Enterprise-control system integration - Part 6: Messaging service model

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 62264-6:2022 sisaldab Euroopa standardi EN IEC 62264-6:2022 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 62264-6:2022 consists of the English text of the European standard EN IEC 62264-6:2022.
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EUROPÄISCHE NORM

EN IEC 62264-6

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English Version

Enterprise-control system integration - Part 6: Messaging service model (IEC 62264-6:2020)

Intégration des systèmes entreprise-contrôle – Partie 6: Modèle de service de messagerie (IEC 62264-6:2020)

Integration von Unternehmensführungs- und Leitsystemen - Teil 6: Dienstmodell zur Nachrichtenübermittlung (IEC 62264-6:2020)

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European foreword

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The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-09-11
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IEC 62541-3:2015	NOTE	Harmonized as EN 62541-3:2015 (not modified)
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IEC 62541-8:2015	NOTE	Harmonized as EN 62541-8:2015 (not modified)
IEC 62541-9:2015	NOTE	Harmonized as EN 62541-9:2015 (not modified)
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IEC 62264-6

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INTERNATIONAL STANDARD

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Enterprise-control system integration – Part 6: Messaging service model

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Enterprise-control system integration – Part 6: Messaging service model

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FOREWORD

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The text of this International Standard is based on the following documents:

FDIS	Report on voting
65E/706/FDIS	65E/724/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62264, published under the general title *Enterprise-control system integration*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

This document is based on the use of IEC 62264 object models defined in IEC 62264-2, IEC 62264-4 and IEC 62264-5 to define a set of services that may be used to exchange messages. This document defines a messaging service model (MSM) for exchanging messages in a publish-subscribe mode and a request-response mode.

The Messaging Service Model provides a method for applications to send and receive messages from MSM service providers without regard to the underlying communication mechanism, as part of a complete application-to-application data exchange.

This document defines a model for message exchange services (Messaging Service Model) that are designed to provide a technology independent method for sending and receiving transaction messages to or from underlying exchange services.

The knowledge requirements to interface to just one message exchange system can be immense and are usually not transferable to a different system. MSM defines a single interface, independent of the underlying exchange services, for exchanging data objects defined by IEC 62264-2 and by IEC 62264-4. This removes the need for vendors to build custom interface after custom interface, and for end users to get locked into a single vendor because their investment prevents them from reusing any of the integration efforts.

Exchanging the data objects between different computer system applications involves multiple different steps, as shown in Figure 1.

a) The applications usually have different internal representations of exchanged objects in their own local data stores. This representation is usually converted from the local format to a commonly accepted global format. IEC 62264-2 defines models of a global format for Level 4-3 data exchanges. IEC 62264-4 defines models of a global format for Level 3-3 data exchanges. This conversion, from local to global and global to local, is usually performed twice for any two-way communications.

   EXAMPLE 1 Assume two applications, ALPHA and BETA: the ALPHA application initiates a data exchange with the BETA application, and BETA responds back to ALPHA. The format conversions are: ALPHA's local format to global format for the request data, global format to BETA's local format for the request data, BETA's local format to global format for the response data, and global format to ALPHA's format for the response data.

b) Conversion is performed to align the namespaces among the exchanging applications and is usually performed four times for any two-way communications.

   EXAMPLE 2 Names for elements of data can be codes, tag names, or equipment identifiers.

   EXAMPLE 3 Data which are represented in one element namespace, such as codes 1,2,3,4, can have a different namespace in another application, such as codes Ok, Done, Error, Delay.

c) Once information is in the global format with global names, the exchanged information is sent from one application to another application.

d) Messages are transported from one application to another, either within the same computer environment or across computers. Transport mechanisms are defined in other standards, such as TCP/IP and Ethernet standards.

e) When data exchange information is received, there are specific rules that define what resultant data are to be returned. The transaction rules are defined in IEC 62264-5.

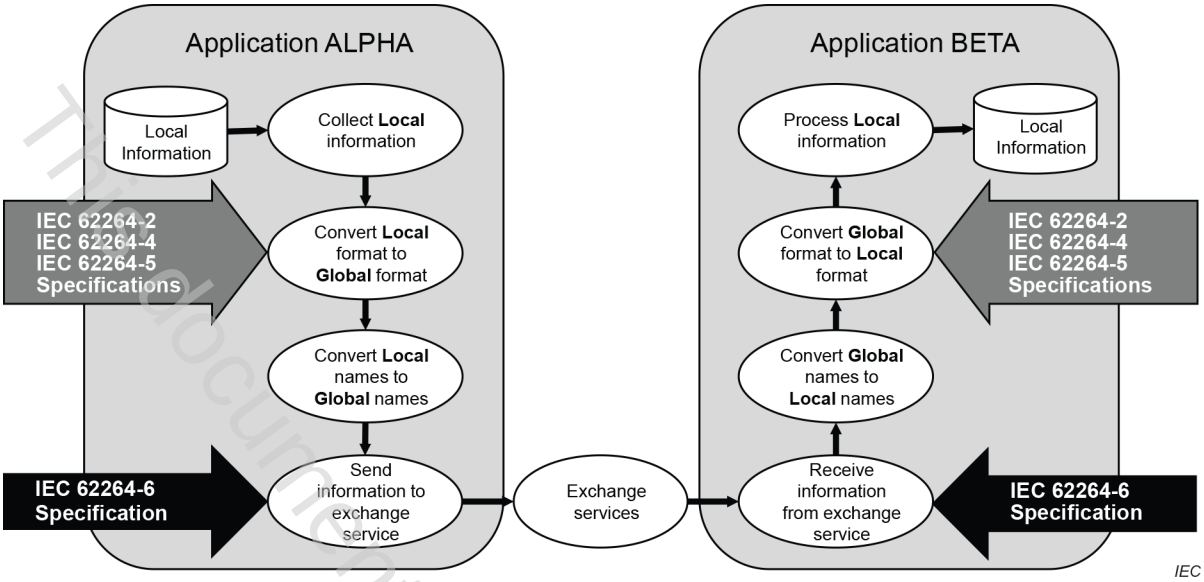

Figure 1 – Steps in application-to-application communication

MSM is a minimal interface subset that can reside on most exchange services and is based on well-defined and structured data objects and transaction messages.

Each layer shown in Figure 2 addresses a specific element of application data exchange.

1) A Data Object layer defines the meaning, format, and structure of the basic elements of exchanged information.

   NOTE 1 This layer uses application space specific definitions, such as the IEC 62264-2 and IEC 62264-4 object definitions, MESA B2MML, MIMOSA CCOM objects, and "Nouns" defined in OAGIS.

2) A Transaction layer defines the meaning, format, and structure of actions to be taken on the data objects.

   NOTE 2 This layer can use IEC 62264-5 transaction style specific definitions. Another transaction layer definition could be the OAGIS "Verb" definitions.

3) The MSM defines an interface to the OSI Application layer's services.

4) The application, presentation, session and lower level layers define the meaning, format, and structure for coordination, buffering, and exchange of messages or files. These layers contain transfer or exchange style specific definitions, such as Enterprise Service Buses, Enterprise Message Delivery Systems, the OPC UA specification (IEC 62541 standard), RSS, FTP, Named Pipes, Ethernet, TCP/IP, HTTP, and others.

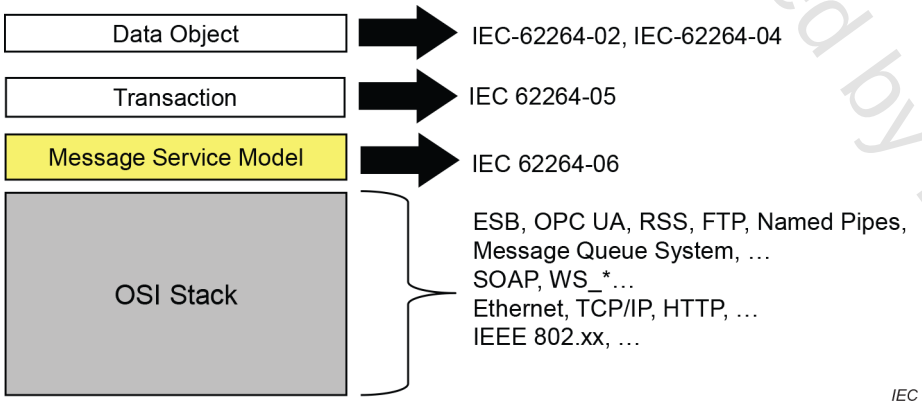

Figure 2 – Defined standards at each level

The IEC 62264-5 standard defines transactions on the information. The Messaging Service Model (MSM) defines an interface to methods for exchange. In a sense, MSM defines the standard "on-ramp" and "off-ramp" to the application layer services. It defines how data is placed into exchange methods and how it is retrieved from the exchange methods.

NOTE 1 Message synchronization using the MSM service is distinct from the message synchronization provided by the 62264-5 transaction models as well as distinct from the synchronization mechanisms provided at lower levels of the communications stack.

NOTE 2 In this document, asynchronous message exchanges between consumers and producers can be considered to be pairs of distinct, unidirectional messages.

This document includes two informative annexes. Annex A is informative. It provides considerations for (MSM) service providers. Annex B is informative. It provides a brief description of Enterprise Service Buses as a message exchange mechanism.

ENTERPRISE-CONTROL SYSTEM INTEGRATION –

Part 6: Messaging service model

1 Scope

This document defines a technology independent model for a set of abstract services that is located above the application layer of the OSI model, and that is used for exchanging transaction messages based on the transaction models defined in IEC 62264-5. The model, which is called the Messaging Service Model (MSM), is intended for interoperability between manufacturing operations domain applications and applications in other domains.

NOTE It is recognized that other sets of services not defined in accordance with this document are possible for the exchange of MOM information and are not deemed invalid as a result of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62264-1, *Enterprise-control system integration – Part 1: Models and terminology*

IEC 62264-2, *Enterprise-control system integration – Part 2: Object and attributes for enterprise-control system integration*

IEC 62264-4, *Enterprise-control system integration – Part 4: Objects models attributes for manufacturing operations management integration*

IEC 62264-5, *Enterprise-control system integration – Part 5: Business to manufacturing transactions*

3 Terms, definitions, abbreviation, and conventions

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
channel description
text that describes a channel

3.1.2
channel type
primary use of a channel for publications or for requests