

Recommendation

ITU-T F.748.49 (03/2025)

SERIES F: Non-telephone telecommunication services

Multimedia services

Architecture and protocols of multi-algorithm scheduling systems

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Recommendation ITU-T F.748.49

Architecture and protocols of multi-algorithm scheduling systems

Summary

Recommendation ITU-T F.748.49 specifies the architecture and protocols of the multi-algorithm scheduling (MAS) systems for artificial intelligence (AI)-based multimedia applications, which meet the requirements and framework of MAS systems specified in Recommendation ITU-T F.748.36. The MAS systems consist of the scheduling unit, the algorithm warehouse unit, and the computing power resource management unit. The MAS systems schedule multiple algorithms (multi-type, multi-version, or from multiple providers) across heterogeneous computing power resources based on specific tasks on-demand. This Recommendation is intended to guide the design, development, implementation and application of MAS systems.

History *

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Algorithm, applications, architecture, artificial intelligence, computing power resource, interfaces, multi-algorithm scheduling, multimedia, protocols, reference points.

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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Recommendation ITU-T F.748.49

Architecture and protocols of multi-algorithm scheduling systems

1 Scope

This Recommendation specifies the architecture and protocols of the multi-algorithm scheduling (MAS) systems for artificial intelligence-based multimedia applications, which meet the requirements and framework of MAS systems specified in [ITU-T F.748.36].

The scope of this Recommendation includes:

- functional architecture and reference points;
- interface descriptions and relevant protocols definitions; and
- algorithm package format descriptions.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[[ITU-T F.748.36](#)] Recommendation ITU-T F.748.36 (2024), *Requirements and framework of multi-algorithm scheduling systems*.

[[ITU-T H.627.3](#)] Recommendation ITU-T H.627.3 (2022), *Protocols for intelligent video surveillance systems*.

[IETF RFC 7616] IETF RFC 7616 (2015), *HTTP Digest Access Authentication*.

[IETF RFC 9110] IETF RFC 9110 (2022), *HTTP Semantics*.

[IETF RFC 9112] IETF RFC 9112 (2022), *HTTP/1.1*.

[ISO 8601-1] ISO 8601-1 (2019), *Date and time – Representations for information interchange – Part 1: Basic rules*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 algorithm [b-ISO/IEC 11557]: A set of rules for transforming the logical representation of data.

3.1.2 algorithm package [ITU-T F.748.36]: A set of algorithmic programs and its formal description information that implement specific functions.

NOTE – The algorithmic program is executable software composed of algorithm and runtime environment.

3.1.3 algorithm warehouse [ITU-T F.748.36]: A system with unified management of algorithm packages, including import, storage, retrieval, download, etc.

3.1.4 artificial intelligence [b-ISO/IEC 2382]: Interdisciplinary field, usually regarded as a branch of computer science, dealing with models and systems for the performance of functions generally associated with human intelligence, such as reasoning and learning.

3.1.5 computing power resource [ITU-T F.748.36]: A resource that provides data processing and computing capabilities for various applications.

3.1.6 functional entity [b-ITU-T Y.2012]: An entity that comprises an indivisible set of specific functions. Functional entities are logical concepts, while groupings of functional entities are used to describe practical, physical implementations.

3.1.7 multi-algorithm scheduling [ITU-T F.748.36]: A method that schedules multiple algorithms (multi-type, multi-version, or from multiple providers) across heterogeneous computing power resources based on specific tasks on-demand.

3.1.8 process instance [b-ISO/IEC 33001]: Single specific and identifiable execution of a process.

3.1.9 reference point [b-ITU-T Y.2012]: A conceptual point at the conjunction of two non-overlapping functional entities that can be used to identify the type of information passing between these functional entities.

NOTE – A reference point may correspond to one or more physical interfaces between pieces of equipment.

3.1.10 resource [b-ISO/IEC 2382]: Any element of a data processing system needed to perform required operations.

3.1.11 scheduling [b-ITU-T X.746]: The method of controlling the timing of the execution of a scheduled activity within or represented by a managed object.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AI	Artificial Intelligence
AIMA	Artificial Intelligence based Multimedia Application
AWU	Algorithm Warehouse Unit
CPRMU	Computing Power Resource Management Unit
CPU	Central Processing Unit
FE	Functional Entity
GPU	Graphics Processing Unit
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ID	Identifier
IP	Internet Protocol
JSON	JavaScript Object Notation
MAS	Multi-algorithm Scheduling
NTP	Network Time Protocol

REST	Representational State Transfer
RTSP	Real Time Streaming Protocol
SU	Scheduling Unit
TCP	Transmission Control Protocol
URI	Uniform Resource Identifier
UTF-8	8-bit Unicode Transformation Format

5 Conventions

In this Recommendation:

- The keywords "**is required to**" indicate a requirement which must be strictly followed and from which no deviation is permitted if conformance to this Recommendation is to be claimed.
- The keywords "**is recommended**" indicate a requirement which is recommended but which is not absolutely required. Thus this requirement needs not be present to claim conformance.
- The keywords "**can optionally**" indicate an optional requirement which is permissible, without implying any sense of being recommended. These terms are not intended to imply that the vendor's implementation must provide the option and the feature can be optionally enabled by the network operator/service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with the specification.

6 Functional architecture and reference points

6.1 Functional architecture of multi-algorithm scheduling systems

Figure 1 shows the functional architecture of multi-algorithm scheduling (MAS) systems.

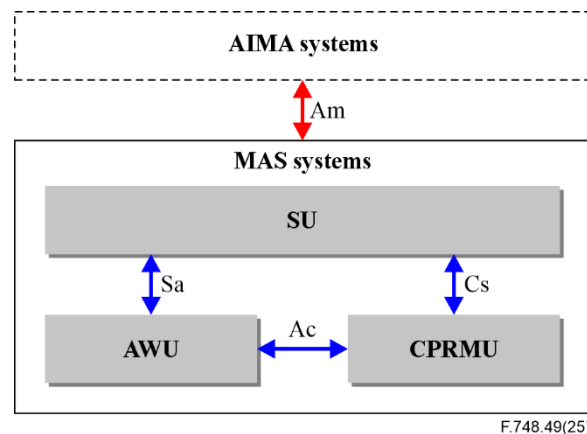


Figure 1 – Functional architecture of multi-algorithm scheduling systems

NOTE – The grey rectangles in Figure 1 represent the functional entities (FEs).

The functional architecture of MAS systems is based on the requirements and framework defined in [ITU-T F.748.36].

The MAS systems are composed of algorithm warehouse unit (AWU), scheduling unit (SU), and computing power resource management unit (CPRMU).

This Recommendation defines the functional entities (FEs) AWU, SU, and CPRMU in clauses 6.1.1 to 6.1.3, and reference points Am, Sa, Cs, and Ac in clause 6.2.