
**Information technology — Open
Distributed Processing —**

Part 2:

**General Inter-ORB Protocol
(GIOP)/Internet Inter-ORB Protocol (IIOP)**

Technologies de l'information — Traitement réparti ouvert —

*Partie 2: «General Inter-ORB Protocol (GIOP)/Internet Inter-ORB
Protocol (IIOP)»*

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

This document is a preview generated by EVS

© ISO/IEC 2003

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

1	Scope	1
2	Normative references	1
2.1	Identical Recommendations International Standards	1
2.2	Other Specifications	2
3	Definitions	2
3.1	Recommendations International Standards	2
3.2	Other Specifications	3
3.2.1	adapter	3
3.2.2	Attribute	3
3.2.3	client	3
3.2.4	data type	3
3.2.5	domain	3
3.2.6	dynamic invocation	3
3.2.7	dynamic skeleton	3
3.2.8	implementation	3
3.2.9	interface repository	3
3.2.10	ORB core	3
3.2.11	repository	4
3.2.12	request	4
3.2.13	results	4
3.2.14	server	4
3.2.15	signature	4
3.2.16	skeleton	4
3.2.17	synchronous request	4
3.2.18	interface type	4
3.2.19	interoperability	4
3.2.20	language binding or mapping	4
3.2.21	method	4
3.2.22	object adapter	5
3.2.23	object implementation	5
3.2.24	object reference	5
3.2.25	objref	5
3.2.26	value	5
3.3	Abbreviations	5
4	Introduction to GIOP/IOP	6
5	ORB Interoperability Architecture	6
5.1	Overview	6
5.1.1	Domains	6
5.1.2	Bridging Domains	7

5.2 ORBs and ORB Services	7
5.2.1 The Nature of ORB Services	7
5.2.2 ORB Services and Object Requests	8
5.2.3 Selection of ORB Services	8
5.3 Domains	9
5.3.1 Definition of a Domain	9
5.3.2 Mapping Between Domains: Bridging	10
5.4 Interoperability Between ORBs	10
5.4.1 ORB Services and Domains	10
5.4.2 ORBs and Domains	11
5.4.3 Interoperability Approaches	11
5.4.4 Policy-Mediated Bridging	13
5.4.5 Configurations of Bridges in Networks	13
5.5 Object Addressing	14
5.5.1 Domain-relative Object Referencing	14
5.5.2 Handling of Referencing Between Domains	15
5.6 An Information Model for Object References	16
5.6.1 What Information Do Bridges Need?	16
5.6.2 Interoperable Object References: IORs	16
5.6.3 Standard IOR Components	19
5.6.4 Profile and Component Composition in IORs	21
5.6.5 IOR Creation and Scope	22
5.6.6 Stringified Object References	22
5.6.7 Object Service Context	23
5.7 Code Set Conversion	27
5.7.1 Character Processing Terminology	27
5.7.2 Code Set Conversion Framework	29
5.7.3 Mapping to Generic Character Environments	35
5.8 Example of Generic Environment Mapping	37
5.8.1 Generic Mappings	37
5.8.2 Interoperation and Generic Mappings	37
5.9 Relevant OSFM Registry Interfaces	37
5.9.1 Character and Code Set Registry	37
5.9.2 Access Routines	38
6 General Inter-ORB Protocol	42
6.1 Goals of the General Inter-ORB Protocol	42
6.1.1 GIOP Overview	43
6.1.2 Common Data Representation (CDR)	43

6.1.3	GIOP Message Overview	44
6.1.4	GIOP Message Transfer	44
6.2	CDR Transfer Syntax	44
6.2.1	Primitive Types	45
6.2.2	OMG IDL Constructed Types	49
6.2.3	Value Types	52
6.2.4	Pseudo-Object Types	59
6.2.5	Object References	64
6.2.6	Abstract Interfaces	64
6.3	GIOP Message Formats	64
6.3.1	GIOP Message Header	65
6.3.2	Request Message	67
6.3.3	Reply Message	70
6.3.4	CancelRequest Message	73
6.3.5	LocateRequest Message	74
6.3.6	LocateReply Message	75
6.3.7	CloseConnection Message	77
6.3.8	MessageError Message	78
6.3.9	Fragment Message	78
6.4	GIOP Message Transport	79
6.4.1	Connection Management	79
6.4.2	Message Ordering	80
6.5	Object Location	81
6.6	Internet Inter-ORB Protocol (IIOP)	82
6.6.1	TCP/IP Connection Usage	82
6.6.2	IIOP IOR Profiles	83
6.6.3	IIOP IOR Profile Components	85
6.7	Bi-Directional GIOP	86
6.7.1	Bi-Directional IIOP	87
6.8	Bi-directional GIOP policy	88
6.9	OMG IDL	89
6.9.1	GIOP Module	89
6.9.2	IIOP Module	95
6.9.3	BiDirPolicy Module	96

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 19500-2 was prepared by the Object Management Group (OMG) and was adopted, under the PAS procedure, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

ISO/IEC 19500 consists of the following parts, under the general title *Information technology — Open Distributed Processing*:

— *Part 2: General Inter-ORB Protocol (GIOP)/Internet Inter-ORB Protocol (IIOP)*

NOTE Other parts will be added in the future.

Introduction

The rapid growth of distributed processing has led to a need for a coordinating framework for the standardization of Open Distributed Processing (ODP). ITU-T Recommendations X.901-904 | ISO/IEC 10746, the Reference Model of Open Distributed Processing (RM-ODP) provides such a framework. It defines an architecture within which support of distribution, interoperability and portability can be integrated.

Within the framework provided by the RM-ODP, ITU-T Rec. X.931 | ISO/IEC 14752, ODP - Protocol Support for Computational Interactions, defines how interactions between computational objects in a computational specification of a system relate to protocol support for those interactions in an engineering specification of that system.

Annex A to ITU-T Rec. X.931 | ISO/IEC 14752 defines a mapping to the General Inter-ORB Protocol (GIOP) and the Internet Inter-ORB Protocol (IIOP) which are specified by this International Standard.

GIOP is the base for all interoperability and support for all object request broker (ORB) functionality in the Common Object Request Broker Architecture (CORBA) specified by the Object Management Group (OMG). IIOP is the mapping of GIOP for the Internet.

Note: This document is technically aligned with the OMG CORBA GIOP and IIOP specifications.

This document is a preview generated by EVS

Information technology — Open Distributed Processing —

Part 2: General Inter-ORB Protocol (GIOP)/Internet Inter-ORB Protocol (IIOP)

1 Scope

This standard specifies the General Inter-ORB Protocol (GIOP) for object request broker (ORB) interoperability. GIOP can be mapped onto any connection-oriented transport protocol that meets a minimal set of assumptions defined by this standard.

This standard also defines the Internet Inter-ORB Protocol (IIOP), a specific mapping of the GIOP which runs directly over connections that use the Internet Protocol and the Transmission Control Protocol (TCP/IP connections).

This standard provides a widely implemented and used particularization of ITU-T Rec. X.931 | ISO/IEC 14752, *Information technology — Open Distributed Processing — Protocol support for computational interactions*. It supports interoperability and location transparency in ODP systems.

2 Normative references

The following referenced documents are indispensable for the application 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.

2.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.902 (1995) | ISO/IEC 10746-2:1996, *Information technology — Open Distributed Processing — Reference Model: Foundations*
- ITU-T Recommendation X.903 (1995) | ISO/IEC 10746-3:1996, *Information technology — Open Distributed Processing — Reference Model: Architecture*
- ITU-T Recommendation X.920 (1997) | ISO/IEC 14750:1999, *Information technology — Open Distributed Processing — Interface Definition Language*
- ISO/IEC 14752:2000, *Information technology — Open Distributed Processing — Protocol support for computational interactions*
- ISO/IEC 8859-1: 1998, *Information technology — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1*
- ISO/IEC 10646-1:2000, *Information technology — Universal Multiple-Octect Coded Character Set (UCS) — Part 1: Architecture and Basic Multilingual Plane*

2.2 Other Specifications

- CORBA 2.3 - The Common Object Request Broker: Architecture and Specification, Revision 2.3, Object Management Group, June 1999 (OMG Doc Number: Formal/98-12-01, <ftp://ftp.omg.org/pub/docs/formal/98-12-01.pdf>)
- CORBA services: Common Object Services Specification, Object Management Group, December 1998 (OMG Doc Number: Formal/98-12-09, <ftp://ftp.omg.org/pub/docs/formal/98-12-09.pdf>)
- Java™ to IDL Language Mapping, Object Management Group, July 1999 (OMG Doc Number: Formal/99-07-59, <ftp://ftp.omg.org/pub/docs/formal/99-07-59.pdf>)
- STD 007 (also, RFC 793), Transmission Control Protocol, J. Postel, Internet Engineering Task Force, Sept. 1981
- STD 005 (also, RFC 791), Internet Protocol, J. Postel, Internet Engineering Task Force, Sept. 1981
- OSF Character and Code Set Registry, OSF DCE FRC 40.1 (Public Version), S. (Martin) O'Donnell, June 1994.
- RPC Runtime Support For I18N Characters — Functional Specification, OSF DCE SIG RFC 41.2, M. Romagna, R. Mackey, November 1994.

3 Definitions

For the purposes of this International Standard, the following definitions apply:

3.1 Recommendations | International Standards

This International Standard makes use of the following terms defined in ITU-T Rec. X.902 | ISO/IEC 10746-2:

behavior
interface
instance
object
state
type

This International Standard makes use of the following terms defined in ITU-T Rec. X.903 | ISO/IEC 10746-3:

operation
stub