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|  | Moving Picture, Audio and Data Coding by Artificial Intelligencewww.mpai.community |

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| **Public Document** |
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| Title | MPAI-AIF Call for Technologies |
| Target | MPAI Members |

Contents

[1 Introduction 1](#_Toc58499071)

[2 How to submit a response 2](#_Toc58499072)

[3 Evaluation Criteria and Procedure 3](#_Toc58499073)

[4 Expected development timeline 3](#_Toc58499074)

[5 References 3](#_Toc58499075)

[Annex A: Information Form 4](#_Toc58499076)

[Annex B: Evaluation Sheet 5](#_Toc58499077)

[Annex C: Requirements check list 7](#_Toc58499078)

[Annex D: Mandatory text in responses 8](#_Toc58499079)

# Introduction

Moving Picture, Audio and Data Coding by Artificial Intelligence (MPAI) is an international non-profit organisation with the mission to develop Artificial Intelligence (AI) enabled digital data coding standards, especially using new technologies such as Artificial Intelligence, and of technologies that facilitate integration of data coding components into ICT systems. With the mechanism of Framework Licences, MPAI seeks to attach clear IPR licensing frameworks to its standards.

As a result of the analysis of several use cases, MPAI has identified the need for a common AI Framework that can support the implementation of Use Cases. MPAI expects that most future use cases will benefit from the use of the MPAI AI Framework or extensions thereof. For this reason, MPAI has decided that a standard satisfying the requirements contained in MPAI document N74 available [online](https://mpai.community/standards/mpai-aif/#Requirements) would benefit use case implementors.

This document is a Call for Technologies (CfT) that 1) satisfy the requirements of N74 and 2) are released according to the Framework Licence of N101, if selected by MPAI for inclusion in the MPAI AI Framework standard called MPAI-AIF. MPAI will select the most suitable technologies on the basis of their technical merits for inclusion in MPAI-AIF.

All parties who believe they have relevant technologies satisfying all or most of the requirements mentioned in MPAI N74 are invited to submit proposals for consideration by MPAI. The parties do not necessarily have to be MPAI members.

MPAI in not obligated, by virtue of this CfT, to select a particular technology or to select any technology if those submitted are found inadequate.

Submissions are due on 2020/02/15T23:59 UTC and will be reviewed according to the schedule that the 5th MPAI General Assembly (MPAI-5) will define at its online meeting on 2021/02/17. Non-MPAI members should contact the MPAI secretariat (secretariat@mpai.community) for further details on how they can attend the said review.

# How to submit a response

Those planning to respond to this CfT

1. Are advised that online events will be held on 2020/12/21 and 2021/01/07 to present the MPAI-AIF CfT and respond to questions. Logistic information of these events will be posted on the MPAI web site
2. Are 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 2021/01/15. A potential submitter making a communication using the said form is not required to actually make a submission. Submission will be accepted even if the submitter did not communicate their intention to submit a response.

Responses to this MPAI-AIF CfT shall/may include:

|  |  |
| --- | --- |
| **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 requirements identified in MPAI N74 are satisfied. If a requirement is not satisfied, the submission shall indicate the reason  | mandatory |
| Comments on the completeness and appropriateness of the MPAI-AIF requirem­ents and any motivated suggestion to 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 D  | mandatory |

Respondents are invited to review the check list of Annex C before submitting their response and filling out Annex B.

Responses to this MPAI-AIF CfT shall be submitted to secretariat@mpai.community (MPAI secretariat) by 2020/02/15T23:59 UTC. The secretariat will acknowledge receipt of the submission via email.

Respondents to this CfT are requested to present their submission (mandatory). If no presenter will attend the meeting, the proposal will be discarded.

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

* A working implementation, including source code, – for use in the development of the MPAI-AIF Reference Software – be made available before the technology is accepted for the MPAI-AIF standard. Software may be written in programming languages that can be compiled or interpreted and in hardware description languages.
* A non-MPAI member immediately join MPAI. If the non-MPAI memberelects not to do so, 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

Submissions will be evaluated on the basis of the criteria identified in Annex B and with the following steps:

1) Presentation (mandatory) / Demonstration (optional)

|  |  |
| --- | --- |
| Goal | To assess the submission based on a presentation and possible demonstration that 1. Demonstrate the appropriateness and disclose the appropriate range of use.
2. Provide evidence of the functionalities claimed, and of how the submission satisfies the evaluation criteria.

NB1: A respondent may opt to select a particular use case to demonstrate their functionalities. MPAI encourages to select one of the existing Use Cases. A respondent my demonstrate a new use case. However, they should provide complete description of the use case, of the inputs and outputs of the implemented AIMs and the interaction between AIMs and Management and Control.NB2: Both demo and presentation will each have a time limit (to be determined). |
| Output | Complete proposal evaluation sheet in Annex B. |

2) Produce a conclusion

|  |  |
| --- | --- |
| Goal | To summarise the results. This should enable MPAI to identify* The strong points of the proposal.
* How the proposal might be adapted or combined with other proposals to enter the Working Draft, and/or be further tested.
 |
| Output |  Proposed evaluation results.  |

# Expected development timeline

Timeline of the call, deadlines and evaluation of the answers:

|  |  |
| --- | --- |
| Call for Technologies | 2020/12/16 |
| Conference Calls | 2020/12/21 and 2021/01/07 |
| Notification of intention to submit a proposal | 2021/01/15 |
| Submission deadline | 2021/02/15T23.59 UTC |
| Evaluation of responses | Calendar determined at MPAI-5 2021/02/17 |

Evaluation to be carried out during 2-hour sessions according to the calendar agrees at MPAI-5

# References

[1] Use Cases & Functional Requirements of MPAI-AIF, MPAI N74; <https://mpai.community/standards/mpai-aif/>

[2] Use Case-Requirements-candidate technologies for MPAI-CAE CfT, MPAI N96

[3] Use Case-Requirements-candidate technologies for MPAI-MMC CfT, MPAI N97

[4] MPAI-CUI Use Cases and Functional Requirements, MPAI N95

# Annex A: Information Form

This information form is to be filled in by a respondent to the MPAI-AIF CfT

1. Title of the proposal
2. Organisation: company name, position, e-mail of contact person
3. What is 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

This evaluation sheet is to be used for self-evaluation in the submission and to be filled out during evaluation phase.

**Title of the Proposal:**

**Main Functionalities:**

**Summary of Response:** (a few lines)

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

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

**Evaluation table:**

|  |  |  |
| --- | --- | --- |
| **Submission features** | **Evaluation elements** | **Final Assement** |
| Completeness of description |  |  |
| Understandability |  |  |
| Adaptability |  |  |
| 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 supported 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 of improving or adding to the proposal, e.g., any missing or weak features.
2. How sure the experts are, i.e., evidence shown, very likely, very hard to tell, etc.
3. Global evaluation (Not Applicable/ --/ - / + / ++)

**New Use Cases/Requirements Identified:**

**Summary of the evaluation:**

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 much 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.)

# Annex C: Requirements check list

This list has been derived from the Requirements of N74. It is not intended to be a replacement of those Requirements.

The submission shall support the following requirements

1. General Machine Learning and/or Data Processing life cycles with the possibility to
	1. instantiate-configure-remove
	2. dump/retrieve internal state
	3. start-suspend-stop
	4. train-retrain-update
	5. enforce resource limits
	6. implement auto-configuration/reconfiguration of ML-based computational models of

single AIMs and

* 1. initialise the overall computational model
	2. instantiate-remove-configure AIMs
	3. manually, automatically, dynamically and adaptively configure interfaces with Com­ponents
	4. one- and two-way signal for computational workflow initialisation and control of

combinations of AIMs

1. Application-scenario dependent hierarchical execution of workflows
2. Topology of networked AIMs that can be synchronised according to a given time base and full ML life cycles
3. Supervised, unsupervised and reinforcement-based learning paradigms
4. Computational graphs, such as Direct Acyclic Graph (DAG) as a minimum
5. Initialisation of signalling patterns, communication and security policies between AIMs
6. Protocols to specify storage access time, retention, read/write throughput etc.
7. Storage of Components’ data
8. Access to
	1. Static or slowly changing data with standard formats
	2. Data with proprietary formats

The submission shall support the implementation of AI Frameworks featuring

1. Asynchronous and time-based synchronous operation depending on application
2. Dynamic update of the ML models with seamless or minimal impact on its operation
3. Time-sharing operation of ML-based AIMs shall to enabl use of the same ML-based AIM in multiple concurrent applications
4. AIMs which are aggregations of AIMs exposing new interfaces
5. Workflows that are a mixture of AI/ML-based and DP technology-based AIMs.
6. Scalability of complexity and performance to cope with different scenarios, e.g. from small MCUs to complex distributed systems

The submission shall not inhibit the creation of MPAI-AIF profiles.

# Annex D: Mandatory text in responses

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

*<Company/Member>* submits this technical document in response to MPAI Call for Technologies for MPAI project MPAI-XYZ (MPAI document Nijk).

 *<Company/Member>* explicitly agrees to the steps of the MPAI standards development process defined in Annex 1 to the MPAI Statutes, 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-XYZ (MPAI document Nmnp), alone or jointly with other IPR holders after the approval of the MPAI-XYZ Technical Specif­ication by the General Assembly and in no event after commercial implementations of the MPAI-XYZ 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 Development Committee XYZ as a contribution to the development of the MPAI-XYZ Technical Specification.

 *<Member>* explicitly agrees to the steps of the MPAI standards development process defined in Annex 1 to the MPAI Statutes, 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 Framework Licence of MPAI-XYZ (MPAI document Nmnp), alone or jointly with other IPR holders after the approval of the MPAI-XYZ Technical Specification by the General Assembly and in no event after commercial implementations of the MPAI-XYZ 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 relevanto for the subset [↑](#footnote-ref-1)