



Public document

N1365

2023/08/23

Source Requirements (XRV)

Title Call for Technologies: XR Venues (MPAI-XRV) – Live Theatrical Stage
Performance

Target MPAI-Members

The Call for Technologies seeks to obtain technologies that support some of and preferably all the Functional Requirements and technical specifications of XR Venues (MPAI-XRV) is an MPAI project addressing a multiplicity of use cases enabled by Extended Reality (XR), the combination of Augmented Reality (AR), Virtual Reality (VR) and Mixed Reality (MR) technologies and enhanced by Artificial Intelligence (AI) technologies. The word Venue is used as a synonym for Real and Virtual Environments. Those proposing technologies in response to the Call are requested to state their availability to license their technologies, if adopted by MPAI, in conformity with the Framework Licence [2].

Contents

1	Introduction	1
2	How to submit a response	3
3	Evaluation Criteria and Procedure	4
4	Expected development timeline	5
5	References	5
	Annex A: Information Form	6
	Annex B: Evaluation Sheet	7
	Annex C: Check list of data formats proposed by a respondent	10
	Annex D: Technologies that may require specific testing	11
	Annex E: Mandatory text in responses	12

1 Introduction

Moving Picture, Audio and Data Coding by Artificial Intelligence (MPAI) is an international non-profit organisation with the mission of developing standards for Artificial Intelligence (AI)-enabled digital data coding and for technologies that facilitate the integration of data coding components into ICT systems [1]. Additionally, MPAI facilitates the creation of patent pools for its standards that rely on the clear IPR licensing frameworks established by Framework Licences [2].

MPAI has developed several Technical Specifications relevant to its mission: execution environment of multi-component AI applications, context-based audio enhancements, multimodal human-machine conversation, company performance prediction, neural network watermarking,

and governance of the MPAI ecosystem. Four Technical Specifications have been adopted by IEEE without modification and one more is in the pipeline.

MPAI is engaged in several other projects on AI health, connected autonomous vehicles, MPAI metaverse model, and XR Venues. When the functional requirements of a project are consolidated, MPAI principal members adopt a “Framework Licence” that sets key elements of the future licence for the standard essential patents. Then MPAI issues a Call for Technologies, a document inviting the submission of contributions in response to the Call for Technologies by parties who accept to licence their technologies according to the Framework Licence, if their technologies are accepted to be part of the target Technical Specification.

MPAI standardisation is based on the following principles:

1. Use Cases addressed by MPAI Application Standards are specified as AI Workflows (AIW) composed of AI Modules (AIM).
2. MPAI Application Standards
 - 2.1. specify:
 - 2.1.1. The input/output data formats and the functions of:
 - 2.1.1.1. The AIWs implementing the Use Cases
 - 2.1.1.2. The AIMs that are part of an AIW.
 - 2.1.2. The AIM topology.
 - 2.2. Do not specify the AIM internals, which are considered as black boxes.
3. MPAI Application Standards are implemented in the MPAI-specified AI Framework environment (MPAI-AIF) [4].
4. Development of MPAI Standards and their implementation and secure distribution constitute an ecosystem that must be governed (MPAI-GME) [3].
5. The specification of AIMs and AIWs executed in AIF promote the creation of a market of interoperable AIMs.

Live Theatrical Stage Performance (LTP) is one of the Use Case collection bearing the XR Venue (MPAI-XRV) title. These Use Cases are enabled by AR/VR/MR (XR) and enhanced by Artificial Intelligence technologies. The word Venue is used as a synonym to Environment, both real and virtual.

As MPAI has fully analysed the Live Theatrical Stage Performance Use Case and identified its Functional Requirements ([**Error! Reference source not found.**]), and MPAI Principal Members have developed the Framework Licence [6], MPAI is now issuing this Call for Technologies (CfT). The Call invites to submit a proposal parties owning technologies that satisfy Functional Requirements: XR Venue (MPAI-XRV) – Live Theatrical Stage Performance MPAI-XRV-LTP [**Error! Reference source not found.**] and are willing to release such technologies according to Framework Licence: XR Venue (MPAI-XRV) – Live Theatrical Stage Performance [6], if MPAI selects those technologies for possible modification and inclusion in the planned MPAI-XRV-LTP standard. Any respondent party who is not an MPAI member and had their technologies accepted shall join MPAI or lose the opportunity to have their technologies included in the planned MPAI-XRV-LTP standard.

The planned MPAI-XRV-LTP standard will be developed using technologies that are:

1. Part of an already published MPAI standard, or
2. Comply with the following mandatory requirements of either being:
 - 2.1. Part of responses to this Call satisfying Use Cases and Functional Requirements: XR Venues (MPAI-XRV) – Live Theatrical Stage Performance [**Error! Reference source n**

ot found.] that are submitted by parties accepting Framework Licence: XR Venues (MPAI-XRV) – Live Theatrical Stage Performance [6].

- 2.2. Based on technologies specified in published MPAI standards, if they are relevant, and their inclusion is desirable and feasible.

Therefore, the goal of this Call is to elicit responses in line with the Use Cases and Functional Requirements of [Error! Reference source not found.] proposing technologies that submitters are willing to license according to the Framework Licence [6].

However, respondents are welcome to additionally do one or more of the following:

1. Make comments on any technology or architectural component identified in [Error! Reference source not found.].
2. Make proposals to:
 - 2.1. Add or remove input/output data flows to the identified AIMs and AIW if:
 - 2.1.1. Changes are justified.
 - 2.1.2. The Functional Requirements of the proposed new data formats are identified.
 - 2.2. Partition the AIMs in an AIW implementing the cases if:
 - 2.2.1. The proposed partitioning is supported by appropriate arguments.
 - 2.2.2. Detailed requirements for the input and output data of the proposed new AIMs are provided.
 - 2.3. New Use Cases if justified and fully described with a level of details comparable to [Error! Reference source not found.].
 - 2.4. Submit motivated proposals of technologies not included in [Error! Reference source not found.], for inclusion in the planned MPAI-XRV-LTP standard MPAI if they satisfy the Framework Licence [6].

At this stage, MPAI membership is not a prerequisite for responding to this CfT. However, proponents should be aware that, if their proposal or part thereof is accepted for inclusion in the planned MPAI-XRV-LTP standard, they will be requested to immediately join MPAI, or lose the opportunity to have their accepted technologies included in the standard.

MPAI will select the most suitable technologies based on their technical merits for inclusion in the planned MPAI-XRV-LTP standard. However, MPAI is not obligated, by virtue of this CfT, to select a particular technology or to select any of the proposed technologies if those submitted are found inadequate.

Submissions shall be received to the MPAI secretariat (secretariat@mpai.community) by 2023/11/20 T23:59 UTC. The secretariat will acknowledge receipt of the submission via email. Submissions will be reviewed according to the schedule that the 37th MPAI General Assembly (MPAI-37) will define at its online meeting on 2023/11/22. For details on how non MPAI members who have made a submission can attend the said review sessions should contact the MPAI secretariat (secretariat@mpai.community).

2 How to submit a response

Those planning to respond to this CfT are:

1. Advised that the MPAI-XRV-LTP CfT has been presented at two online events held on 2023/09/05 at 08 and 15 UTC.
2. Requested to communicate their intention to respond to this CfT with an initial version of the form of Annex A to the MPAI secretariat (secretariat@mpai.community) by 2023/09/15. Submission of Annex A helps MPAI to properly plan for the revision of submissions.

However, a respondent is not required to send Annex A by 2023/09/15 to make a submission and a response to this Call not preceded by the submission of Annex A will still be accepted.

3. Encouraged to regularly visit the [Call for Technologies](#) webpage where relevant additional information will be posted.

Responses to this MPAI-XRV-LTP CfT may/shall include:

Table 1 – Optional and mandatory elements of a response

Item	Status
Detailed documentation describing the proposed technologies	mandatory
The final version of Annex A.	mandatory
The text of Annex B duly filled out with the table indicating which Functional Requirements identified in [5] are satisfied. If some of the Functional Requirements of a Use Case are not satisfied, this should be explained.	mandatory
Comments on the completeness and appropriateness of the MPAI-XRV-LTP Functional Requirements and any motivated suggestion to amend and/or extend those Requirements.	optional
A preliminary demonstration, with a detailed document describing it.	optional
Any other additional relevant information that may help evaluate the submission, such as additional use cases.	optional
The text of Annex E.	mandatory

Respondents are invited to take advantage of the check list of Annex C before filling out Annex A and submitting their response.

Respondents are mandatorily requested to present their submissions at a teleconference meeting to be properly announced to submitters by the MPAI Secretariat. A submission not presented at that teleconference meeting will be discarded.

Respondents are advised that, *upon acceptance by MPAI of their submission in whole or in part for further evaluation*, MPAI will require that:

- A working implementation, including source code – for use in the development of the MPAI-MMC Reference Software and later publication as an MPAI standard – be made available before the technology is accepted for inclusion in the MPAI-MMC standard. Software may be written in programming languages that can be compiled or interpreted. Hardware Description Language implementations are also accepted.
- The working implementation be suitable for operation in the MPAI MMC Framework (MPAI-MMC).
- A non-MPAI member immediately join MPAI. If the non-MPAI member elects not to do so, their submission will be discarded. Direction on how to join MPAI can be found [online](#).

Further information on MPAI can be obtained from the [MPAI website](#).

3 Evaluation Criteria and Procedure

Proposals will be assessed using the following process:

1. Evaluation panel is created from:
 1. MPAI members in attendance.

2. Non-MPAI members who are respondents.
3. Non respondents/non MPAI member experts invited in a consulting capacity.
2. No one from 1.1.-1.2. is denied membership in the Evaluation panel.
3. Respondents present their proposals.
4. Evaluation Panel members ask questions.
5. If required, subjective and/or objective tests are carried out with the following process:
 1. The required tests are defined.
 2. The required tests are carried out.
 3. A report is produced.
6. If required, at least 2 reviewers are appointed to review and report about specific points in a proposal.
7. Evaluation panel members fill out Annex B for each proposal.
8. Respondents respond to evaluations.
9. Proposal evaluation report is produced.

4 Expected development timeline

Timeline of the CfT, deadlines and response evaluation:

Table 2 – Dates and deadlines

Step	Date	Time
Call for Technologies	2023/08/23	17:00 UTC
Online presentation of MPAI-XRV-LTS	2023/09/05	08:00 UTC 15:00 UTC
Notification of intention to submit proposal	2023/09/15	23.59 UTC
Submission deadline	2023/11/20	23.59 UTC
Evaluation of responses will start	2023/11/22	(MPAI-38)

Evaluation to be carried out during 2-hour online sessions according to the calendar agreed at MPAI-38.

5 References

1. MPAI Standards Resources; <https://mpai.community/standards/resources/>.
2. MPAI Patent Policy; <https://mpai.community/about/the-mpai-patent-policy/>.
3. Governance of the MPAI Ecosystem (MPAI-GME) V1; <https://mpai.community/standards/mpai-xrv/>.
4. AI Framework (MPAI-AIF) V1.1; <https://mpai.community/standards/mpai-aif/>
5. MPAI; Use Cases and Functional Requirements: XR Venues (MPAI-XRV) – Live Theatrical Stage Performance; N1366; <https://mpai.community/standards/mpai-xrv/use-cases-and-functional-requirements/>.
6. Framework Licence: XR Venues (MPAI-XRV) – Live Theatrical Stage Performance MPAI N1367; <https://mpai.community/standards/mpai-xrv/framework-licence/>.
7. MPAI; Template for Responses: XR Venues (MPAI-XRV) – Live Theatrical Stage Performance; N1368; <https://mpai.community/standards/mpai-xrv/template-for-responses/>

Annex A: Information Form

This information form is to be filled in by a Respondent to this MPAI-XRV-LTP Call for Technologies.

1. Title of the proposal.
2. Organisation: company name, position, e-mail of contact person.
3. What are the main functionalities of your proposal?
4. Does your proposal provide or describe a formal specification and APIs?
5. Will you provide a demonstration to show how your proposal meets the evaluation criteria?

Annex B: Evaluation Sheet

NB: This evaluation sheet will be filled out by Evaluation Team members.

Proposal title:

Main functionalities:

Response summary: (a few lines)

Comments on relevance to the CFT (Requirements):

Comments on possible MPAI-XRV-LTP profiles¹

Evaluation table:

Table 3 – Assessment of submission features

Note 1 The semantics of submission features is provided by *Table 4*.

Note 2 Evaluation Elements indicate the elements used by the evaluator in assessing the submission.

Note 3 Final Assessment indicates the ultimate assessment based on the Evaluation Elements.

Submission features	Evaluation Elements	Final Assessment
Completeness of description		
Understandability		
Extensibility		
Use of standard technology		
Efficiency		
Test cases		
Maturity of reference implementation		
Relative complexity		
Support of MPAI use cases		
Support of non-MPAI use cases		

Content of the criteria table cells:

Evaluation facts should mention:

✓ Not supported / partially supported / fully supported.

¹ Profile of a standard is a particular subset of the technologies that are used in a standard and, where applicable, the classes, subsets, options and parameters relevant for the subset.

- ✓ What supports these facts: submission/presentation/demo.
- ✓ The summary of the facts themselves, e.g., very good in one way, but weak in another.

Final assessment should mention:

- ✓ Possibilities to improve or add to the proposal, e.g., any missing or weak features.
- ✓ How sure the evaluators are, i.e., evidence shown, very likely, very hard to tell, etc.
- ✓ Global evaluation (Not Applicable/ --/ - / + / ++)

New Use Cases/Requirements Identified:

(please describe)

Evaluation summary:

- **Main strong points, qualitatively:**
- **Main weak points, qualitatively:**
- **Overall evaluation: (0/1/2/3/4/5)**
 - 0: could not be evaluated
 - 1: proposal is not relevant.
 - 2: proposal is relevant, but requires significant more work.
 - 3: proposal is relevant, but with a few changes.
 - 4: proposal has some very good points, so it is a good candidate for standard.
 - 5: proposal is superior in its category, very strongly recommended for inclusion in standard.

Additional remarks: (points of importance not covered above.)

The submission features in *Table 3* are explained in the following *Table 4*.

Table 4 – Explanation of submission features

Submission features	Criteria
Completeness of description	Evaluators should: <ol style="list-style-type: none"> 1. Compare the list of requirements (Annex C of the CfT) with the submission. 2. Check if respondents have described in sufficient detail how the requirements are supported by the proposal. Note1: Completeness of a proposal for a Use Case is a merit because reviewers can assess how the components are integrated. Note2: Submissions will be judged for the merit of what is proposed. A submission on a single technology that is excellent may be considered instead of a submission that is complete but has a less performing technology.
Understandability	Evaluators should identify items that are demonstrably unclear (inconsistencies, sentences with dubious meaning etc.)
Extensibility	Evaluators should check if respondent has proposed extensions to the Use Cases. Note: Extensibility is the capability of the proposed solution to support use cases that are not supported by current requirements.

Use of standard Technology	Evaluators should check if new technologies are proposed where widely adopted technologies exist. If this is the case, the merit of the new technology shall be proved.
Efficiency	Evaluators should assess power consumption, computational speed, computational complexity.
Test cases	Evaluators should report whether a proposal contains suggestions for testing the technologies proposed.
Maturity of reference implementation	Evaluators should assess the maturity of the proposal. Note1: Maturity is measured by the completeness, i.e., having all the necessary information and appropriate parts of the HW/SW implementation of the submission disclosed. Note2: If there are parts of the implementation that are not disclosed but demonstrated, they will be considered if and only if such components are replicable.
Relative complexity	Evaluators should identify issues that would make it difficult to implement the proposal compared to the state of the art.
Support of MPAI-MMC use cases	Evaluators should check how many composite AIMS and use cases are supported in the submission.
Support of non MPAI-MMC use cases	Evaluators should check whether the technologies proposed can demonstrably be used in other significantly different use cases.

Annex C: Check list of data formats proposed by a respondent

Table 5 is a suggested check list to inform MPAI about the data formats contained in a response.

Table 5 – List of data formats in Use Cases and Functional Requirements: MPAI-XRV-LTP
[Error! Reference source not found.]

Note: The numbers in the first column refer to the section numbers of [Error! Reference source not found.] (specimen).

Sections	Data formats	Response
8.1	Scene Descriptors	Y/N
8.2	Participant Descriptors	Y/N
8.3	Participant Status	Y/N
8.4	Script	Y/N
8.5	Cue point	Y/N
8.6	Interpreted Operator Control	Y/N
8.7	Action Descriptors	Y/N
8.8	Real Experience Generation	Y/N
8.8.1	Lighting	Y/N
8.8.2	SFX	Y/N
8.8.3	A/V	Y/N
8.8.4	Real Experience Venue specification	Y/N
8.9	Virtual Experience Generation	Y/N
8.9.1	Virtual Experience Descriptors	Y/N
8.9.2	A/V	Y/N
8.9.3	Virtual Experience Venue specification	Y/N

Respondent should in any case review the equivalent list in the table of contents of [Error! Reference source not found.].

Annex D: Technologies that may require specific testing

Table 6 will be compiled based on the responses received.

Table 6 – Data formats that may require specific testing

Section	Technology	Nature of Test

Annex E: Mandatory text in responses

A response to this MPAI-XRV-LTP CfT shall mandatorily include the following text

<Company/Member> submits this technical document in response to MPAI Call for Technologies for Live Theatrical Stage Performance (MPAI-XRV-LTP) V2 (N1360).

<Company/Member> explicitly agrees to the steps of the MPAI standards development process defined in Annex 1 to the [MPAI Statutes](#) (N421), in particular <Company/Member> declares that <Company/Member> or its successors will make available the terms of the Licence related to its Essential Patents according to the MPAI-XRV-LTP Framework Licence (N1362), alone or jointly with other IPR holders after the approval of the MPAI-XRV-LTP Technical Specification by the General Assembly and in no event after commercial implementations of the MPAI-XRV-LTP Technical Specification become available on the market.

In case the respondent is a non-MPAI member, the submission shall mandatorily include the following text:

If (a part of) this submission is identified for inclusion in a specification, <Company> understands that <Company> will be requested to immediately join MPAI and that, if <Company> elects not to join MPAI, this submission will be discarded.

Subsequent technical contribution shall mandatorily include this text

<Member> submits this document to MPAI as a contribution to the development of the planned MPAI-XRV-LTP Technical Specification.

<Member> explicitly agrees to the steps of the MPAI standards development process defined in Annex 1 to the [MPAI Statutes](#) (N421), in particular <Company> declares that <Company> or its successors will make available the terms of the Licence related to its Essential Patents according to the MPAI-XRV-LTP Framework Licence (N1362), alone or jointly with other IPR holders after the approval of the MPAI-MMC Technical Specification by the General Assembly and in no event after commercial implementations of the MPAI-MMC Technical Specification become available on the market.