

C 2236

INTERNATIONAL
STANDARD

ISO/IEC
9579-1

First edition
1993-12-15

**Information technology — Open Systems
Interconnection — Remote Database
Access —**

**Part 1:
Generic Model, Service and Protocol**

*Technologies de l'information — Interconnexion de systèmes ouverts
(OSI) — Accès aux bases de données à distance —
Partie 1: Modèle, service et protocole*



Reference number
ISO/IEC 9579-1:1993(E)

Contents

Foreword	xiii
Introduction	xiv
Section 1: Introduction	1
1.1 Scope	1
1.2 Normative references	3
1.3 Definitions	4
1.3.1 Basic Reference Model	4
1.3.2 Reference Model – Naming and Addressing	4
1.3.3 Service conventions	4
1.3.4 Application Layer Structure	5
1.3.5 Connection Oriented Presentation Service Definition	5
1.3.6 Service Definition for the Association Control Service Element	5
1.3.7 Specification of Abstract Syntax Notation One (ASN.1)	5
1.3.8 Commitment, Concurrency, and Recovery	6
1.3.9 Distributed Transaction Processing	6
1.3.10 Reference Model of Data Management	6
1.3.11 Remote Database Access	6
1.3.11.1 database language	6
1.3.11.2 database language command	6
1.3.11.3 database language statement	6

© ISO/IEC 1993

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 the publisher.

ISO/IEC Copyright Office • Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland



1.3.11.4 database server	6
1.3.11.5 data resource	7
1.3.11.6 RDA client	7
1.3.11.7 RDA Control service	7
1.3.11.8 RDA dialogue	7
1.3.11.9 RDA dialogue-state model	7
1.3.11.10 RDA Generic Standard	7
1.3.11.11 RDA operation	7
1.3.11.12 RDA protocol machine	7
1.3.11.13 RDA server	7
1.3.11.14 RDA Service	7
1.3.11.15 RDA Specialization Standard, RDA Specialization	7
1.3.11.16 RDA transaction	7
1.4 Abbreviations	8
1.5 Conventions	9
1.5.1 Service conventions	9
1.5.2 Service parameter description	9
Section 2: Model	11
2.1 Concepts	12
2.1.1 Overview of the components	12
2.1.2 Database server concepts	12
2.1.2.1 Organization of data	12
2.1.2.2 RDA transactions	13
2.1.2.3 RDA operations	13
2.1.2.4 Database language commands	14
2.1.3 Communication concepts	14
2.1.3.1 RDA dialogues	14
2.1.3.2 Failure and recovery	15
2.1.4 RDA application-contexts	16
2.1.5 RDA Specialization Standards	16
Section 3: Service	17
3.1 Services	18
3.1.1 RDA Dialogue Management services	19

3.1.1.1 RDA Dialogue Initialization functional unit	19
3.1.1.1.1 R-Initialize service	20
3.1.1.2 RDA Dialogue Termination functional unit	23
3.1.1.2.1 R-Terminate service	23
3.1.2 RDA Transaction Management services	25
3.1.2.1 RDA Transaction Management functional unit	25
3.1.2.1.1 R-BeginTransaction service	25
3.1.2.1.2 R-Commit service	26
3.1.2.1.3 R-Rollback service	28
3.1.3 RDA Control services	29
3.1.3.1 Cancel functional unit	29
3.1.3.1.1 R-Cancel service	29
3.1.3.2 Status functional unit	31
3.1.3.2.1 R-Status service	32
3.1.4 Resource Handling services	34
3.1.4.1 Resource Handling functional unit	35
3.1.4.1.1 R-Open service	35
3.1.4.1.2 R-Close service	38
3.1.5 Database Language services	40
3.1.5.1 Immediate Execution DBL functional unit	41
3.1.5.1.1 R-ExecuteDBL service	41
3.1.5.2 Stored Execution DBL functional unit	43
3.1.5.2.1 R-DefineDBL service	44
3.1.5.2.2 R-InvokeDBL service	46
3.1.5.2.3 R-DropDBL service	49
3.2 Sequencing rules	51
3.2.1 RDA client sequencing rules	51
3.2.2 RDA server sequencing rules	54
Section 4: Protocol	57
4.1 Server execution rules	58
4.1.1 RDA dialogue-state model	58
4.1.1.1 RDA operation entity	59
4.1.1.2 RDA dialogue entity	60

4.1.1.3	Opened data resource entity	61
4.1.1.4	Defined DBL entity	61
4.1.2	General server execution rules	62
4.1.2.1	Generation of the RDA operation entity	62
4.1.2.2	Implementor defined errors	63
4.1.2.3	Beginning of an RDA operation	63
4.1.2.4	Cancellation of an RDA operation	63
4.1.2.5	Execution of an RDA operation	63
4.1.2.6	End of an RDA operation	64
4.1.2.7	Response to an RDA operation	64
4.1.2.8	Failure of the RDA dialogue	65
4.1.3	RDA Dialogue Management services	65
4.1.3.1	RDA Dialogue Initialization functional unit	65
4.1.3.1.1	R-Initialize service	65
4.1.3.2	RDA Dialogue Termination functional unit	66
4.1.3.2.1	R-Terminate service	66
4.1.4	RDA Transaction Management services	66
4.1.4.1	RDA Transaction Management functional unit	66
4.1.4.1.1	R-BeginTransaction service	66
4.1.4.1.2	R-Commit service	67
4.1.4.1.3	R-Rollback service	67
4.1.5	RDA Control services	68
4.1.5.1	Cancel functional unit	68
4.1.5.1.1	R-Cancel service	68
4.1.5.2	Status functional unit	69
4.1.5.2.1	R-Status service	69
4.1.6	Resource Handling services	71
4.1.6.1	Resource Handling functional unit	71
4.1.6.1.1	R-Open service	71
4.1.6.1.2	R-Close service	72
4.1.7	Database Language services	73
4.1.7.1	Immediate Execution DBL functional unit	73
4.1.7.1.1	R-ExecuteDBL service	73
4.1.7.2	Stored Execution DBL functional unit	74

4.1.7.2.1	R-DefineDBL service	74
4.1.7.2.2	R-InvokeDBL service	75
4.1.7.2.3	R-DropDBL service	76
4.2	RDA protocol machine	77
4.2.1	Functional units	77
4.2.2	Correspondence between RDA service primitives and RDA APDUs	78
4.2.3	Concatenation	78
4.2.4	State tables	79
4.2.4.1	Conventions	79
4.2.4.2	Actions to be taken by the RDAPM	80
4.2.4.3	States	81
4.2.4.4	Incoming events	82
4.2.4.5	Outgoing actions	84
4.2.4.6	Predicates	85
4.2.4.7	RDAPM state tables	86
4.2.4.7.1	RDA client state tables	86
4.2.4.7.2	RDA server state tables	90
4.2.4.7.3	Values of diagnosticInformation for invalidSequence error	94
4.2.5	Protocol procedures	94
4.2.5.1	Initialization of an RDA dialogue	94
4.2.5.2	Termination of an RDA dialogue	94
4.2.5.3	Initiation of an RDA transaction	95
4.2.5.4	Termination of an RDA transaction	95
4.3	Application-protocol-data-units	96
4.4	Conformance	112
4.4.1	Static conformance	112
4.4.2	Dynamic conformance	112
Section 5: Application-contexts		113
5.1	RDA Basic application-context	114
5.1.1	Application-context name	114
5.1.2	Purpose and scope	114
5.1.2.1	General description	114
5.1.2.2	RDA dialogue failure	114

5.1.3	Set of ASEs	114
5.1.4	SACF rules	114
5.1.4.1	Association establishment and release	115
5.1.4.1.1	A-ASSOCIATE	115
5.1.4.1.2	A-RELEASE	115
5.1.4.1.3	A-ABORT	115
5.1.4.1.4	A-P-ABORT	115
5.1.4.2	RDA dialogue initialization and termination	115
5.1.4.2.1	R-Initialize	115
5.1.4.2.2	R-Terminate	116
5.1.4.3	Mapping rules	116
5.1.4.3.1	ACSE APDUs	116
5.1.4.3.2	RDA APDUs	116
5.1.5	State transition diagrams	116
5.1.6	Use of optional features	119
5.1.6.1	A-ASSOCIATE	119
5.1.6.2	A-RELEASE	119
5.1.6.3	A-ABORT	119
5.1.6.4	A-P-ABORT	119
5.1.7	Conformance	119
5.1.7.1	Static conformance	119
5.1.7.2	Dynamic conformance	120
5.2	RDA TP application-context	121
5.2.1	Application-context name	121
5.2.2	Purpose and scope	121
5.2.3	Set of ASEs	121
5.2.4	SACF rules	121
5.2.4.1	Sequencing rules	122
5.2.4.1.1	RDA with TP Dialogue functional unit	122
5.2.4.1.2	RDA with TP Polarized Control functional unit	123
5.2.4.1.3	RDA with TP Shared Control functional unit	123
5.2.4.1.4	RDA with TP Handshake functional unit	123
5.2.4.1.5	RDA with TP Commit and Chained Transactions functional units	123
5.2.4.1.6	RDA with TP Commit and Unchained Transactions functional units	124

5.2.4.1.7	R-Initialize	124
5.2.4.2	Mapping rules	124
5.2.4.2.1	TP APDUs	124
5.2.4.2.2	RDA APDUs	124
5.2.4.3	Concatenation rules	124
5.2.4.4	Transaction states	125
5.2.4.4.1	RDA with TP Dialogue functional unit	125
5.2.4.4.2	RDA with TP Polarized Control functional unit	125
5.2.4.4.3	RDA with TP Shared Control functional unit	125
5.2.4.4.4	RDA with TP Handshake functional unit	125
5.2.4.4.5	RDA with TP Commit and Chained Transactions functional units	125
5.2.4.4.6	RDA with TP Commit and Unchained Transactions functional units	126
5.2.5	State transition diagrams	126
5.2.6	Use of optional features	131
5.2.6.1	A-ASSOCIATE	131
5.2.7	Conformance	131
5.2.7.1	Static conformance	131
5.2.7.2	Dynamic conformance	131
Section 6: Specializations		133
6.1	RDA Specialization Standards	134
6.1.1	General	134
6.1.2	Model	134
6.1.3	Service	134
6.1.4	Protocol	135
6.1.4.1	Server execution rules	135
6.1.4.2	State tables	135
6.1.4.3	Structure of RDA Specialization APDUs	135
6.1.4.4	Conformance	135
6.1.5	Application-contexts	136
Annex A: Relationship to the Application Layer structure		137
A.1	Introduction	137
A.2	RDA as an application-service-element	137
A.3	RDA application-contexts	137

A.4 RDA service-provider	137
Index	141

Figures

1	RDA component relationships	12
2	Overview of RDA states	15
3	Structure of RDA service primitives	19
4	Relationship of RDAPM to RDA model	79
5	State transition diagram for RDA Basic application-context – RDA client	117
6	State transition diagram for RDA Basic application-context – RDA server	118
7	State transition diagram for RDA TP application-context – RDA client (Chained Transactions)	127
8	State transition diagram for RDA TP application-context – RDA server (Chained Transactions)	128
9	State transition diagram for RDA TP application-context – RDA client (Unchained Transactions)	129
10	State transition diagram for RDA TP application-context – RDA server (Unchained Transactions)	130
A.1	The RDA Service viewed in the RDA Basic application-context	138
A.2	The RDA Service viewed in the RDA TP application-context	139

Tables

1	RDA functional units and associated RDA services	18
2	R-Initialize service primitives and their parameters	20
3	R-Terminate service primitives and their parameters	23
4	R-BeginTransaction service primitives and their parameters	25
5	R-Commit service primitives and their parameters	27
6	R-Rollback service primitives and their parameters	28
7	R-Cancel service primitives and their parameters	29
8	R-Status service primitives and their parameters	32
9	R-Open service primitives and their parameters	35
10	R-Close service primitives and their parameters	38
11	R-ExecuteDBL service primitives and their parameters	41
12	R-DefineDBL service primitives and their parameters	44
13	R-InvokeDBL service primitives and their parameters	46
14	R-DropDBL service primitives and their parameters	49
15	State table for RDA client service primitives	53
16	State table for RDA server service primitives	55
17	RDA functional units and associated RDA APDUs	77
18	States	81
19	Incoming events: RDA Dialogue Management and RDA Transaction Management services	82
20	Incoming events: RDA Control, Resource Handling, and Database Language services	83
21	Outgoing actions: RDA Dialogue Management and RDA Transaction Management services	84
22	Outgoing actions: RDA Control, Resource Handling, and Database Language services	85
23	Predicates	85
24	RDA client state table: RDA Dialogue Management services	86
25	RDA client state table: RDA Transaction Management services	87
26	RDA client state table: RDA Control and Resource Handling services	88

27	RDA client state table: Database Language services	89
28	RDA server state table: RDA Dialogue Management services	90
29	RDA server state table: RDA Transaction Management services	91
30	RDA server state table: RDA Control and Resource Handling services	92
31	RDA server state table: Database Language services	93
32	diagnosticInformation for invalidSequence error	94