ISO/IEC 9075-3:2008-07 (E)

Information technology_- Database languages_- SQL_- Part_3: Call-Level Interface (SQL/CLI)

Contents

Page

Foreword ix

Introduction x

1 Scope 1

2 Normative references 3
2.1 ISO and IEC standards 3

3 Definitions, notations, and conventions 5
3.1 Definitions 5
3.1.1 Definitions provided in Part 3 5
3.2 Conventions 5
3.2.1 Specification of routine definitions 5

4 Concepts 7
4.1 Introduction to SQL/CLI 7
4.2 Return codes 11
4.3 Diagnostics areas in SQL/CLI 11
4.3.1 Setting of ROW_NUMBER and COLUMN_NUMBER fields 15
4.4 Miscellaneous characteristics 15
4.4.1 Handles 15
4.4.2 Null terminated strings 16
4.4.3 Null pointers 16
4.4.4 Environment attributes 16
4.4.5 Connection attributes 17
4.4.6 Statement attributes 17
4.4.7 CLI descriptor areas 18
4.4.8 Obtaining diagnostics during multi-row fetch 19
4.5 SQL-invoked routines 19
4.5.1 Result sets returned by SQL-invoked procedures 19
4.6 Cursors 20
4.6.1 General description of cursors 20
4.7 Client-server operation 20

5 Call-Level Interface specifications 21
5.1 <CLI routine> 21
5.2 <CLI routine> invocation 30
5.3 Implicit set connection 33
5.4 Preparing a statement 34
5.5 Executing a statement 36
5.6 Implicit CLI prepared cursor 38
5.7 Implicit CLI procedural result cursor 40
5.8 Initial CLI cursor 41
5.9 Implicit DESCRIBE USING clause 42
5.10 Implicit EXECUTE USING and OPEN USING clauses 48
5.11 Implicit CALL USING clause 54
5.12 Fetching a rowset 58
5.13 Implicit FETCH USING clause 62
5.14 Character string retrieval 68
5.15 Binary string retrieval 69
5.16 Deferred parameter check 70

5.17 CLI-specific status codes ... 71
5.18 Description of CLI item descriptor areas ... 73
5.19 Other tables associated with CLI ... 85
5.20 SQL/CLI data type correspondences ... 112

6 SQL/CLI routines ... 123
6.1 AllocConnect ... 123
6.2 AllocEnv ... 124
6.3 AllocHandle ... 125
6.4 AllocStmt ... 129
6.5 BindCol ... 130
6.6 BindParameter ... 132
6.7 Cancel ... 136
6.8 CloseCursor ... 138
6.9 ColAttribute ... 139
6.10 ColumnPrivileges ... 141
6.11 Columns ... 147
6.12 Connect ... 156
6.13 CopyDesc ... 160
6.14 DataSources ... 161
6.15 DescribeCol ... 163
6.16 Disconnect ... 165
6.17 EndTran ... 167
6.18 Error ... 171
6.19 ExecDirect ... 173
6.20 Execute ... 174
6.21 Fetch ... 175
6.22 FetchScroll ... 176
6.23 ForeignKeys ... 177
6.24 FreeConnect ... 190
6.25 FreeEnv ... 191
6.26 FreeHandle ... 192
6.27 FreeStmt ... 195
6.28 GetConnectAttr ... 197
6.29 GetCursorName ... 199
6.30 GetData ... 200
6.31 GetDescField ... 206
6.32 GetDescRec ... 208
6.33 GetDiagField ... 210
6.34 GetDiagRec ... 219
6.35 GetEnvAttr ... 221
6.36 GetFeatureInfo ... 223
6.37 GetFunctions ... 226
6.38 GetInfo ... 227
6.39 GetLength ... 231
6.40 GetParamData ... 233
6.41 GetPosition ... 239
6.42 GetSessionInfo ... 241
6.43 GetStmtAttr ... 243
6.44 GetSubString ... 246
6.45 GetTypeInfo ... 248
6.46 MoreResults ... 252
6.47 NextResult ... 253
6.48 NumResultCols ... 254
6.49 ParamData ... 255
6.50 Prepare ... 260
6.51 PrimaryKeys ... 261
6.52 PutData ... 266
6.53 RowCount ... 269
6.54 SetConnectAttr ... 270
6.55 SetCursorName ... 272
6.56 SetDescField ... 274

6.57 SetDescRec 279
6.58 SetEnvAttr 281
6.59 SetStmtAttr 283
6.60 SpecialColumns 287
6.61 StartTran 294
6.62 TablePrivileges 296
6.63 Tables 301

7 Additional data manipulation rules 309
7.1 Effect of opening a cursor 309

8 Dynamic SQL 311
8.1 <preparable dynamic cursor name> 311

9 Definition Schema 313
9.1 SQL_IMPLEMENTATION_INFO base table 313
9.2 SQL_SIZING base table 316

10 Conformance 319
10.1 Claims of conformance to SQL/CLI 319
10.2 Additional conformance requirements for SQL/CLI 319
10.3 Implied feature relationships of SQL/CLI 320

Annex A SQL Conformance Summary (informative) 321

Annex B Implementation-defined elements (informative) 323

Annex C Implementation-dependent elements (informative) 337

Annex D Deprecated features (infomative) 343

Annex E Incompatibilities with ISO/IEC 9075:2003 (informative) 345

Annex F SQL feature taxonomy (informative) 347

Annex G Defect reports not addressed in this edition of this part of ISO/IEC 9075 (informative) 349

Annex H Typical header files (informative) 351

H.1 C header file SQLCLI.H 351
H.2 COBOL library item SQLCLI 364

Annex I Sample C programs (informative) 375

I.1 Create table, insert, select 375
I.2 Interactive Query 378
I.3 Providing long dynamic arguments at Execute time 382

Index 385

Table

Page

1 Header fields in SQL/CLI diagnostics areas. . . . 13
2 Status record fields in SQL/CLI diagnostics areas. . . . 13
3 Supported calling conventions of SQL/CLI routines by language. . . . 24
4 Abbreviated SQL/CLI generic names. . . . 25
5 SQLSTATE class and subclass values for SQL/CLI-specific conditions. . . . 71
6 Fields in SQL/CLI row and parameter descriptor areas. . . . 78
7 Codes used for implementation data types in SQL/CLI. . . . 80
8 Codes used for application data types in SQL/CLI. . . . 81
9 Codes associated with datetime data types in SQL/CLI. . . . 82
10 Codes associated with <interval qualifier> in SQL/CLI. . . . 83
11 Codes associated with <parameter mode> in SQL/CLI. . . . 84
12 Codes associated with user-defined types in SQL/CLI. . . . 84
13 Codes used for SQL/CLI diagnostic fields. . . . 85
14 Codes used for SQL/CLI handle types. . . . 87
15 Codes used for transaction termination. . . . 87
16 Codes used for environment attributes. . . . 87
17 Codes used for connection attributes. . . . 88
18 Codes used for statement attributes. . . . 88
19 Codes used for FreeStmt options. . . . 88
20 Data types of attributes. . . . 89
21 Codes used for SQL/CLI descriptor fields. . . . 89
22 Ability to set SQL/CLI descriptor fields. . . . 92
23 Ability to retrieve SQL/CLI descriptor fields. . . . 94
24 SQL/CLI descriptor field default values. . . . 97
25 Codes used for fetch orientation. . . . 99
26 Multi-row fetch status codes. . . . 100
27 Miscellaneous codes used in CLI. . . . 100
28 Codes used to identify SQL/CLI routines. . . . 101
29 Codes and data types for implementation information. . . . 104
30 Codes and data types for session implementation information. . . . 106
31 Values for TRANSACTION ISOLATION OPTION with StartTran. . . . 106
32 Values for TRANSACTION ACCESS MODE with StartTran. . . . 106
33 Codes used for concise data types. . . . 107
34 Codes used with concise datetime data types in SQL/CLI. . . . 109
35 Codes used with concise interval data types in SQL/CLI. . . . 109
36 Concise codes used with datetime data types in SQL/CLI. . . . 110
37 Concise codes used with interval data types in SQL/CLI. . . . 110
38 Special parameter values. . . . 111
39 Column types and scopes used with SpecialColumns. . . . 111
40 SQL/CLI data type correspondences for Ada. . . . 112
41 SQL/CLI data type correspondences for C. . . . 113
42 SQL/CLI data type correspondences for COBOL. . . . 115
43 SQL/CLI data type correspondences for Fortran. . . . 116
44 SQL/CLI data type correspondences for M. . . . 117
45 SQL/CLI data type correspondences for Pascal. . . . 119
46 SQL/CLI data type correspondences for PL/I. . . . 120
47 Implied feature relationships of SQL/CLI. . . . 320
48 Feature taxonomy and definition for mandatory features. . . . 347