|  |  |  |
| --- | --- | --- |
|  | | Moving Picture, Audio and Data Coding by Artificial Intelligence  www.mpai.community |
| **Public document** | | |
| **N768** | 2022/07/19 | |
| **Source** | AIF-DC | |
| **Title** | MPAI-AIF V2 Call for Technologies | |
| **Target** | MPAI-22 | |

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# 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 technologies that facilitate the integration of data coding components into ICT systems [1]. With the mechanism of Framework Licences, MPAI intends to facilitate the creation of a patent pool that relies on the clear IPR licensing frameworks established by the Framework Licences [2].

AI Framework Version 1 (MPAI-AIF V1) is an MPAI System-oriented standard specifying an environment able to execute AI applications called AI Workflows (AIW) composed of AI Modules (AIM).

MPAI Application Standards normatively specify the Function of the AIW and its AIMs, the Syntax and Semantics of the input and output Data of the AIW and its AIMs, and the Connections between and among the AIMs of an AIW. MPAI Application Standards do not specify the internal architecture of the AIMs, which may be based on AI or data processing technologies, and be implemented in software, hardware or mixed software and hardware technologies.

MPAI-AIF V1 assumes that the execution environment is in a Trusted Zone. However, it does not specify how an environment with the required attributes can be realised. Therefore, MPAI has developed a set of Functional Requirements whose satisfaction can support the developer with specific security requirements.

This MPAI-AIF V2 Call for Technologies (CfT) invites any party owning technologies that satisfy the MPAI-AIF V2 Use Cases and Functional Requirements [5] and are willing to release their technologies to any third party according to the MPAI-AIF V2 Framework Licence [6], if selected by MPAI and inclusion in the MPAI-AIF V2 standard with possible modifications. Any respondent party who is not an MPAI member and has their technologies accepted shall join MPAI or lose the opportunity to have their technologies included.

The MPAI-AIF V2 Technical Specification will be developed using technologies that are:

1. Part of an already published MPAI standard, or
2. Satisfy the following mandatory requirements:
   1. To be part of responses to this Call containing acceptance of the MPAI-AIF V2 Framework Licence [6].
   2. To satisfy the MPAI-AIF V2 Use Cases and Functional Requirements [5]. In the future, MPAI may decide to further extend MPAI-AIF to support new functionalities as a part of this MPAI-AIF V2 or as a future extension of it.
   3. To use, where feasible and desirable, the technologies in the MPAI-AIF V1.1 standard [4] that satisfy MPAI-AIF V2 Use Cases and Functional Requirements [5] or the technologies specified in other relevant MPAI standards published in [1].

**Therefore, the scope of this Call for Technologies includes technologies satisfying the requirements identified in [5]**.

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

1. Make comments on any technology or architectural component identified in [5].
2. Propose to:
3. Add or remove input/output signals to the identified AIMs:
   1. Justifying the changes.
   2. Identifying the data formats of the new input/output data.
4. Partition the AIMs in an AIW implementing the cases providing:
   1. Arguments in support of the proposed partitioning.
   2. Detailed specifications of the input and output data of the proposed new AIMs.
5. New fully described Use Cases as done in [5].
6. In general, submit motivated proposals of technologies not included in [5], for inclusion in the MPAI-AIF V2 standard MPAI if they satisfy the Framework Licence [6].

All parties who believe they have relevant technologies satisfying all or most of the requirements of [5] are invited to submit proposals for consideration by MPAI. 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 MPAI-AIF V2 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 MPAI-AIF V2 standard after possible adaptation/modification. However, MPAI in 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](mailto:secretariat@mpai.community)) by 2021/10/10 T23:59 UTC. The secretariat will acknowledge receipt of the submission via email. Submissions will be reviewed according to the schedule that the 25th MPAI General Assembly (MPAI-25) will define at its online meeting on 2021/10/12. 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](mailto:secretariat@mpai.community)).

# How to submit a response

Those planning to respond to this CfT are:

1. Advised that online event has been held on 2022/07/11 at 15:00 UTC where the MPAI-AIF V2 Functional Requirements were presented. The recording of the presentation is available [7].
2. Requested to communicate their intention to respond to this MPAI-AIF V2 CfT with an initial version of the form of Annex A to the MPAI secretariat ([secretariat@mpai.community](mailto:secretariat@mpai.community)) by 2021/09/13. Submission of Annex A helps MPAI properly plan for the revision of submissions. However, those who have submitted an Annex A are not requested to make a submission and those who have not submitted Annex A are not precluded from making a submission.
3. Encouraged to visit regularly the [Call for Technologies web page](https://mpai.community/standards/calls-for-technologies/) where additional relevant information will be posted.

Responses to this MPAI-AIF V2 CfT may or 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 MPAI N768 [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-AIF V2 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. | optional |
| The text of Annex E. | **mandatory** |

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

Respondents are mandatorily requested to present their submission at a teleconference meeting to be properly announced to submitters by the MPAI Secretariat. If no presenter of a submission will be attending that meeting, the submission will be discarded.

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

* *Make available* a working implementation, including source code – for use in the development of the MPAI-AIF V2 Reference Software and successive publication as an MPAI-AIF V2 Reference Software Implementation – before the technology is accepted for inclusion in the MPAI-AIF V2 standard. Software may be written in programming languages that can be compiled or interpreted. Hardware Description Language implementations are also accepted.
* *Immediately join* MPAI if non-MPAI member. If the non-MPAI memberelects not to join, their submission will be discarded. Direction on how to join MPAI can be found [online](https://mpai.community/how-to-join/join/).

Further information on MPAI can be obtained from the [MPAI website](https://www.mpai.community).

# Evaluation Criteria and Procedure

Proposals will be assessed using the following process:

1. Evaluation panel is created from:
   1. AIF-DC 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 after:
   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.

# Expected development timeline

Timeline of the CfT, deadlines and response evaluation:

*Table 2 – Dates and deadlines*

|  |  |  |
| --- | --- | --- |
| **Step** | **Date** | **Time** |
| Online presentation of MPAI-AIF V2 | 2022/07/11 | 15:00 UTC |
| Call for Technologies | 2022/07/19 | 17:00 UTC |
| Notification of intention to submit proposal | 2022/09/13 | 23.59 UTC |
| Submission deadline | 2022/10/10 | 23.59 UTC |
| Start of response evaluation | 2022/10/12 (MPAI-25) | 14:00 UTC |
| MPAI-AIF V2 publication | Spring 2023 |  |

Evaluation will be carried out during 2-hour sessions according to the calendar agreed at the time of MPAI-25.

# 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); <https://mpai.community/standards/resources/#GME>.
4. AI Framework (MPAI-AIF) V1.1; <https://mpai.community/standards/resources/#AIF>
5. MPAI-AIF V2 Use Cases and Functional Requirements; <https://mpai.community/standards/mpai-aif/use-cases-and-functional-requirements/mpai-aif-v2-use-cases-and-functional-requirements/>.
6. MPAI-AIF V2 Framework Licence; <https://mpai.community/standards/mpai-aif/framework-licence/mpai-aif-v2-framework-licence/>.
7. Presentation of MPAI-AIF V2 Use Cases and Functional Requirements; <https://platform.wim.tv/#/webtv/convenor/vod/0b55db63-3ef9-4e69-ab02-b08b5a6dec7c>.

# Annex A: Information Form

This information form is to be filled in by a Respondent to this MPAI-AIF V2 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 members of the Evaluation Team.

**Proposal title:**

**Main functionalities:**

**Response summary:** (a few lines)

**Comments on relevance to the CfT (Requirements):**

**Comments on possible MPAI-AIF profiles[[1]](#footnote-1)**

**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:

1. Not supported / partially supported / fully supported.
2. What supports these facts: submission/presentation/demo.
3. The summary of the facts themselves, e.g., very good in one way, but weak in another.

Final assessment should mention:

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

**New Use Cases/Requirements Identified:**

(Please describe)

**Evaluation summary:**

1. **Main strong points, qualitatively:**
2. **Main weak points, qualitatively:**
3. **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   1. Compare the list of requirements (Annex C of the CfT) with the submission. 2. Check if respondents have described in sufficient detail to what part of the requirements their proposal refers to.   NB1: Completeness of a proposal for a Use Case is a merit because reviewers can assess how the components are integrated.  NB2: 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.  NB: Extensibility is the capability of the proposed solution to support functionalities 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.  Note 1: 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.  Note 2: 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-AIF use cases | Evaluators should check how many use cases are supported in the submission |
| Support of non MPAI-AIF use cases | Evaluators should check whether the technologies proposed can demonstrably be used in other significantly different use cases. |

# Annex C: Requirements check list

*Table 5 – List of technologies in MPAI-AIF Use Cases and Functional Requirements [5]*

|  |  |
| --- | --- |
| **Requirements** | **Response** |
| 1. The AIF Components shall access high-level implementation-independent Trusted Services API to handle: |  |
| * 1. Encryption Service. | Y/N |
| * 1. Attestation Service. | Y/N |
| * 1. Trusted Communication Service. | Y/N |
| * 1. Trusted AIM Storage Service including the following functional­ities: | Y/N |
| * + 1. Initialisation (secure and non-secure flash and RAM) | Y/N |
| * + 1. Read/Write. | Y/N |
| * + 1. De-initialisation. | Y/N |
| * 1. Trusted AIM Model Services including the following functional­ities: | Y/N |
| * + 1. Secure and non-secure Model Storage. | Y/N |
| * + 1. Model Update. | Y/N |
| * + 1. Model Validation. | Y/N |
| * 1. AIM Security Engine including the following functionalities: | Y/N |
| * + 1. Model Encryption. | Y/N |
| * + 1. Model Signature. | Y/N |
| * + 1. Model Watermarking. | Y/N |
| 1. The AIF Components shall be easily integrated with the above Services. | Y/N |
| 1. The AIF Trusted Services shall be able to use hardware and OS security features already existing in the hardware and software of the environment in which the AIF is implemented. | Y/N |
| 1. Application developers shall be able to select the application’s security either or both by: |  |
| * 1. Level of security that includes a defined set of security features for each level. | Y/N |
| * 1. Developer-defined security, i.e., a level that includes a developer-defined set of security features. | Y/N |
| 1. The specification of the AIF V2 Metadata shall be an extension of the AIF V1 Metadata supporting security with either or both standardised and developer-defined levels. | Y/N |
| 1. Submission of use cases and their respective threat models. | Y/N |

# Annex D: APIs that may require specific testing

Table 6 will be compile based on the responses received.

Table 6 - APIs that may require specific testing

|  |  |  |
| --- | --- | --- |
| **Section** | **APIs** | **Nature of Test** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

# Annex E: Mandatory text in responses

**A response to this MPAI-AIF CfT shall mandatorily include the following text**

*<Company/Member>* submits this technical document in response to MPAI Call for Technologies for AI Framework Version 2 (MPAI-AIF V2) (N769).

*<Company/Member>* explicitly agrees to the steps of the MPAI standards development process defined in Annex 1 to the [MPAI Statutes](https://mpai.community/about/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 Framework Licence of MPAI-AIF V2 (N799), alone or jointly with other IPR holders after the approval of the MPAI-AIF Technical Specification Version 2 by the General Assembly and in no event after commercial implementations of the MPAI-AIF V2 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-AIF Development Committee (AIF-DC) as a con­tribution to the development of the MPAI-AIF Technical Specification.

*<Member>* explicitly agrees to the steps of the MPAI standards development process defined in Annex 1 to the [MPAI Statutes](https://mpai.community/about/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-AIF V2 Framework Licence (N799), alone or jointly with other IPR holders after the approval of the MPAI-AIF Technical Specification by the General Assembly and in no event after commercial implementations of the MPAI-AIF Technical Specification become available on the market.

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 relevan for the subset. [↑](#footnote-ref-1)