SQL Standards
Status and Directions

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Abstract

While the SQL Standard has not been at the forefront of the computing press, it is still progressing and expanding.

- What distinguishes SQL?
- ANSI and ISO
- Current Status
- Directions

What Distinguishes SQL?

Several factors distinguish SQL from other query and data storage technologies:

- Persistent data
- Transactions and concurrent access.
- Null values and three-valued logic.
- Integration with other technologies.

ANSI and ISO

- In the international arena, the SQL Standard is developed by ISO/IEC JTC1 SC32 WG3.
- Officers:
  - Convenor – Keith W. Hare – USA
  - Editor – Jim Melton – USA
- Active participants are:
  - Australia – Australian Bureau of Statistics
  - Canada – Standards Council of Canada
  - China – Chinese Electronics Standardization Institute
  - Germany – DIN Deutsches Institut für Normung e. V.
  - Great Britain – British Standards Institution
  - Japan – SQL working group of JIS (Japan Industrial Standards)
  - Netherlands
  - Sweden
  - USA – ANSI INCITS H2

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- Officers
  - Chair: Don Deutsch – Oracle
  - Vice Chair: Keith Hare – JCC Consulting, Inc.
  - Secretary – Mike Gorman – Whitemarsh
  - International Representative – Krishna Kulkarni – IBM
  - Editor – Jim Melton – Oracle
- Current Participants
  - Bentley Systems
  - Computer Associates (Ingres)
  - Data Direct
  - HP
  - IBM
  - Intersystems
  - JCC Consulting, Inc.
  - Microsoft
  - NCR
  - Oracle Corporation
  - Sybase
  - Whitemarsh Information Systems
- H2 was organized in 1978 to standardize database languages.

Current Status

- Brief History
- SQL 2003
- SQL 200x (x>=7)
- Validation Test
- SQL/MM

Brief History

The following is a brief history of the SQL Standard's major revisions:

- SQL-86 (ANSI) and SQL-87 (ISO)
- SQL-89
- SQL-92
- SQL:1999
- SQL:2003
- SQL:2003 Technical Corrigendum
- SQL:200x

SQL:1999

- INCITS/ISO/IEC 9075-1 1999 Information Technology - Database Languages - SQL - Part 1: Framework (SQL/Framework)
- INCITS/ISO/IEC 9075-2 1999 Information Technology - Database Languages - SQL - Part 2: Foundation (SQL/Foundation)
- INCITS/ISO/IEC 9075-3 1999 Information Technology - Database Languages - SQL - Part 3: Call Level Interface (SQL/CLI)
- INCITS/ISO/IEC 9075-4 1999 Information Technology - Database Languages - SQL - Part 4: Persistent Stored Modules (SQL/PSM)
- INCITS/ISO/IEC 9075-5 1999 Information Technology - Database Languages - SQL - Part 5: Host Language Bindings (SQL/Bindings)

SQL 2003

For SQL 2003:

- Part 5, host language bindings has been re-integrated with Part 2, SQL/Foundation
- The Schema information tables have been pulled out into a separate part, Part 11, SQL/Schemata.
- In addition, there are four new parts:
  - Part 9 – SQL/MED – Management of External Data
  - Part 10 – SQL/OLB – Object Language Bindings – SQL embedded in Java
  - Part 13 – SQL/JRT – Java Routines and Types – Using Java methods and classes as stored procedures and data types in an SQL database.
  - Part 14 – SQL/XML – Using SQL and XML together.

SQL 2003

With these changes, the complete list for SQL 2003 is:

- Part 1: Framework (SQL/Framework)
- Part 2: Foundation (SQL/Foundation)
- Part 3: Call-Level Interface (SQL/CLI)
- Part 4: Persistent Stored Modules (SQL/PSM)
- Part 9: Management of External Data (SQL/MED)
- Part 10: Object Language Bindings (SQL/OLB)
- Part 11: Information and Definition Schemas (SQL/Schemata)
- Part 13: SQL Routines and Types Using the Java™ Programming Language (SQL/JRT)
- Part 14: XML-Related Specifications (SQL/XML)

Page Count Comparison

Part	SQL 1992	SQL 1999	SQL 2003
Part 1 – SQL/Framework		85	81
Part 2 – SQL/Foundation	628	1,147	1,267
Part 3 – SQL/CLI (1995)	236	421	405
Part 4 – SQL/PSM (1996)	256	170	184
Part 5 – SQL/Bindings		261	
Part 9 – SQL/MED			498
Part 10 – SQL/OLB			405
Part 11 – SQL/Schemata			296
Part 13 – SQL/JRT			204
Part 14 – SQL/XML			266
Total	**1,120**	**2,084**	**3,606**

SQL:2003 Technical Corrigendum

The Technical Corrigendum contains interpretations and bug fixes for all of the SQL:2003 parts:

- Part 1: Framework (SQL/Framework)
- Part 2: Foundation (SQL/Foundation)
- Part 3: Call-Level Interface (SQL/CLI)
- Part 4: Persistent Stored Modules (SQL/PSM)
- Part 9: Management of External Data (SQL/MED)
- Part 10: Object Language Bindings (SQL/OLB)
- Part 11: Information and Definition Schemas (SQL/Schemata)
- Part 13: SQL Routines and Types Using the Java™ Programming Language (SQL/JRT)
- Part 14: XML-Related Specifications (SQL/XML)

Completed in 2004, published 2005-11-21.

SQL/XML 2006

- The SQL committees just finished revisions to SQL/XML to align with the next W3C (World Wide Web Consortium) version of XQuery.
- XQuery moved to the next level at the end of September.
- SQL/XML 2006 references the XQuery specification.
- One last ballot, then will be published in 2006.

SQL-200x

The next full version of the SQL standard is targeted for completion in 2007 or 2008.

- Additional expansions to SQL/XML
- Some other new features
- Bug fixes

What happened to the missing parts?

There are several part numbers that have been retired:

- Part 5 - SQL/Bindings integrated back into SQL/Foundation
- Part 6 - SQL/Transaction – withdrawn
- Part 7 - SQL/Temporal – withdrawn.
- Part 8 - SQL/Objects – Extended Objects – integrated back into SQL/Foundation
- Part 12 - SQL/Replication – never got moving

Part 7 - SQL/Temporal

Expansion of SQL Standard to deal with issues of time

- Transaction time – What was the data when it was recorded
- Valid Time – What should the data have been at a particular point in time
- Two competing academic viewpoints
  - Richard T. Snodgrass, Christian S. Jensen, “Developing Time-Oriented Database Applications in SQL”, Morgan Kaufmann, 1999. This book is out of print but can be downloaded from Rick’s web site at http://www.cs.arizona.edu/people/rts/
  - C. J. Date, Hugh Darwen, & Nikos Lorentzos, “Temporal Data & the Relational Model”, Morgan Kaufmann, 2002.
- Important issues, but technically challenging and complex to explain
- Most likely part to be revived

Validation Test

- NIST canceled the SQL Validation Test project in 1996
- No organization is testing SQL Standards Compliance
- Vendors more-or-less adhere to the SQL standard due to market pressure
- New features implemented when requested by user base
- If user base does not know about a feature, it is unlikely to be implemented

SQL/MM

The SQL Multimedia and Application Packages specifications are layered on top of the SQL Standard.

- SQL/MM Part 1: Framework
- SQL/MM Part 2: Full Text
- SQL/MM Part 3: Spatial
- SQL/MM Part 5: Still Image
- SQL/MM Part 6: Data Mining
- SQL/MM Part 7: History

Directions

- Over the decades, the SQL Standards process has incorporated new technology directions:
  - Object oriented capabilities.
  - Using Java with SQL.
  - Most of the current SQL standards development is in the area of SQL and XML.
  - We are not sure what the next direction will be.
- SQL Standards participants have many competing demands for their time.
- Database choice is no longer the driving factor in software decisions.

Summary

- SQL Standards development is ongoing
- Visibility of SQL Standards development is not high
- New standards development is following new technologies
  - Java
  - XML
  - Next?

Questions?