Stable Implementation Agreements for Open Systems Interconnection Protocols: Part 19 - Remote Database Access

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Foreword

This part of the Stable Implementation Agreements was prepared by the Remote Database Access Special Interest Group (RDA SIG) of the Open Systems Environment Implementors' Workshop (OIW). See Part 1 - Workshop Policies and Procedures of the "Draft Working Implementation Agreements Document" for the charter.

Text in this part has been approved by the Plenary of the Workshop. This part replaces the previously existing part on this subject.

Future changes and additions to this version of these implementation Agreements will be published as change pages. Deleted and replaced text will be shown as strikeout. New and replacement text will be shown as shaded.

The text in this part contains a set of Remote Database Access (RDA) Implementation Agreements intended to serve in lieu of an International Standardized Profile (ISP) for RDA. It is the aim of the OIW RDA SIG to pursue alignment of this part with a future RDA ISP. When the ISP is complete, this part will be revised to refer to the ISP, and to only highlight additional practices and North American regional requirements.

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Part 19 - Remote Database Access

0 Introduction

This part defines Implementation Agreements based on ISO Remote Database Access, as defined in ISO/IEC 9579. That specification has two parts. Part 1 defines the RDA Generic Model, Service, and Protocol; part 2 defines the RDA SQL Specialization.

1 Scope

This implementation agreement addresses interaction between an application program and a remote database server. The database server is an open system that provides database storage facilities and supplies database processing services to clients at other open systems.

The RDA service-provider supplies the protocol for RDA client interaction with an RDA server. The RDA client initiates an RDA dialogue and requests RDA operations to be performed by the RDA server on behalf of an application program. The RDA server, located within the RDA database server, provides database services to RDA clients.

More specifically, this document describes implementation agreements in the following areas:

a) limitations on values of parameters of the RDA protocol;

b) other restrictions on operations of an RDA client or server;

c) profiles.

These agreements presently include only the RDA SQL Specialization Basic Application Context.

2 Status

The following clauses were moved to the Stable Implementation Agreements in December 1992 :

0 Introduction

1 Scope

2 Status

3 Normative references

4 Definitions and abbreviations

5 Structure of RDA standards

6 SQL specialization

Annex A (normative), RDA SIG object identifiers

3 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of these Implementation Agreements. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on these Implementation Agreements are warned against automatically applying any more recent editions of the documents listed below since the nature of references made by the Implementation Agreements to such documents is that they may be specific to a particular edition. Members of IEC and ISO maintain registers of currently valid International Standards, and CCITT maintains published editions of its current recommendations.

[**1**] ISO/IEC 9579-1 *Information Processing Systems - Open Systems Interconnection - Remote Database Access - Part 1: Generic Model, Service, and Protocol.*

[**2**] ISO/IEC 9579-2 *Information Processing Systems - Open Systems Interconnection - Remote Database Access - Part 2: SQL Specialization.*

[**3**] ISO/IEC TR10000-1: 1990(E) *Information Technology - Framework and Taxonomy of International Standardized Profiles - Part 1: Framework.*

[**4**] ISO/IEC TR10000-2: 1990(E) *Information Technology - Framework and Taxonomy of International Standardized Profiles - Part 2: Taxonomy.*

[**5**] ISO/IEC 8859-1:1987 *Information Processing - 8-bit single-byte coded graphic characters sets - Part 1: Latin alphabet No. 1.*

4 Definitions and abbreviations

Definitions and abbreviations are given in the standards listed in clause 3.

5 Structure of RDA standards

The complete specification of an RDA Service is only obtained by the combination of two standards:

a) the RDA Generic Model, Service, and Protocol (ISO/IEC 9579-1), which specifies general capabilities of any RDA service; and

b) an RDA Specialization, which applies to a particular type of database language and augments the RDA Generic standard.

Since RDA Specializations "complete" an RDA specification, these Implementation Agreements are based on RDA Specializations rather than on the RDA Generic standard.

At present there is only one RDA Specialization, the RDA SQL Specialization (ISO/IEC 9579-2).

6 SQL specialization

6.1 Service parameter limits/agreements

This subclause states the limits on the values of RDA parameters for the RDA Basic Application Context.

> **NOTE -** Limits for the RDA TP Application Context will be defined at a later time.

A tabular format is used to describe the usage of each RDA parameter and its limit. Limits vary among implementations. This subclause defines the range of parameter values that developers may safely assume all OIW-compliant systems support.

Each parameter table indicates the following:

a) the name of the parameter;

b) whether it is sent in the request or response service primitive under these Implementation Agreements;

c) whether it is received in the indication or confirm service primitive under these Implementation Agreements;

d) the limitations on the parameter.

The Parameter column gives the name of the parameter or type, as defined in either the service parameter tables or the ASN.1 for the protocol data units of ISO/IEC 9579-1 and 9579-2.

> **NOTE -** Parameter names begin with a lowercase letter, and type names begin with an uppercase letter.

The req (ind) column states whether the parameter is present in the request (indication) service primitive event.

The rsp (cnf) column states whether the parameter is present in the response (confirm) service primitive event.

The Limitation column gives the limits on the parameter value in addition to any limits imposed by the RDA standard. The maximum value indicated for the limit imposed by these Implementation Agreements is a min-max limit. This means that an OIW-compliant implementation must support minimally at least the min-max value. An implementation can support values beyond the min-max value but it can not expect other implementations to do the same. Hence, an implementation should stay within the min-max limit when it is interoperating with another implementation.

If a parameter value is outside the range specified in the Limitation column for that parameter, then the behavior is outside the scope of these Implementation Agreements.

Each RDA parameter is listed on a separate line. Some parameters are structures, composed of subparameters. The structure is shown by the bullet (•) symbols in the parameter column. A parameter name preceded by bullets is a subparameter of the nearest entry above it that has one fewer bullet. In the example below, parameterA and parameterB are subparameters of the structure parameter parameterX, and parameterC is a subparameter of parameterB :

parameterX
•parameterA
•parameterB
••parameterC

The presence of subparameters is always dependent on the presence of the parameter that they appear under (for example, an optional parameter may have subparameters; if the parameter is not supplied, then no subparameters may be supplied).

Under each req, ind, rsp, or cnf column, a code is used to specify the type of usage of each RDA parameter. For the sake of explanation, let x represent the entry under columns req, rsp, ind, and cnf.

If x is M, the parameter is mandatory.

If x is U, the parameter is a user option and may or may not be provided, depending upon the requirements of the user.

If x is C, the parameter is conditional and subject to rules stated in the parameter description in ISO/IEC 9579-1 and 9579-2.

If x is S, the parameter is a mandatory selection from a collection of two or more possible parameters. The parameters that make up this collection are indicated in the parameter table as follows:

a) each parameter in the collection is specified with the code "S";

b) the name of each parameter in the collection has the same number of bullets preceding it in the parameter column in the table; and

c) either

1) each parameter has no bullets preceding it in the table; or

2) each parameter is part of the same structure parameter.

If x is I, the parameter is out of the scope of this profile. The parameter is optional in the base standard but is not used by this profile, or the parameter is not used by the RDA SQL specialization. The parameter may be present. If present, it is ignored or processed according to local procedures; it does not cause an error.

A blank code indicates the parameter is never present.

If x includes (=), the parameter is semantically equivalent to the parameter in the service primitive to its left in the table.

6.1.1 Dialogue initialization functional unit

6.1.1.1 R-Initialize service

6.1.1.1.1 R-Initialize request

Table 1 - Parameters for R-Initialize request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
dialogueID	M	M(=)	See subparameter(s) below.
•dialogueIDClient-Invocation		M	See subparameter(s) below.
••aP-title	M	M(=)	No additional limitation.
••aE-qualifier	M	M(=)	No additional limitation.
••aP-invocationID	M	M(=)	No additional limitation.
••aE-invovationID	M	M(=)	No additional limitation.
•dialogueIDSuffix	M	M(=)	An OCTET STRING from 1 through 64 octets long.
identityOfUser	M	M(=)	A VisibleString from 1 through 64 characters long.
userAuthenticationData	I	I(=)	The client may provide an IA5String from 1 through 255 characters long, an OCTET STRING from 1 through 255 octets long, or a BIT STRING from 1 through 2040 bits long.
controlServiceData-Requested (default value: FALSE)	M	M(=)	No additional limitation.
functionalUnitsRequested	M	M(=)	No additional limitation.
sQLInitializeArgument	U	C(=)	See subparameter(s) below.
•sQLConformanceLevel-Default	U	C(=)	An OBJECT IDENTIFIER from 2 through 16 elements.
•userData	I	I(=)	An OCTET STRING from 1 through 255 octets long.

6.1.1.1.2 R-Initialize result

Table 2 - Parameters for R-Initialize result response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
controlServiceData	C	C(=)	See subparameter(s) below.
•controlServicesAllowed (default value: TRUE)	M	M(=)	No additional limitation.
•controlAuthentication-Data	I	I(=)	The server may provide an IA5String from 1 through 255 characters long, an OCTET STRING from 1 through 255 octets long, or a BIT STRING from 1 through 2040 bits long.
functionalUnitsAllowed	M	M(=)	No additional limitation.
sQLInitializeResult	U	C(=)	See subparameter(s) below.
•userData	I	I(=)	An OCTET STRING from 1 through 255 octets long.

6.1.1.1.3 R-Initialize error

Table 3 - Parameters for R-Initialize error response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
accessControlViolation	S	S(=)	No additional limitation.
duplicateDialogueID	S	S(=)	No additional limitation.
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.
operationAborted	S	S(=)	See subparameter(s) below.
•errorType (default value:transient)	M	M(=)	No additional limitation.

Parameter	rsp	cnf	Limitation
•diagnosticInformation	U	C(=)	A VisibleString, from 1 through 254 characters long.
userAuthenticationFailure	S	S(=)	No additional limitation.

6.1.1.2 R-Synchronize APDU

The R-Synchronize-RI APDU has no parameters.

6.1.2 Dialogue termination functional unit

6.1.2.1 R-Terminate service

6.1.2.1.1 R-Terminate request

Table 4 - Parameters for R-Terminate request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.

6.1.2.1.2 R-Terminate result

Table 5 - Parameters for R-Terminate result response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.

6.1.2.1.3 R-Terminate error

Table 6 - Parameters for R-Terminate error response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
duplicateOperationID	S	S(=)	No additional limitation.
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.
operationAborted	S	S(=)	See subparameter(s) below.
•errorType(default value: transient)	M	M(=)	No additional limitation.
•diagnosticInformation	U	C(=)	A VisibleString from 1 through 254 characters long.
serviceNotNegotiated	S	S(=)	No additional limitation.

6.1.3 Transaction management functional unit

6.1.3.1 R-BeginTransaction service

6.1.3.1.1 R-BeginTransaction request

Table 7 - Parameters for R-BeginTransaction request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.

6.1.3.1.2 R-BeginTransaction error

Table 8 - Parameters for R-BeginTransaction error response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
duplicateOperationID	S	S(=)	No additional limitation.
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.
operationAborted	S	S(=)	See subparameter(s) below.
•errorType(default value: transient)	M	M(=)	No additional limitation.
•diagnosticInformation	U	C(=)	A VisibleString, from 1 through 254 characters long.
serviceNotNegotiated	S	S(=)	No additional limitation.

6.1.3.2 R-Commit service

6.1.3.2.1 R-Commit request

Table 9 - Parameters for R-Commit request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.

6.1.3.2.2 R-Commit result

Table 10 - Parameters for R-Commit result response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
transactionResult	M	M(=)	No additional limitation.

6.1.3.2.3 R-Commit error

Table 11 - Parameters for R-Commit error response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
duplicateOperationID	S	S(=)	No additional limitation.
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.

6.1.3.3 R-Rollback service

6.1.3.3.1 R-Rollback request

Table 12 - Parameters for R-Rollback request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.

6.1.3.3.2 R-Rollback result

Table 13 - Parameters for R-Rollback result response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.

6.1.3.3.3 R-Rollback error

Table 14 - Parameters for R-Rollback error response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
duplicateOperationID	S	S(=)	No additional limitation.
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.

6.1.4 Cancel functional unit

6.1.4.1 R-Cancel service

6.1.4.1.1 R-Cancel request

Table 15 - Parameters for R-Cancel request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
controlledDialogue	U	C(=)	See subparameter(s) below.
•dialogueID	M	M(=)	See subparameter(s) below.
••dialogueIDClient-Invocation	U	C(=)	See subparameter(s) below.
•••aP-title	M	M(=)	No additional limitation.
•••aE-qualifier	M	M(=)	No additional limitation.
•••aP-invocationID	M	M(=)	No additional limitation.
•••aE-invocationID	M	M(=)	No additional limitation.
••dialogueIDSuffix	M	M(=)	An OCTET STRING from 1 through 64 octets long.
•controlAuthenticationData	M	M(=)	The client may provide an IA5String from 1 through 255 characters long, an OCTET STRING from 1 through 255 octets long, or a BIT STRING from 1 to 2040 bits long.

Parameter	req	ind	Limitation
listOfOperationID	U	C(=)	This list may contain from 1 through 32 entries of OperationID.
•OperationID	C	C(=)	An INTEGER with value greater than 0.

6.1.4.1.2 R-Cancel result

Table 16 - Parameters for R-Cancel result response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.

6.1.4.1.3 R-Cancel error

Table 17 - Parameters for R-Cancel error response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
controlAuthenicationFailure	S	S(=)	No additional limitation.
controlServices-NotAllowed	S	S(=)	No additional limitation.
dialogueIDUnknown	S	S(=)	No additional limitation.
duplicateOperationID	S	S(=)	No additional limitation.
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.
operationAborted	S	S(=)	See subparameter(s) below.
•errorType (default value: transient)	M	M(=)	No additional limitation.
•diagnosticInformation	U	C(=)	A VisibleString, from 1 through 254 characters long.
serviceNotNegotiated	S	S(=)	No additional limitation.

6.1.5 Status functional unit

6.1.5.1 R-Status service

6.1.5.1.1 R-Status request

Table 18 - Parameters for R-Status request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
controlledDialogue	U	C(=)	See subparameters below.
•dialogueID	M	M(=)	See subparameter(s) below.
••dialogueIDClient-Invocation	U	C(=)	See subparameter(s) below.
•••aP-title	M	M(=)	No additional limitation.
•••aE-qualifier	M	M(=)	No additional limitation.
•••aP-invocationID	M	M(=)	No additional limitation.
•••aE-invocationID	M	M(=)	No additional limitation.
••dialogueIDSuffix	M	M(=)	An OCTET STRING from 1 through 64 octets long.
•controlAuthenticationData	M	M(=)	The client may provide an IA5String from 1 through 255 characters long, an OCTET STRING from 1 through 255 octets long, or a BIT STRING from 1 to 2040 bits long.
listOfOperationID	U	C(=)	This list may contain from 1 through 32 entries of OperationID.
•OperationID	C	C(=)	An INTEGER with value greater than 0.

6.1.5.1.2 R-Status result

Table 19 - Parameters for R-Status result response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
listOfStatusInformation	C	C(=)	This list may contain from 1 through 32 entries of StatusInformation.
•StatusInformation	U	C(=)	See subparameter(s) below.
••operationID	M	M(=)	An INTEGER with value greater than 0.
••operationStatus	M	M(=)	See choice(s) below.
•••operationIDUnknown	S	S(=)	No additional limitation.
•••awaitingExecution	S	S(=)	No additional limitation.
•••executing	S	S(=)	No additional limitation.
•••finished	S	S(=)	No additional limitation.
•••cancelled	S	S(=)	No additional limitation.
•••aborted	S	S(=)	A VisibleString with value from 1 through 254 characters long.

6.1.5.1.3 R-Status error

Table 20 - Parameters for R-Status error response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
controlAuthenticationFailure	S	S(=)	No additional limitation.
controlServices-NotAllowed	S	S(=)	No additional limitation.
dialogueIDUnknown	S	S(=)	No additional limitation.
duplicateOperationID	S	S(=)	No additional limitation.
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.
operationAborted	S	S(=)	See subparameter(s) below.
•errorType (default value: transient)	M	M(=)	No additional limitation.

Parameter	rsp	cnf	Limitation
•diagnosticInformation	U	C(=)	A VisibleString, from 1 through 254 characters long.
serviceNotNegotiated	S	S(=)	No additional limitation.

6.1.6 Resource handling functional unit

6.1.6.1 R-Open service

6.1.6.1.1 R-Open request

Table 21 - Parameters for R-Open request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
dataResourceHandle	M	M(=)	An INTEGER with value greater than 0.
parentDataResourceHandle	I	I(=)	An INTEGER with value geater than 0.
dataResourceName	U	C(=)	A VisibleString, from 1 through 254 characters long.
sQLAccessControlData	I	I(=)	The client may provide an IA5String from 1 through 255 characters long, an OCTET STRING from 1 through 255 octets long, or a BIT STRING from 1 through 2040 bits long.
sQLUsageMode	U	C(=)	No additional limitation.
sQLOpenArgument	U	C(=)	See subparameter(s) below.
•charSet	U	C(=)	An OBJECT IDENTIFIER from 2 through 16 elements long.
•sQLConformanceLevel	U	C(=)	An OBJECT IDENTIFIER from 2 through 16 elements long.

6.1.6.1.2 R-Open result

Table 22 - Parameters for R-Open result response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
sQLOpenResult	U	C(=)	See subparameter(s) below.
•charSet	U	C(=)	An OBJECT IDENTIFIER from 2 through 16 elements long.
•charSetNotSupported (default value : FALSE)	U	C(=)	No additional limitation.
•sQLConformanceLevel	C	C(=)	An OBJECT IDENTIFIER from 2 through 16 elements long.

6.1.6.1.3 R-Open error

Table 23 - Parameters for R-Open error response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
dataResourceAlreadyOpen	S	S(=)	See subparameter(s) below.
•dataResourceHandle	M	M(=)	An INTEGER with value greater than 0.
dataResourceNameNot-Specified	S	S(=)	No additional limitation.
dataResourceNotAvailable	S	S(=)	See subparameters below.
•errorType (default value : transient)	M	M(=)	No additional limitation.
•diagnosticInformation	U	C(=)	A VisibleString, from 1 through 254 characters long.
dataResourceUnknown	S	S(=)	No additional limitation.
duplicateDataResource-Handle	S	S(=)	No additional limitation.
duplicateOperationID	S	S(=)	No additional limitation.

Parameter	rsp	cnf	Limitation
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.
operationAborted	S	S(=)	See subparameter(s) below.
•errorType(default value: transient)	M	M(=)	No additional limitation.
•diagnosticInformation	U	C(=)	A VisibleString, from 1 through 254 characters long.
operationCancelled	S	S(=)	No additional limitation.
parentDataResource-Unknown	I	I(=)	No additional limitation.
serviceNotNegotiated	S	S(=)	No additional limitation.
sQLOpenError	S	S(=)	See choice(s) below.
•invalidSQLConformance-Level	S	S(=)	No additional limitation.
•sQLAccessControl-Violation	S	S(=)	No additional limitation.
•sQLDatabaseResource-AlreadyOpen	S	S(=)	No additional limitation.
•rDATransactionOpen	S	S(=)	No additional limitation.

6.1.6.2 R-Close service

6.1.6.2.1 R-Close request

Table 24 - Parameters for R-Close request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
listOfDataResourceHandle	U	C(=)	This list shall contain one entry of DataResourceHandle.
•DataResourceHandle	U	C(=)	An INTEGER with value greater than 0.

6.1.6.2.2 R-Close result

Table 25 - Parameters for R-Close result response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
listOfCloseExceptions	U	C(=)	This list shall contain one entry of CloseException.
•CloseException	M	M(=)	See subparameter(s) below.
••dataResourceHandle	M	M(=)	An INTEGER with value greater than 0.
••closeException	M	M(=)	See choice(s) below.
•••dataResourceHandle-Unknown	S	S(=)	No additional limitation.

6.1.6.2.3 R-Close error

Table 26 - Parameters for R-Close error response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
duplicateOperationID	S	S(=)	No additional limitation.
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.
operationAborted	S	S(=)	See subparameter(s) below.
•errorType(default value: transient)	M	M(=)	No additional limitation.
•diagnosticInformation	U	C(=)	A VisibleString, from 1 through 254 characters long.
operationCancelled	S	S(=)	No additional limitation.
serviceNotNegotiated	S	S(=)	No additional limitation.
sQLCloseError	S	S(=)	See choice(s) below.
•rDATransactionOpen	S	S(=)	No additional limitation.

6.1.7 Immediate execution DBL functional unit

6.1.7.1 R-ExecuteDBL service

6.1.7.1.1 R-ExecuteDBL request

Table 27 - Parameters for R-ExecuteDBL request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
dataResourceHandle	U	C(=)	An INTEGER with value greater than 0.
sQLDBLStatement	M	M(=)	See subparameter(s) below.
•statementText	M	M(=)	An OCTET STRING, from 1 through 4000 octets long.
•charSet	U	C(=)	An OBJECT IDENTIFIER, from 2 through 16 elements long.
sQLDBLArgument-Specification	U	C(=)	This parameter may contain 1 through 100 entries of SQLDataTypeDescriptor. See table 39, Parameters for SQLDataTypeDescriptor.
sQLDBLResultSpecification	U	C(=)	This parameter may contain 1 through 100 entries of SQLDataTypeDescriptor. See table 39, Parameters for SQLDataTypeDescriptor.
dBLArguments	U	C(=)	See choice(s) below.
•singleArgument	S	S(=)	See subparameter(s) below.
••repetitionCount(default value: 1)	M	M(=)	An INTEGER with value from 1 through 64.
••sQLDBLArgumentValues	C	C(=)	This parameter may contain from 1 through 100 entries of SQLValue. See table 41, Parameters for SQLValue.
•multipleArgument	S(=)	S(=)	See subparameter(s) below.
••listOfSQLDBLArgument-Values	M	M(=)	This list may contain from 1 through 64 entries of SQLDBLArgumentValues.
•••SQLDBLArgumentValues	C	C(=)	This parameter may contain from 1 through 100 entries of SQLValue. See table 41, Parameters for SQLValue.

6.1.7.1.2 R-ExecuteDBL result

Table 28 - Parameters for R-ExecuteDBL result response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
sQLDBLResult-Specification	C	C(=)	This parameter may contain 1 through 100 entries of SQLDataTypeDescriptor. See table 39, Parameters for SQLDataTypeDescriptor.
listOfResultValues	U	C(=)	This list may contain 1 through 64 entries of ResultValues.
•ResultValues	M	M(=)	See subparameter(s) below.
••sQLDBLException	M	M(=)	See table 40, Parameters for SQLDBLException.
••sQLDBLResultValues	C	C(=)	This parameter may contain 1 through 100 entries of SQLValue. See table 41, Parameters for SQLValue.

6.1.7.1.3 R-ExecuteDBL error

Table 29 - Parameters for R-ExecuteDBL error response

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
badRepetitionCount	S	S(=)	No additional limitation.
dataResourceHandle-NotSpecified	S	S(=)	No additional limitation.
dataResourceHandle-Unknown	S	S(=)	No additional limitation.
duplicateOperationID	S	S(=)	No additional limitation.
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.
noDataResourceAvailable	S	S(=)	No additional limitation.
operationAborted	S	S(=)	See subparameter(s) below.
•errorType(default value: transient)	M	M(=)	No additional limitation.
•diagnosticInformation	U	C(=)	A VisibleString, from 1 through 254 characters long.
operationCancelled	S	S(=)	No additional limitation.
serviceNotNegotiated	S	S(=)	No additional limitation.
transactionRolledBack	S	S(=)	No additional limitation.
sQLExecuteDBLError	S	S(=)	See choice(s) below.
•sQLUsageModeViolation	S	S(=)	No additional limitation.
•sQLDBLTransaction-StatementNotAllowed	S	S(=)	No additional limitation.
•sQLDBLArgumentCount-Mismatch	S	S(=)	No additional limitation.
•sQLDBLArgumentType-Mismatch	S	S(=)	No additional limitation.
•sQLDBLNoCharSet	S	S(=)	No additional limitation.
•hostIdentifierError	S	S(=)	No additional limitation.

Parameter	rsp	cnf	Limitation
•rDATransactionNotOpen	S	S(=)	No additional limitation.

6.1.8 Stored Execution DBL Functional Unit

6.1.8.1 R-DefineDBL Service

6.1.8.1.1 R-DefineDBL request

Table 30 - Parameters for R-DefineDBL request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
commandHandle	M	M(=)	An INTEGER with value greater than 0.
dataResourceHandle	U	C(=)	An INTEGER with value greater than 0.
sQLDBLStatement	M	M(=)	See subparameter(s) below.
•statementText	M	M(=)	An OCTET STRING from 1 through 4000 octets long.
•charSet	U	C(=)	An OBJECT IDENTIFIER from 2 through 16 elements long.
sQLDBLArgument-Specification	U	C(=)	This parameter may contain 1 through 100 entries of SQLDataTypedescriptor. See table 39, Parameters for SQLDataTypeDescriptor.
sQLDBLResult-Specification	U	C(=)	This parameter may contain 1 through 100 entries of SQLDataTypeDescriptor. See table 39, Parameters for SQLDataTypeDescriptor.

6.1.8.1.2 R-DefineDBL result

Table 31 - Parameters for R-DefineDBL result

Parameter	res	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
sQLDBLResult-Specification	C	C(=)	This parameter may contain 1 through 100 entries of SQLDataTypeDescriptor. See table 39, Parameters for SQLDataTypeDescriptor.
sQLDBLException	C	C(=)	See table 40, Parameters for SQLDBLException.

6.1.8.1.3 R-DefineDBL error

Table 32 - Parameters for R-DefineDBL error

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
dataResourceHandle-NotSpecified	S	S(=)	No additional limitation.
dataResourceHandle-Unknown	S	S(=)	No additional limitation.
duplicateCommandHandle	S	S(=)	No additional limitation.
duplicateOperationID	S	S(=)	No additional limitation.
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.
noDataResourceAvailable	S	S(=)	No additional limitation.
operationAborted	S	S(=)	See subparameter(s) below.
•errorType(default value: transient)	M	M(=)	No additional limitation.
•diagnosticInformation	U	C(=)	A VisibleString, from 1 through 254 characters long.
operationCancelled	S	S(=)	No additional limitation.

Parameter	rsp	cnf	Limitation
serviceNotNegotiated	S	S(=)	No additional limitation.
sQLDefineDBLError	S	S(=)	See choice(s) below.
•sQLDBLNoCharSet	S	S(=)	No additional limitation.
•sQLDBLTransaction-StatementNotAllowed	S	S(=)	No additional limitation.
•sQLUsageModeViolation	S	S(=)	No additional limitation.
•hostIdentifierError	S	S(=)	No additional limitation.

6.1.8.2 R-InvokeDBL Service

6.1.8.2.1 R-InvokeDBL request

Table 33 - Parameters for R-InvokeDBL request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
commandHandle	M	M(=)	An INTEGER with value greater than 0.
dBLArguments	U	C(=)	See choice(s) below.
•singleArgument	S	S(=)	See subparameter(s) below.
••repetitionCount (Default Value: 1)	M	M(=)	An INTEGER with value from 1 through 64.
••sQLDBLArgumentValues	C	C(=)	This parameter may contain 1 through 100 entries of SQLValue. See table 41, Parameters for SQLValue.
•multipleArgument	S	S(=)	See subparameter(s) below.
••listOfSQLDBLArgument-Values	M	M(=)	This list may contain 1 through 64 entries of SQLDBLArgumentValues.

Parameter	req	ind	Limitation
•••SQLDBLArgument-Values	C	C(=)	This parameter may contain 1 through 100 entries of SQLValue. See table 41, Parameters for SQLValue.

6.1.8.2.2 R-InvokeDBL result

Table 34 - Parameters for R-InvokeDBL result

Parameter	res	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
sQLDBLResult-Specification	C	C(=)	This parameter may contain 1 through 100 entries of SQLDataTypedescriptor. See table 39, Parameters for SQLDataTypeDescriptor.
listOfResultValues	M	M(=)	This list may contain 1 through 64 entries of ResultValues.
•ResultValues	M	M(=)	See subparameter(s) below.
••sQLDBLException	M	M(=)	See table 40, Parameters for SQLDBLException.
••sQLDBLResultValues	C	C(=)	This parameter may contain 1 through 100 entries of SQLValue. See table 41, Parameters for SQLValue.

6.1.8.2.3 R-InvokeDBL error

Table 35 - Parameters for R-InvokeDBL error

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
badRepetitionCount	S	S(=)	No additional limitation.
commandHandleUnknown	S	S(=)	No additional limitation.

Parameter	rsp	cnf	Limitation
duplicateOperationID	S	S(=)	No additional limitation.
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.
operationAborted	S	S(=)	See subparameter(s) below.
•errorType(default value: transient)	M	M(=)	No additional limitation.
•diagnosticInformation	U	C(=)	A VisibleString, from 1 through 254 characters long.
operationCancelled	S	S(=)	No additional limitation.
serviceNotNegotiated	S	S(=)	No additional limitation.
transactionRolledBack	S	S(=)	No additional limitation.
sQLInvokeDBLError	S	S(=)	See choice(s) below.
•sQLUsageModeViolation	S	S(=)	No additional limitation.
•sQLDBLArgumentType-Mismatch	S	S(=)	No additional limitation.
•sQLDBLArgumentCount-Mismatch	S	S(=)	No additional limitation.
•rDATransactionNotOpen	S	S(=)	No additional limitation.

6.1.8.3 R-DropDBL Service

6.1.8.3.1 R-DropDBL request

Table 36 - Parameters for R-DropDBL request

Parameter	req	ind	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
listOfCommandHandle	U	C(=)	This list may contain from 1 through 32 entries of CommandHandle.
•CommandHandle	C	C(=)	An INTEGER with value greater than 0.

6.1.8.3.2 R-DropDBL result

Table 37 - Parameters for R-DropDBL result

Parameter	res	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
listOfDropDBLExceptions	U	C(=)	This list may contain 1 through 32 entries of DropDBLException.
•DropDBLException	M	M(=)	See subparameter(s) below.
••commandHandle	M	M(=)	An INTEGER with value greater than 0.
••dropDBLException	M	M(=)	See subparameter(s) below.
•••commandHandle-Unknown	S	S(=)	No additional limitation.

6.1.8.3.3 R-DropDBL error

Table 38 - Parameters for R-DropDBL error

Parameter	rsp	cnf	Limitation
operationID	M	M(=)	An INTEGER with value greater than 0.
duplicateOperationID	S	S(=)	No additional limitation.
invalidSequence		S	See subparameter(s) below.
•diagnosticInformation		U	No additional limitation.
operationAborted	S	S(=)	See subparameter(s) below.
•errorType(default value: transient)	M	M(=)	No additional limitation.
•diagnosticInformation	U	C(=)	A VisibleString, from 1 through 254 characters long.
operationCancelled	S	S(=)	No additional limitation.

Parameter	rsp	cnf	Limitation
serviceNotNegotiated	S	S(=)	No additional limitation.

6.2 Limits for common parameters

This clause describes the parameters of the common RDA Types, those shared by more than one RDA Service.

Table 39 describes the parameters for SQLDataTypeDescriptor.

Table 40 describes the parameters for SQLDBLException.

Table 41 describes the parameters for SQLValue. The range of values for each type of dataItem in this table is implied by the values of the parameters of the corresponding type of SQLDataTypeDescriptor in Table 39.

6.2.1 SQLDataTypeDescriptor

Table 39 - Parameters for SQLDataTypeDescriptor

Parameter	req	ind	rsp	cnf	Limitation
nullable (default value: true)			M	M(=)	No additional limitation.
colName			M	M(=)	A VisibleString, from 1 through 18 characters long.
typeDescriptor	M	M(=)	M	M(=)	See choice(s) below.
•characterType	S	S(=)	S	S(=)	See subparameter(s) below.
••charSet	U	C(=)	U	C(=)	An OBJECT IDENTIFIER, from 2 through 16 elements long.
••length	M	M(=)	M	M(=)	An INTEGER with value from 1 through 240. It represents the maximum number of characters in the data value. Trailing (padded) spaces are included in the length, but a trailing null byte is not.

Parameter	req	ind	rsp	cnf	Limitation
••fixedLength-Encoding	M	M(=)	M	M(=)	No additional limitation.
•numericType	S	S(=)	S	S(=)	See subparameter(s) below.
••precision	M	M(=)	M	M(=)	This parameter shall contain a value within the range of 1 through 15.
••scale	M	M(=)	M	M(=)	This parameter shall contain a value within the range of 0 through the value of precision.
•decimalType	S	S(=)	S	S(=)	See subparameter(s) below.
••precision	M	M(=)	M	M(=)	This parameter shall contain a value within the range of 1 through 15.
••scale	M	M(=)	M	M(=)	This parameter shall contain a value within the range of 0 through the value of precision.
•integerType	S	S(=)	S	S(=)	See subparameter(s) below.
••precision	M	M(=)	M	M(=)	If precisionBase is decimal, precision must be in the range 1 through 9. If precisionBase is binary, precision must be in the range 1 through 31.
••precisionBase	M	M(=)	M	M(=)	No additional limitation.
•smallIntType	S	S(=)	S	S(=)	See subparameter(s) below.
••precision	M	M(=)	M	M(=)	If precisionBase is decimal, precision must be in the range 1 through 4. If precisionBase is binary, precision must be in the range 1 through 15.

Parameter	req	ind	rsp	cnf	Limitation
••precisionBase	M	M(=)	M	M(=)	No additional limitation.
•floatType	S	S(=)	S	S(=)	See subparameter(s) below.
••mantissa-Precision	M	M(=)	M	M(=)	An INTEGER with value from 1 through 20.
••maxExponent	M	M(=)	M	M(=)	An INTEGER with value from 0 through 38.
•realType	S	S(=)	S	S(=)	See subparameter(s) below.
••mantissa-Precision	M	M(=)	M	M(=)	An INTEGER with value from 1 through 20.
••maxExponent	M	M(=)	M	M(=)	An INTEGER with value from 0 through 38.
•double-PrecisionType	S	S(=)	S	S(=)	See subparameter(s) below.
••mantissa-Precision	M	M(=)	M	M(=)	An INTEGER with value from 1 through 30.
••maxExponent	M	M(=)	M	M(=)	An INTEGER with value from 0 through 38.

6.2.2 SQLDBLException

Table 40 - Parameters for SQLDBLException

Parameter	rsp	cnf	Limitation
sQLSTATE	C	C(=)	No additional limitation.
sQLCODE	C	C(=)	No additional limitation.
sQLErrorText	U	C(=)	A VisibleString from 1 through 254 characters long.

6.2.3 SQLValue

Table 41 - Parameters for SQLValue

Parameter	req	ind	rsp	cnf	Limitation
dataItem	U	C(=)	U	C(=)	See choice(s) below.
•characterItem	S	S(=)	S	S(=)	An OCTET STRING from 1 through 240 characters.
•numericItem	S	S(=)	S	S(=)	An INTEGER with absolute value less than 10**15. Note that the maximum requires a 7-octet INTEGER value.
•decimalItem	S	S(=)	S	S(=)	An INTEGER with absolute value less than 10**15. Note that the maximum requires a 7-octet INTEGER value.
•integerItem	S	S(=)	S	S(=)	An INTEGER with absolute value less than 10**9, if precisionBase is decimal. An INTEGER with absolute value less than 2**31, if precisionBase is binary.
•smallIntItem	S	S(=)	S	S(=)	An INTEGER with absolute value less than 10**4, if precisionBase is decimal. An INTEGER with absolute value less than 2**15, if precisionBase is binary.
•floatItem	S	S(=)	S	S(=)	A REAL with the value 0 or absolute value in the range 10**-38 through 10**38 inclusive.
•realItem	S	S(=)	S	S(=)	A REAL with the value 0 or absolute value in the range 10**-38 through 10**38 inclusive.

Parameter	req	ind	rsp	cnf	Limitation
•double-PrecisionItem	S	S(=)	S	S(=)	A REAL with the value 0 or absolute value in the range 10**-38 through 10**38 inclusive.
indicator	U	C(=)	U	C(=)	No additional limitation.

6.3 Other limits and agreements

6.3.1 Operation limits and agreements

Operation limits and agreements follow:

a) OIW-compliant RDA implementations shall conform to the following agreements stated in part 5, Upper layers:

1) the specific ASE requirements stated in clause 13.8, Remote Database Access; and

2) all other agreements that pertain to the Association Control Service Element, Presentation, and Session, including those for ASN.1 encoding;

b) OIW-compliant RDA implementations shall be able to process at a minimum RDA Application Protocol Data Units of 30,000 octets. It is recommended, however, that Presentation user data not be restricted in size;

c) The maximum number of outstanding RDA operations is 32;

d) If an RDA server receives an abort event after an R-BeginTransaction indication and before an R-Commit indication, then it should roll back the current transaction;

e) As a minimum, the character set ISO 8859-1 shall be supported. The OIW-defined object identifier for this character set is :

{ iso (1) identified-organization (3) oiw (14)
rda-sig (9) character-sets (1) oiw-latin-1 (1) abstract-syntax (1) }

NOTE - This object identifier will be deprecated at such time that ISO defines an object identifier for ISO 8859-1.

6.3.2 Recommended practices

An implementation should document any limitation on the number of schema statements that the server permits within a single transaction. For maximum interoperability, a client should never mix schema statements and data statements within a transaction and should restrict the number of schema statements within a transaction to one.

6.4 Rules for Profiles

An implementation conformant to a profile shall implement all the functional units of that profile; it may additionally implement other functional units without being nonconformant.

If a functional unit is included in a profile, all the services of that functional unit, as specified in the ISO/IEC 9579-1 and 9579-2, shall be included.

An implementation conforming to a given profile may accept a dialogue whose functional units conform to a different profile without being nonconformant.

6.4.1 Application contexts

This subclause specifies agreements that apply to individual application contexts.

6.4.1.1 RDA basic application context

This subclause specifies agreements that apply to the RDA Basic Application Context.

6.4.1.2 Profiles

This subclause specifies which functional units combine to form each profile.

6.4.1.2.1 Rationale

The minimum requirement is to be able to execute SQL Statements. Therefore all profiles include the "Immediate Execution DBL" functional unit, and one profile (Immediate Execution) includes just this minimum capability.

Additional capabilities may be required for defining and invoking DBL statements. Therefore the "Stored Execution DBL" functional unit is required only in a separate profile (Stored Execution) defined specifically for this capability.

For the RDA Control Services, executing control services on the current dialogue requires different and probably simpler capabilities than executing control services on other dialogues. Therefore additional profiles are defined for controlling other dialogues.

The R-Status Service implies only inquiry about the controlled dialogue, while the R-Cancel Service requires the ability to modify the controlled dialogue. Since different authorization or access control permissions may be required, it is useful to separate R-Status from R-Cancel. Therefore two separate profiles (Status and Cancel) are defined for controlled dialogue capabilities.

Since an implementation may include functional units and services beyond those required, only this minimum set of four profiles is defined.

6.4.1.2.2 Immediate Execution

This profile requires support of immediate execution of SQL Statements. It requires the following functional units:

a) dialogue initialization;

b) dialogue termination;

c) transaction management;

d) resource handling; and

e) immediate execution DBL.

6.4.1.2.3 Stored execution

This profile requires support of execution of stored SQL Statements. It requires the following functional units:

a) dialogue initialization;

b) dialogue termination;

c) transaction management;

d) resource handling;

e) immediate execution DBL; and

f) stored execution DBL.

6.4.1.2.4 Status

This profile requires support of the R-Status service on other dialogues. It requires the following functional units:

a) dialogue initialization, specifically including the following parameters:

1) controlServiceDataRequested; and

2) controlServiceData;

b) dialogue termination;

c) transaction management;

d) status, specifically including the following parameters:

1) controlledDialogue;

e) resource handling; and

f) immediate execution DBL.

6.4.1.2.5 Cancel

This profile requires support of the R-Cancel service on other dialogues. It requires the following functional units:

a) dialogue initialization, specifically including the following parameters:

1) controlServiceDataRequested; and

2) controlServiceData;

b) dialogue termination;

c) transaction management;

d) cancel, specifically including the following parameters:

1) controlledDialogue;

e) resource handling; and

f) immediate execution DBL.

6.4.2 RDA TP application context

No text.

Annex A (normative)

RDA SIG object identifiers

Table 42 lists the object identifiers defined by this part of the Implementation Agreements.

Table 42 - Object Identifiers defined by RDA

Object Identifier	Reference
iso (1) identified-organization (3) oiw (14) rda-sig (9) character-sets (1) oiw-latin-1 (1) abstract-syntax (1)	6.3.1