing
14. Content Monitoring

While all requirements will be important for realising the three Use Cases, among all of them, we consider the following clusters as especially important for the deployment of a minimum viable product that achieves most of the objectives defined in the initial proposal: XR Authoring, Copyrights Management, Search and Retrieval, and Publishing. With XR Authoring requirements fulfilled, MediaVerse will be able to provide innovative tools for cost-effective production of immersive media experiences. Copyrights Management requirements will ensure that copyright negotiation will take place in an automatic and efficient manner while content ownership will be recorded and identified transparently. Fulfilling Search and Retrieval requirements will provide the main way to discover and acquire content in a distributed environment. Alongside copyrights management these requirements will foster content generation by facilitating content provision during a co-creation process. Finally, Publishing will ensure that generated content can reach a wide audience in social media, within the MediaVerse network and in 3<sup>rd</sup> party platforms.

It was a challenging task to find an appropriate level of detail and complexity for the specification of the requirements. As many tools had already been agreed on in the project workplan and these tools are already at a high TRL, there was no need to describe requirements that have basically already been fulfilled. Where the Use Case partners may find later on that the available tools and features may have to be adapted to the needs of the Use Cases, this can be done as part of the iterative process that this workpackage will follow for the first two thirds of the project lifetime.

The following table will give an insight into all requirements, focusing on their descriptions and rationales, indicating also which Use Cases require them.

Table 21: List of requirements; Part 1 – User Management &amp; User Experience

| ID                     | SHORT DESCRIPTION   | RATIONALE   | USE CASES |
|------------------------|---|---|-----------|
| <b>USER MANAGEMENT</b> |   |   |           |
| USMG-01                | <b>Users need to register/log in to add, edit, update</b>   | To control creation processes and, if necessary, ban content creators from the platform, permission to add, edit, change content must be given after log in.                            | 1, 2, 3   |
| USMG-02                | <b>Using a guest account, users can create content without saving it</b>                            | Interested users may want to try the features and tools before making the effort to register  | 2,3       |
| USMG-03                | <b>Each user can edit their profile information</b>   | User data may influence account permissions and other options   | 1, 2, 3   |
| USMG-04                | <b>The dashboard provides a concise overview of various types of information</b>                    | The user needs one place where relevant notifications and the current status can be found. This will preferably be shown directly after login and/or can be accessed easily at any time | 1, 2, 3   |
| <b>USER EXPERIENCE</b> |   |   |           |
| UX-01                  | <b>The user receives a short tour of the main features of MediaVerse and what they can do there</b> | Not all MV users will be experienced in creating media, so an introduction may be needed even more than in any other case of a new product  | 2, 3      |
| UX-02                  | <b>Content information will be easily visible</b>   | Once an item was selected, the interface will show some basic data, available extras, and copyright information   | 1, 2, 3   |
| UX-03                  | <b>Content search can be performed by visually impaired</b>   | Audio Descriptions make content accessible for people with little or no eyesight, but only if they can find it  | 1, 2, 3   |
| UX-04                  | <b>If a user activates subtitles (same for AD, SL), these settings will be inherited</b>            | Users with special needs for accessibility extras would be annoyed having to activate the needed extras every time they start a new video, etc.   | 1, 2, 3   |

Table 22: List of requirements; Part 2 – Co-Creation &amp; Player

| ID                 | SHORT DESCRIPTION  | RATIONALE  | USE CASES |
|--------------------|--|--|-----------|
| <b>Co-CREATION</b> |  |  |           |
| COLL-01            | <b>Users will find an easy way to contribute to a piece of content</b>                   | Content may not have CC, SL, AD, but users may be willing and able to add such extras; same goes for content, e.g., for Citizen Journalism, where people may have private footage or images which would add value          | 1, 2      |
| COLL-02            | <b>The project dashboard provides a concise overview of various types of information</b> | A project owner needs an interface where s/he can edit and view all sorts of information   | 1, 2      |
| COLL-03            | <b>A visual sitemap of the project</b>   | During the co-creation process it would be great to see at which points content items have been added. This could come as a timeline in linear A/V projects or as a navigation tree with 1+n levels                        | 2         |
| COLL-04            | <b>Project participants communicate via simple chat</b>                                  | Collaboration requires communication   | 1, 2      |
| COLL-05            | <b>Project participants can add notes in the project</b>                                 | Another means of communication, but closely related to the content the team is working on: Project participants can attach notes to segments of the project (e.g., scene in a video) as comments, mentions, or assignments | 2         |
| <b>PLAYER</b>      |  |  |           |
| PLAY-01            | <b>The player enables display/overlay of subtitles from .srt files</b>                   | .srt is a standard format that can be used and reused from and in other players  | 1, 2      |
| PLAY-02            | <b>Accessibility extras can be switched on and off</b>                                   | Inclusion: People in need of such extras (CC, SL, AD) should consume the same content as those who are not   | 2         |
| PLAY-03            | <b>Playing (with) content will create a new version</b>                                  | There is no such thing as passive content consumption. Each “use” of a content item will create a new version of it.   | 3         |
| PLAY-04            | <b>MediaVerse content can be consumed/displayed in different devices</b>                 | Depending on the content, 1-4 device types will be able to show or use MediaVerse content: desktop (web interface), mobile (tablet/smartphone), TV, VR   | 2         |

Table 23: List of requirements; Part 3 – Content Brokering &amp; Authoring

| ID                       | SHORT DESCRIPTION   | RATIONALE   | USE CASES |
|--------------------------|---|---|-----------|
| <b>CONTENT BROKERING</b> |   |   |           |
| BRKR-01                  | <b>Project owners can pick available content (MV content marketplace)</b>                 | An editor or project owner may be looking for additional content  | 1, 3      |
| BRKR-02                  | <b>Project owners can call for contributions</b>  | An editor or project owner may be looking for additional content, expertise, or accessibility enhancements.   | 1         |
| BRKR-03                  | <b>A content creator can flag content as private or public</b>                            | Some content may be visible only for a selected groups of users; this includes re-use of segments of this content in projects that would be visible for more users  | 2         |
| BRKR-04                  | <b>Incorporating segments will have implications on the usage rights of the project</b>   | Whoever wants to use a fragment, must accept the rules, incl. its copyrights, moral rights, local restrictions, age restrictions, etc.  | 1, 2      |
| BRKR-05                  | <b>If a piece of content is being re-used, the creator will be informed</b>               | As a creator/author of content, I want to monitor who re-uses my content  | 1, 2, 3   |
| BRKR-06                  | <b>MV shortlists topics that trend in Social Media</b>                                    | Discovery of trending topics, influencers and content related to these topics and creators  | 1         |
| <b>AUTHORING</b>         |   |   |           |
| AUTH-01                  | <b>Mobile and desktop interfaces</b>  | There are alternative interfaces for the search, retrieval, creation and editing of MediaVerse content: <ol style="list-style-type: none"> <li>1. web browser (All)</li> <li>2. mobile interface (Editing, management, visualisation)</li> <li>3. HMD (Editing, visualisation)</li> <li>4. Connected TVs (visualisation)</li> </ol> | 1, 2, 3   |
| AUTH-02                  | <b>MediaVerse enables content creators to do basic editing on audio, video, 360 video</b> | These are the basics of “content co-creation”   | 2         |
| AUTH-03                  | <b>External authoring tools can be connected with MediaVerse for easy updates</b>         | Content creators can use MV tools or external tools to edit content. If it is external, then it would be good to automatically synch MV folders/content with the content edited with the external tool.   | 2         |
| AUTH-04                  | <b>The authoring UIs need to support various languages</b>                                | The tools will be used for demonstrators in (at least) 4 countries with these languages.  | 1, 2, 3   |
| AUTH-05                  | <b>Creators can add and edit various accessibility enhancements to content</b>            | These enhancements could be <ul style="list-style-type: none"> <li>• Edit subtitles (.srt) in different languages</li> <li>• Add sign language videos</li> <li>• Add Audio Description</li> <li>• Add and edit translations</li> </ul>  | 1, 2, 3   |

Table 24: List of requirements; Part 4 – XR Authoring &amp; Translation

| ID                  | SHORT DESCRIPTION   | RATIONALE  | USE CASES |
|---------------------|---|--|-----------|
| <b>XR AUTHORING</b> |   |  |           |
| XR-01               | <b>Creators can edit 3D objects</b>   | Not all MV users will have access to 3D editing software   | 3         |
| XR-02               | <b>A 3D Scene can be exported as a video clip</b>                                     | 3D experiences require special players to watch. Sharing them via other Social Media platforms will only be possible, if they can be exported as video files   | 2         |
| XR-03               | <b>3D objects can be imported from Open Source libraries</b>                          | Not all users will be able to create their own 3D models. Ideally the MV search would be able to search these connected libraries  | 3         |
| XR-04               | <b>Walls in 3D rooms/VR spaces can be decorated with background images</b>            | Re-creating the room of, e.g., an elderly family member in 3D/VR would be easier and more realistic, if images of the actual wall could be imported and mapped on the virtual walls. These may be images of the complete walls or of objects on these walls like framed pictures and paintings, vases, furniture, etc. | 2         |
| XR-05               | <b>360 video can be enhanced by adding objects/assets</b>                             | A 360 scene can be adapted to the need of the situation, e.g., by adding 2D videos or images, 3D diagrams, text panels, etc., or hotspots that will open such related/attached media   | 2         |
| XR-06               | <b>360 video can be enhanced by hotspots with different functions</b>                 | A hotspot is a button which triggers certain actions in the interactive scene  | 1, 2      |
| <b>TRANSLATION</b>  |   |  |           |
| TRSL-01             | <b>Assets' short descriptions will be available in multiple languages</b>             | Project owners/content creators will create short descriptions of their content. They will do this in their own language. Short descriptions can support finding this content item   | 1, 2, 3   |
| TRSL-02             | <b>Subtitles should be available for all content in as many languages as possible</b> | Automatic subtitling in as many languages as possible as the approach is European (EU). Meaning, content should be properly perceived in every EU member state.  | 1, 2, 3   |

Table 25: List of requirements; Part 5 – Copyright Management

| ID                          | SHORT DESCRIPTION  | RATIONALE  | USE CASES |
|-----------------------------|--|--|-----------|
| <b>COPYRIGHT MANAGEMENT</b> |  |  |           |
| RGHT-01                     | <b>MediaVerse will propose a set of license properties to the user for copyright management, including the Creative Commons models</b> | In an easy, understandable way, MediaVerse will propose to the user some licensing conditions which will allow for a license being generated. These license options will also include the CC properties. CC is a widespread model which is easy to understand, and many people have been in contact with it. This will make it easier to understand the rules  | 2         |
| RGHT-02                     | <b>The system must support creators in filling in copyright information</b>  | Creators need to understand what sort of information is required, why, and in some cases also where to get this information, especially when they re-use content from other sources. They also need to understand the consequences of disrespecting such rules   | 1, 2, 3   |
| RGHT-03                     | <b>The system must be able to trace content sources (inside MV)</b>  | In case a segment is being re-used, the new asset must carry information of the original source. This information should be based on small units (shots, scenes, objects) so that in case of a re-use of the new asset's segments, tracing these origins will still be possible  | 1         |
| RGHT-04                     | <b>Each new project will inherit available information about authors and used assets</b>   | If a creator re-uses content they found on MediaVerse, they will not copy the attached copyright information manually and ensure that it is connected with the right scenes. It is essential that all creators/authors involved in creating will be acknowledged for the respective scenes and that such information will also be inherited, in case the new asset will be re-used by another creator. | 1         |
| RGHT-05                     | <b>Moral rights can be specified per contribution; if not specified, the “per user” default settings will be inherited</b>             | If a user uploads an asset, their default settings (see below) will automatically be attributed to this new asset. These settings will be editable as an asset may be created by multiple people outside MV; the uploading user is expected to give credits to all authors involved (incl. people who are not MV users)  | 1, 2      |
| RGHT-06                     | <b>Users can invite external creators to MV so that their contributions can be rewarded</b>  | A person without a user account may have been involved in the creation of an asset   | 2         |

Table 26: List of requirements; Part 6 – Search and Retrieval &amp; Content Annotation

| ID                          | SHORT DESCRIPTION  | RATIONALE   | USE CASES |
|-----------------------------|--|---|-----------|
| <b>SEARCH AND RETRIEVAL</b> |  |   |           |
| SRCH-01                     | <b>Content can be searched across nodes</b>  | Content from other nodes will be available for search and retrieval and also re-use, given that the content settings allow. Content in other languages should also be found in a relevant search  | 1, 2, 3   |
| SRCH-02                     | <b>MV users can search their connected Social Media (albums, etc.)</b>               | After a “social log-in”, users can import/export content from/to the connected platform   | 2         |
| SRCH-03                     | <b>MV users can search in and import from connected stock image/video databases</b>  | In many cases the use of royalty-free content from external repositories would be beneficial  | 2         |
| SRCH-04                     | <b>Creators can save a search</b>  | If the search results were not satisfying users will want to revisit it again later   | 1         |
| SRCH-05                     | <b>Creators can transform a search request into a Call for Content</b>               | One reason for not finding content about a certain topic is that this doesn’t exist yet or is not available in the connected repositories. In these cases, users could make use of the option to ask other MV users to provide (produce) something suitable | 1         |
| SRCH-06                     | <b>Search results can be filtered according to several criteria</b>                  | If you start a project with 14 year-old students (replace with vulnerable, people from crisis areas), you may not want them to see violence, or corpses.<br>Search options should include filtering such content  | 1, 2, 3   |
| SRCH-07                     | <b>Search results can be ordered/downranked according to certain aspects</b>         | Especially for very successful search requests it will be helpful to sort and order search results  | 1, 2, 3   |
| <b>CONTENT ANNOTATION</b>   |  |   |           |
| ANNO-01                     | <b>The system will add tags to each new asset</b>                                    | If contributors have not added descriptions, the system should at least add keywords/tags. Even if the user has added some tags, automatic tagging can be used to suggest additional tags   | 1         |
| ANNO-02                     | <b>Tags and keywords should support search and retrieval in all system languages</b> | Keywords should be understood by all supported languages  | 1, 2, 3   |
| ANNO-03                     | <b>Content Analysis will recognise near duplicates and flag them respectively</b>    | Once the system detected near duplicates the owners should be contacted and asked to clarify/clear the rights. The original owner can block the publishing of the duplicate   | 1, 2, 3   |

Table 27: List of requirements; Part 7 – Content Moderation

| ID                        | SHORT DESCRIPTION  | RATIONALE   | USE CASES |
|---------------------------|--|---|-----------|
| <b>CONTENT MODERATION</b> |  |   |           |
| MDRT-01                   | <b>New incoming content should be tested wrt whether it is appropriate</b> | Content creators may not be aware that certain depictions, e.g., of violence, violate the rules of the node it was uploaded to. Furthermore, if content is automatically tested as soon as it is imported to MV, this information will also be available for exchange with other MV nodes which may have different rules  | 1         |
| MDRT-02                   | <b>Content Moderators need an interface</b>                                | Content Moderators need an interface where <ul style="list-style-type: none"> <li>• They will configure the rules, e.g. <ul style="list-style-type: none"> <li>◦ what exactly is deemed appropriate, etc.</li> <li>◦ when/how often they want to be updated or receive an alert</li> </ul> </li> <li>• They will be informed when new content has been submitted</li> <li>• They may release or block publishing (new) content</li> <li>• They can communicate with content contributors <ul style="list-style-type: none"> <li>◦ e.g., to inform them that their contribution was inappropriate, that publishing is on hold and can only be allowed again after a number of changes will have been made</li> </ul> </li> </ul> | 1         |
| MDRT-03                   | <b>Guidelines support Content Creators to abide by the rules</b>           | Content creators are expected to abide by the rules of the MV node they are contributing to. These rules must be clear, easy to understand, and must not be hidden  | 1         |
| MDRT-04                   | <b>Content Moderators have access to Content Verification tools</b>        | Truthfulness may/should be one of the basic rules for all content created and shared. Content Moderators need tools to evaluate this. Verification tools may hope to support a moderator's claim that content appears to be misleading, etc.  | 1, 3      |
| MDRT-05                   | <b>Content Creators can signal that their content is "not factual"</b>     | Rules of content moderation may not always apply completely for some content categories: Some content segments may be "untrue" on purpose, e.g., in comedy or satire. Content creators should have the option to flag their content as "comedy/satire" to avoid being blocked by Content Moderators. This tag or flag should also be visible to consumers   | 2         |



Table 28: List of requirements; Part 8 – Publishing &amp; Content Monitoring

| ID                        | SHORT DESCRIPTION   | RATIONALE   | USE CASES |
|---------------------------|---|---|-----------|
| <b>PUBLISHING</b>         |   |   |           |
| PUBL-01                   | <b>Content creators can publish their content in the MediaVerse</b>                   | MediaVerse is not only a platform for creating content but also for sharing and streaming   | 2         |
| PUBL-02                   | <b>Content can be published on Social Media</b>                                       | MediaVerse users could publish links to their MV content, but exporting videos (at least teasers) to Social Media will certainly gain more attention  | 2         |
| PUBL-03                   | <b>Content can and should be re-edited and/or republished by consumers</b>            | ArtShare's concept is built on the idea that there is no passive consumption, but that each consumer becomes a co-creator through the act of experiencing the content. Interacting with the content will create new versions of it  | 3         |
| <b>CONTENT MONITORING</b> |   |   |           |
| MNTR-01                   | <b>Monitor the consumption and re-use of content</b>                                  | Monitoring the use of the content is important and should provide information about where the content has been used in order to determine the reach, or engagement  | 1, 3      |
| MNTR-02                   | <b>Inform owners when their content is re-used and/or exported to other platforms</b> | Even though it may not be possible to track use and re-use of content outside MV with MV tools, it would help MV users to know that their content was shared on other platforms. Inside MV it is crucial that users can track how their content is being re-used, e.g., in mashups, especially from the perspective of moral rights | 1, 2, 3   |

## 5 Conclusion

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At the end of this very intensive first period of gathering and specifying ideas on what MediaVerse could and should be, we have gathered a variety of very attractive use cases and scenarios. All partners have been and will continue to be involved in this iterative process and fruitful exchange between the Use Case partners representing the future users and the technology partners who know the potentials and limits of the available technologies.

While the whole concept of enabling the combination of media co-creation, accessibility of authoring tools as well as players, and copyright management, to name but a few outstanding aspects of how the MediaVerse vision is already unique, the process of requirements specification has furthermore brought up some very innovative features and aspects.

This was the first important outcome in the process of developing the MediaVerse. The 63 requirements have now been handed over to the technical work packages. The next steps will be for the Use Case partners to define priorities, and for the technical partners to check the feasibility of all these requirements and create a development plan which will consider both feasibility and priorities.

Although the respective partners have been involved all the time, the technical development process may bring up aspects that have not been solved yet and integrating the components in a coherent workflow may show that some ideas do not match expectations. These would be normal aspects of an iterative development process and the project plan has foreseen and provided for this. Wherever necessary, requirements will be added, adapted, updated or changed as an integral part of the ongoing iterative requirement specification process.

The Scenarios will also be a solid basis for the project pilots, for which the planning and preparations can also start now.

Overall, the consortium is fully satisfied with the foundation laid for the development of the MediaVerse platform and business concept. The ideas gathered and described above provide a solid basis, and even though a lot still lies ahead, the partners are confident that MediaVerse is an appealing offer which provides real added value to the target groups of the scenarios.



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