

ISO/IEC 9579:2000-02 ()

Contents

Page

Contents iii

Tablesviii

Figuresix

Forewordx

Introductionxi

1 Scope 1

2 Normative References 3

2.1 International Standards 3

2.2 Internet Engineering Task Force 3

2.3 Institute of Electrical and Electronics Engineers 4

3 Interoperability 5

3.1 Interoperability between implementations 5

3.2 Interoperability with conforming OSI implementations 5

3.3 Interoperability with future editions 5

4 Definitions, Conventions and Notations 6

4.1 Definitions 6

4.2 Conventions 7

4.2.1 Convention for Figures 7

4.2.2 Naming of Concepts 7

4.2.3 Naming of Parameters 7

4.2.4 Specification of RDA Protocol, RDA Operations and RDA encoding elements 7

4.2.5 Evaluation of Rules 7

iv Contents 4.3 Notations 9

4.3.1 SQL/CLI functions 9

4.3.2 Implicit encoding definitions 9

4.3.3 Encoding Attributes 9

4.3.4 Notation for encoding syntax 9

5 Model and Facilities 10

5.1 Model 10

5.2 The RDA-client environment 11

5.2.1 Service User 11

5.2.2 SQL-client Services 11

5.2.3 RDA-client Services 12

5.2.4 Transport Mapping 12

5.2.5 RDA-client 12

5.2.6 RDA Location Server 13

5.3 The RDA-server environment 14

5.3.1 Transport Mapping 14

5.3.2 RDA-server Services 14

5.3.3 RDA-server 15

5.3.4 SQL-server 15

5.3.5 RDA Support Server 15

5.4	RDA concepts and the mapping of SQL/CLI concepts	16
5.4.1	Application Communication Areas	16
5.4.1.1	Attributes	16
5.4.1.2	Diagnostics areas	16
5.4.1.3	Descriptor areas	16
5.4.2	SQL_TEXT	17
5.4.3	SQL-session and SQL-connection	17
5.4.4	SQL User Name and Password	17
5.4.5	Multi-site Transactions	17
5.4.6	SQL/CLI Handles	17
5.4.7	Connection Ident	18
5.4.8	Statement Ident	18
5.4.9	Request Ident	18
5.4.10	Encodings	18
5.5	RDA Model of Transport	19
5.5.1	Transport Provider	19
5.5.2	Transport Address	19
5.5.3	Destination SQL-server Name	19
5.5.4	Transport Connection	19
5.5.5	Transport Facilities	19
5.6	RDA Facilities for Transport Connections	21
5.6.1	RDA Suspend and Resume Facility	21
5.6.2	RDA Encoding Facility	21
5.7	RDA Facilities for Transaction Co-ordination	22
5.7.1	RDA Transaction Co-ordination Facility	22
Remote Database Access for SQL (RDA/SQL) v 5.8 RDA Facilities for Security		23
5.8.1	RDA Security Services	23
5.8.2	Use of Transport Provider security facilities	23
5.8.3	Use of Authentication in RDAConnect	24
5.8.4	Use of MessageAuthentication in RDAMessage	24
6	RDA Protocol	26
6.1	The RDA Protocol Exchange	26
6.2	RDAMessage	27
6.2.1	RDAMessage protocol element	27
6.2.2	MessageAuthentication encoding element	30
6.3	Invocation of RDA Operations	32
6.3.1	Invocation of the Request in the RDA-client environment	32
6.3.2	Evaluation of the Request in the RDA-server environment	33
6.3.3	Invocation of the Response in the RDA-server environment	34
6.3.4	Evaluation of the Response in the RDA-client environment	35
6.3.5	Transport Fail Indication	35
7	RDA Operations	37
7.1	RDA request operations	37
7.1.1	RDAConnect Operation	37
7.1.2	RDADisconnect Operation	40
7.1.3	RDAEndTran Operation	41
7.1.4	RDAClientAttribute Operation	43
7.1.5	RDASTatementPrepare Operation	44
7.1.6	RDASTatementDeallocate Operation	45
7.1.7	RDASTatementExecute Operation	46
7.1.8	RDASTatementExecDirect Operation	49
7.1.9	RDASTatementFetchRows Operation	50
7.1.10	RDASTatementCloseCursor Operation	52
7.1.11	RDASTatementCancel Operation	53
7.1.12	RDASetCursorName Operation	54
7.1.13	RDAGetCursorName Operation	55
7.1.14	RDAGetInfo Operation	56
7.1.15	RDAGetTypeInfo Operation	57
7.2	RDA response encoding element	58

7.3	Encoding components	62
7.3.1	RDAAtribute encoding element	62
7.3.2	RDADiagnostic and RDADiagnosticStatus encoding elements	65
7.3.3	RDAItemDescriptor encoding element	66
7.3.4	RDARow and RDAValue encoding elements	68
8	Exceptions	69
8.1	Exception codes for RDA-specific Conditions	69
vi	Contents 8.2 Exception Behaviour	70
9	Encodings	71
9.1	The Base Encoding	72
9.2	The ASN.1 PER Encoding	73
10	Transport Mappings	74
10.1	Mapping to TCP/IP	75
10.1.1	Transport Address	75
10.1.2	Mapping of Transport Connect	75
10.1.3	Mapping of Transport Disconnect	75
10.1.4	Mapping of Transport Fail	75
10.1.5	Mapping of Transport Send	75
10.1.6	Mapping of Transport Receive	75
10.1.7	Mapping of Transport Errors	75
10.1.8	Default Encoding	75
10.2	Mapping to TLS	76
10.2.1	Mapping of Transport Connect	76
10.2.2	Mapping of encodings	76
10.2.3	Mapping of Transport Errors	76
10.2.4	Provision of mandatory security facilities	76
10.2.5	Provision of optional security facilities	76
11	Conformance	77
11.1	RDA-client Conformance	77
11.2	RDA-server Conformance	77
11.3	Claims of Conformance	77
	Annex A Conformance Proforma	79
A.1.	Identification	79
A.2.	Supplier Details	79
A.3.	Implementation Details	80
A.4.	RDA Support	80
A.5.	Optional facilities for RDA-clients only	81
A.6.	Optional facilities for RDA-servers only	82
	Annex B RDA Programming Interface	83
B.1.	Notation for defining RDA/API functions	84
B.2.	Mapping RDA/API to a programming language	84
B.3.	Transport Handles	84
	Remote Database Access for SQL (RDA/SQL) vii B.4. Transport Mapping Codes	84
B.5.	Transport Connection Management	85
B.6.	RDA/API functions	85
B.7.	RDA/API function invocation	85
B.8.	RDA/API function parameters	86
	Annex C Mapping of SQL/CLI	93
C.1.	SQLDisconnect	94
C.2.	SQLEndTran	94

C.3.	SQLSetConnectAttr, SQLSetStmtAttr and SQLSetEnvAttr	94
C.4.	<set transaction statement>	95
Annex D RDA Location Server		97
D.1.	RDA Location Server name and schema	97
D.2.	Server Location Table	98
Annex E RDA Support Server		99
E.1.	RDA Support Server name and schema	99
E.2.	Server Information Table	99
E.3.	Request Log Table	101
Annex F Security Service Requirements		103
F.1.	Potential Vulnerabilities	103
F.2.	Authentication	104
F.3.	Access Control	105
F.4.	Transfer Integrity	106
F.5.	Transfer Confidentiality	106
F.6.	Storage Integrity	106
F.7.	Storage Confidentiality	107
F.8.	Non-repudiation	107
Annex G Security Profiles		109
Annex H RDA Operations and Protocol in ASN.1 notation		111
Annex I Encoding of Multiple Rows		115
viii	Tables Table 1-Codes used to identify the protocol	27
	Table 2-Codes used to identify the protocol version	27
	Table 3-Codes used to identify an RDA message type	28
	Table 4-Use of MessageAuthenticateParameters	31
	Table 6-Codes used for attribute types	62
	Table 7-Codes used for RDA defined Connection Attributes	62
	Table 8-Prohibited attributes	63
	Table 10-Values of Statement Ident	64
	Table 11-RDADescriptorEntries required for SQL Data Types	66
	Table 12-SQLSTATE class and subclass values for RDA-specific conditions	69
	Table 13-RDAResponse Parameter settings for RDA generated conditions	70
	Table 14-Codes used to identify TCP/IP encoding	71
	Table 15-Transport Mappings	74
	Table 16-Transport Mapping Codes	84
	Table C.1-RDA Operations invoked when evaluating an SQL/CLI function	93
	Table G.1-Security Profiles - Facilities Used	109

Table G.2-Security Profile - Services Provided 109
Remote Database Access for SQL (RDA/SQL) ix Figures Figure 1-RDA model of SQL-environment . 10
Figure 2-Model of the RDA-client environment 11
Figure 3-Model of the RDA server environment 14