

# Comparison of relational database management systems

From Wikipedia, the free encyclopedia

The following tables compare general and technical information for a number of relational database management systems. Please see the individual products' articles for further information. Unless otherwise specified in footnotes, comparisons are based on the stable versions without any add-ons, extensions or external programs.

## Contents

- 1 General information
- 2 Operating system support
- 3 Fundamental features
- 4 Limits
- 5 Tables and views
- 6 Indices
- 7 Database capabilities
- 8 Data types
- 9 Other objects
- 10 Partitioning
- 11 Access control
- 12 Databases vs schemas (terminology)
- 13 See also
- 14 References
- 15 External links

## General information

	Maintainer	First public release date	Latest stable version	Latest release date	License
4D (4th Dimension)	4D S.A.S. <sup>[1]</sup>	1984	v14.2	2014-07-10	Proprietary
ADABAS	Software AG	1970	8.1	2013-06	Proprietary
Adaptive Server Enterprise	Sybase	1987	16.0		Proprietary
Advantage Database Server (ADS)	Sybase	1992	11.1	2012	Proprietary
Altibase	Altibase Corp.	2000	6.1.3	2014-04-18	Proprietary
Apache Derby	Apache	2004	10.10.2.0 <sup>[2]</sup>	2014-04-15	Apache License
Clustrix	Clustrix	2010	v5.2	2013-10-16	Proprietary
CUBRID	NHN Corporation <sup>[3]</sup>	2008-11	9.2.0	2013-10-24	GPL v2 or later
Datacom	CA, Inc.	Early 70s <sup>[4]</sup>	14 <sup>[5]</sup>	2012 <sup>[6]</sup>	Proprietary
DB2	IBM	1983	10.5	2013-04-23	Proprietary
Drizzle	Brian Aker	2008	7.1.36	2012-05-23	GPL v2 and v3, with some BSD components
Empress Embedded Database	Empress Software Inc <sup>[7]</sup>	1979	10.20	2010-03	Proprietary
EXASolution	EXASOL AG	2004 <sup>[8]</sup>	4.2.8	2014-04-22	Proprietary
Firebird	Firebird project <sup>[9]</sup>	2000-07-25	2.5.2	2013-03-24	IPL <sup>[10]</sup> and IDPL <sup>[11]</sup>
HSQldb	HSQL Development Group	2001	2.3.1 <sup>[12]</sup>	2013-10-08	BSD
H2	H2 Software	2005	1.3.171	2013-03-17	EPL and modified MPL
Informix Dynamic Server	IBM	1980	12.10.xC3	2014-03-14	Proprietary
Ingres	Ingres Corp.	1974	Ingres Database 10	2010-10-12	GPL and Proprietary
InterBase	Embarcadero	1984	InterBase XE	2010-09-21	Proprietary
Linter SQL RDBMS	RELEX Group	1990	6.x	2013-08-26	Proprietary
LucidDB	The Eigenbase Project <sup>[13]</sup>	2007-01	0.9.3		GPL v2
MariaDB	MariaDB Community	2010-02-01	10.0.14 <sup>[14]</sup>	2014-09-26	GPL v2 and LGPL for client-libraries
MaxDB	SAP AG	2003-05	7.9.0.8	2014	Proprietary
Microsoft Access (JET)	Microsoft	1992	15 (2013)	2012-10-02	Proprietary
Microsoft Visual Foxpro	Microsoft	1984 <sup>[15]</sup>	9 (2005)	2007-10-11 <sup>[15]</sup>	Proprietary
Microsoft SQL Server	Microsoft	1989	2014 (12)	2014-03-18	Proprietary
Microsoft SQL Server Compact (Embedded Database)	Microsoft	2000	2011 (v4.0)		Proprietary
MonetDB	The MonetDB Developer Team	2004	11.17.13	2014-03	MonetDB License v1.1 (based on the MPL 1.1) <sup>[16]</sup>
mSQL	Hughes Technologies	1994	3.9 <sup>[17]</sup>	2011-02	Proprietary
MySQL	Oracle Corporation	1995-11	5.6.21	2014-09-23	GPL v2 or Proprietary
MemSQL	MemSQL	2012-06	1.8 (2012)	2012-12	Proprietary
Nexusdb	Nexus Database Systems Pty Ltd <sup>[18]</sup>	2003-09	3.04	2010-05-08	Proprietary
HP NonStop SQL	Hewlett-Packard	1987	SQL/MX 2.3		Proprietary
Omnis Studio	TigerLogic Inc <sup>[19]</sup>	1982-07	4.3.1 Release 1no	2008-05	Proprietary
OpenBase SQL	OpenBase International <sup>[20]</sup>	1991	11.0.0		Proprietary
OpenEdge	Progress Software Corporation	1984	11.0		Proprietary
OpenLink Virtuoso	OpenLink Software <sup>[21]</sup>	1998	7.x	2013-08-05	GPL v2 or Proprietary
Oracle	Oracle Corporation	1979-11	12c Release 1	2013-06-25	Proprietary
Oracle Rdb	Oracle Corporation	1984	7.3.1.1.1	2014-02-24 <sup>[22]</sup>	Proprietary
Paradox	Corel Corporation <sup>[23]</sup>	1985	11	2003	Proprietary
Pervasive PSQL	Pervasive Software	1982	v11 SP3	2013	Proprietary
Polyhedra DBMS	ENEAB AB	1993	8.9	2014-09	Proprietary
PostgreSQL	PostgreSQL Global Development Group <sup>[24]</sup>	1989-06	9.3.4 <sup>[25]</sup>	2014-03-20	PostgreSQL Licence (a liberal Open Source license) <sup>[26]</sup>
R:Base	R:BASE Technologies <sup>[27]</sup>	1982	9.5		Proprietary
RDM	Raima Inc. <sup>[28]</sup>	1984	11.0	2012-06-29	Proprietary
RDM Server	Raima Inc. <sup>[29]</sup>	1993	8.4	2012-10-31	Proprietary
SAP HANA	SAP AG <sup>[30]</sup>	2010	1.0		Proprietary
ScimoreDB	Scimore <sup>[31]</sup>	2005	3.0	2008-03-03	Proprietary
SmallSQL	SmallSQL	2005-04-16	0.20	2008-12	LGPL
solidDB	UNICOM Global	1992	7.0.0.10	2014-04-29	Proprietary
SQL Anywhere	Sybase	1992	12.0	2010-07-09	Proprietary
SQLBase	Unify Corp. <sup>[32]</sup>	1982	11.5	2008-11	Proprietary
SQLite	D. Richard Hipp	2000-08-17	3.8.7.2	2014-11-19 <sup>[33]</sup>	Public domain
Superbase	Superbase	1984	Scientific (2004)		Proprietary
Teradata	Teradata	1984	14.10		Proprietary
UniData	Rocket Software	1988	7.2.12	2011-10	Proprietary

## Operating system support

The operating systems that the RDBMSes can run on.

	Windows	OS X	Linux	BSD	UNIX	AmigaOS	Symbian	z/OS	iOS	Android	OpenVMS
4th Dimension	Yes	Yes	No	No	No	No	No	No	No	No	No
ADABAS	Yes	No	Yes	No	Yes	No	No	Yes	No	No	No
Adaptive Server Enterprise	Yes	No	Yes	Yes	Yes	No	No	No	Yes	Yes	No
Advantage Database Server	Yes	No	Yes	No	No	No	No	No	No	No	No
Altibase	Yes	No	Yes	No	Yes	No	No	No	No	No	No
Apache Derby	Yes	Yes	Yes	Yes	Yes	No	No	Yes	?	No	No
Clustrix	No	No	Yes	No	Yes	No	No	No	No	No	No
CUBRID	Yes	Partial	Yes	No	No	No	No	No	No	No	No
Drizzle	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No
DB2	Yes	Yes (Express C)	Yes	No	Yes	No	No	Yes	Yes	No	No
Empress Embedded Database	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No
EXASolution	No	No	Yes	No	No	No	No	No	No	No	No
Firebird	Yes	Yes	Yes	Yes	Yes	No	No	Maybe	No	No	No
HSQldb	Yes	Yes	Yes	Yes	Yes	No	No	Yes	?	?	No
H2	Yes	Yes	Yes	Yes	Yes	No	No	Yes	?	Yes	No
FileMaker	Yes	Yes	No	No	No	No	No	No	Yes	No	No
Informix Dynamic Server	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Ingres	Yes	Yes	Yes	Yes	Yes	No	No	Partial	No	No	?
InterBase	Yes	Yes	Yes	No	Yes (Solaris)	No	No	No	No	No	No
Lintar SQL RDBMS	Yes	Yes	Yes	Yes	Yes	No	No	Under Linux on System z	?	Yes	No
LucidDB	Yes	Yes	Yes	No	No	No	No	No	No	No	No
MariaDB	Yes	Yes <sup>[34]</sup>	Yes	Yes	Yes	No	No	No	?	?	No
MaxDB	Yes	No	Yes	No	Yes	No	No	Maybe	No	No	No
Microsoft Access (JET)	Yes	No	No	No	No	No	No	No	No	No	No
Microsoft Visual Foxpro	Yes	No	No	No	No	No	No	No	No	No	No
Microsoft SQL Server	Yes	No	No	No	No	No	No	No	No	No	No
Microsoft SQL Server Compact (Embedded Database)	Yes	No	No	No	No	No	No	No	No	No	No
MonetDB	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
MySQL	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	?	Yes <sup>[35]</sup>	No
Omnis Studio	Yes	Yes	Yes	No	No	No	No	No	No	No	No
OpenBase SQL	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
OpenEdge	Yes	No	Yes	No	Yes	No	No	No	No	No	No
OpenLink Virtuoso	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No
Oracle	Yes	Yes	Yes	No	Yes	No	No	Yes	No	No	Yes
Oracle Rdb	No	No	No	No	No	No	No	No	No	No	Yes
Pervasive PSQL	Yes	Yes (OEM only)	Yes	No	No	No	No	No	No	No	No
Polyhedra	Yes	No	Yes	No	Yes	No	No	No	No	No	No
PostgreSQL	Yes	Yes	Yes	Yes	Yes	No	No	Under Linux on System z <sup>[36]</sup>	No	Yes	No
R:Base	Yes	No	No	No	No	No	No	No	No	No	No
RDM	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No
RDM Server	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
ScimoreDB	Yes	No	No	No	No	No	No	No	No	No	No
SmallSQL	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No
solidDB	Yes	No	Yes	No	Yes	No	No	Under Linux on System z	No	No	No
SQL Anywhere	Yes	Yes	Yes	No	Yes	No	No	No	No	Yes	No
SQLBase	Yes	No	Yes	No	No	No	No	No	No	No	No
SQLite	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Maybe	Yes	Yes	No
Superbase	Yes	No	No	No	No	Yes	No	No	No	No	No
Teradata	Yes	No	Yes	No	Yes	No	No	No	No	No	No
UniData	Yes	No	Yes	No	Yes	No	No	No	No	No	No
UniVerse	Yes	No	Yes	No	Yes	No	No	No	No	No	No

## Fundamental features

Information about what fundamental RDBMS features are implemented natively.

	ACID	Referential integrity	Transactions	Fine-grained locking	Unicode	Interface
4th Dimension	Yes	Yes	Yes	?	Yes	GUI & SQL
ADABAS	Yes	No	Yes	?	Yes	proprietary direct call & SQL (via 3rd party)
Adaptive Server Enterprise	Yes	Yes	Yes	?	Yes	SQL
Advantage Database Server	Yes	Yes	Yes	?	Yes <sup>4</sup>	API & SQL
Altibase	Yes	Yes	Yes	Yes (Row-level locking)	Yes	API & GUI & SQL
Apache Derby	Yes	Yes	Yes	?	Yes	SQL
Clustrix	Yes	Yes	Yes	?	Yes	SQL
CUBRID	Yes	Yes	Yes	?	Yes	GUI & SQL
Drizzle	Yes	Yes	Yes	?	Yes	SQL
DB2	Yes	Yes	Yes	Yes (Row-level locking) <sup>[37]</sup>	Yes	GUI & SQL
Empress Embedded Database	Yes	Yes	Yes	?	Yes	API & SQL
EXASolution	Yes	Yes	Yes	?	Yes	API & GUI & SQL
Firebird	Yes	Yes	Yes	?	Yes	SQL
HSQldb	Yes	Yes	Yes	?	Yes	SQL
H2	Yes	Yes	Yes	?	Yes	SQL
Informix Dynamic Server	Yes	Yes	Yes	Yes (Row-level locking)	Yes	SQL and JSON
Ingres	Yes	Yes	Yes	?	Yes	SQL & QUEL
InterBase	Yes	Yes	Yes	?	Yes	SQL
Inter SQL RDBMS	Yes	Yes	Yes	?	Yes	GUI & SQL
LucidDB	Yes	No	No	?	Yes	SQL
MariaDB	Yes <sup>2</sup>	Partial <sup>3</sup>	Yes <sup>2</sup> except for DDL <sup>[38]</sup>	Yes (Row-level locking)	Yes	SQL
MaxDB	Yes	Yes	Yes	?	Yes	SQL
Microsoft Access (JET)	Yes	Yes	Yes	?	Yes	GUI & SQL
Microsoft Visual FoxPro	No	Yes	Yes	?	No	GUI & SQL
Microsoft SQL Server	Yes	Yes	Yes	Yes (Row-level locking) <sup>[39]</sup>	Yes	GUI & SQL
Microsoft SQL Server Compact (Embedded Database)	Yes	Yes	Yes	?	Yes	GUI & SQL
MonetDB	Yes	Yes	Yes	?	Yes	SQL
MySQL	Yes <sup>2</sup>	Partial <sup>3</sup>	Yes <sup>2</sup> except for DDL <sup>[38]</sup>	Yes (Row-level locking) <sup>[40]</sup>	Yes	GUI <sup>5</sup> & SQL
OpenBase SQL	Yes	Yes	Yes	?	Yes	GUI & SQL
Oracle	Yes	Yes	Yes except for DDL <sup>[38]</sup>	Yes (Row-level locking) <sup>[41]</sup>	Yes	API & GUI & SQL
Oracle Rdb	Yes	Yes	Yes	?	Yes	SQL
OpenLink Virtuoso	Yes	Yes	Yes	?	Yes	API & GUI & SQL
Pervasive PSQL	Yes	Yes	Yes	?	Yes <sup>6</sup>	API & GUI & SQL
Polyhedra DBMS	Yes	Yes	Yes	Yes (optimistic and pessimistic cell-level locking) <sup>[42]</sup>	Yes	API & SQL
PostgreSQL	Yes	Yes	Yes	Yes (Row-level locking) <sup>[43]</sup>	Yes	API & GUI & SQL
RDM	Yes	Yes	Yes	?	Yes	SQL & API
RDM Server	Yes	Yes	Yes	?	Yes	SQL & API
ScimoreDB	Yes	Yes	Yes	?	Partial	SQL
solidDB	Yes	Yes	Yes	Yes (Row-level locking)	Yes	API & SQL
SQL Anywhere	Yes	Yes	Yes	?	Yes	SQL
SQLBase	Yes	Yes	Yes	?	Yes	API & GUI & SQL
SQLite	Yes	Yes	Yes	No (Database-level locking) <sup>[44]</sup>	Optional <sup>[45]</sup>	API & SQL
Teradata	Yes	Yes	Yes	?	Yes	SQL
UniData	Yes	No	Yes	?	Yes	Multiple
UniVerse	Yes	No	Yes	?	Yes	Multiple
	ACID	Referential integrity	Transactions	Fine-grained locking	Unicode	Interface

Note (1): Currently only supports read uncommitted transaction isolation. Version 1.9 adds serializable isolation and version 2.0 will be fully ACID compliant.

Note (2): MySQL provides ACID compliance through the default InnoDB storage engine.<sup>[46][47]</sup>

Note (3): "For other [than InnoDB] storage engines, MySQL Server parses and ignores the FOREIGN KEY and REFERENCES syntax in CREATE TABLE statements. The CHECK clause is parsed but ignored by all storage engines."<sup>[48]</sup>

Note (4): Support for Unicode is new in version 10.0.

Note (5): MySQL provides GUI interface through MySQL Workbench.

## Limits

Information about data size limits.

	Max DB size	Max table size	Max row size	Max columns per row	Max Blob/Clob size	Max CHAR size	Max NUMBER size	Min DATE value	Max DATE value	Max column name size
<b>4th Dimension</b>	Limited	?	?	65,135	200 GB (2 GiB Unicode)	200 GB (2 GiB Unicode)	64 bits	?	?	?
<b>Advantage Database Server</b>	Unlimited	16 EiB	65,530 B	65,135 / (10+ AvgFieldNameLength)	4 GiB	?	64 bits	?	?	128
<b>Apache Derby</b>	Unlimited	Unlimited	Unlimited	1,012 (5,000 in views)	2,147,483,647 chars	254 (VARCHAR: 32,672)	64 bits	0001-01-01	9999-12-31	128
<b>Clustrix</b>	Unlimited	Unlimited	64 MB on Appliance, 4 MB on AWS	?	64 MB	64 MB	64 MB	0001-01-01	9999-12-31	254
<b>CUBRID</b>	2 EB	2 EB	Unlimited	6400	Unlimited	1 GB	64 bits	0001-01-01	9999-12-31	254
<b>Drizzle</b>	Unlimited	64 TB	8 KB	1,000	4 GB (longtext, longblob)	64 KB (text)	64 bits	0001	9999	64
<b>DB2</b>	Unlimited	2 ZB	32,677 B	1,012	2 GB	32 KiB	64 bits	0001-01-01	9999-12-31	128
<b>Empress Embedded Database</b>	Unlimited	2 <sup>63</sup> -1 bytes	2 GB	32,767	2 GB	2 GB	64 bits	0000-01-01	9999-12-31	32
<b>EXASolution</b>	Unlimited	Unlimited	Unlimited	10,000	N/A	2 MB	128 bits	0001-01-01	9999-12-31	256
<b>FileMaker</b>	8 TB	8 TB	8 TB	256,000,000	4 GB	10 <sup>9</sup> characters	10 <sup>9</sup> numbers w/ range 10 <sup>4</sup> -400 to 10 <sup>3</sup> 400	0001-01-01	4000-12-31	100
<b>Firebird</b>	Unlimited <sup>1</sup>	~32 TB	65,536 B	Depends on data types used	2 GB	32,767 B	64 bits	100	32768	31
<b>HSQldb</b>	64 TB	Unlimited <sup>8</sup>	Unlimited <sup>8</sup>	Unlimited <sup>8</sup>	64 TB <sup>7</sup>	Unlimited <sup>8</sup>	Unlimited <sup>8</sup>	0001-01-01	9999-12-31	128
<b>H2</b>	64 TB	Unlimited <sup>8</sup>	Unlimited <sup>8</sup>	Unlimited <sup>8</sup>	64 TB <sup>7</sup>	Unlimited <sup>8</sup>	64 bits	-99999999	99999999	Unlimited <sup>8</sup>
	Max DB size	Max table size	Max row size	Max columns per row	Max Blob/Clob size	Max CHAR size	Max NUMBER size	Min DATE value	Max DATE value	Max column name size
<b>Informix Dynamic Server</b>	~128 PB	~128 PB	32,765 bytes (exclusive of large objects)	32,765	4 TB	32,765	10 <sup>32</sup>	01/01/0001 <sup>10</sup>	12/31/9999	128 bytes
<b>Ingres</b>	Unlimited	Unlimited	256 KB	1,024	2 GB	32 000 B	64 bits	0001	9999	256
<b>InterBase</b>	Unlimited <sup>1</sup>	~32 TB	65,536 B	Depends on data types used	2 GB	32,767 B	64 bits	100	32768	31
<b>Lintor SQL RDBMS</b>	Unlimited	2 <sup>30</sup> rows	64 KB (w/o BLOBs), 4 GB (BLOB)	250	4 GB	4 KB	64 bits	0001-01-01	9999-12-31	66
<b>MariaDB 10</b>	Unlimited	MyISAM storage limits: 256 TB; Innodb storage limits: 64 TB; Aria storage limits: ???	64 KB <sup>3</sup>	4,096 <sup>4</sup>	4 GB (longtext, longblob)	64 KB (text)	64 bits	1000	9999	64 <sup>[49]</sup>
<b>Microsoft Access (JET)</b>	2 GB	2 GB	16 MB	255	64 KB (memo field), 1 GB ("OLE Object" field)	255 B (text field)	32 bits	0100	9999	64
<b>Microsoft Visual Foxpro</b>	Unlimited	2 GB	65,500 B	255	2 GB	16 MB	32 bits	0001	9999	10
<b>Microsoft SQL Server</b>	524,272 TB (32 767 files * 16 TB max file size)	524,272 TB	8,060 bytes (Unlimited) <sup>6</sup>	30,000	2 GB	2 GB <sup>6</sup>	126 bits <sup>2</sup>	0001	9999	128
<b>Microsoft SQL Server Compact (Embedded Database)</b>	4 GB	4 GB	8,060 bytes	1024	2 GB	4000	154 bits	0001	9999	128
<b>MonetDB</b>	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	64 bits	0	9999-12-31	?
<b>MySQL 5</b>	Unlimited	MyISAM storage limits: 256 TB; Innodb storage limits: 64 TB	64 KB <sup>3</sup>	4,096 <sup>4</sup>	4 GB (longtext, longblob)	64 KB (text)	64 bits	1000	9999	64
<b>OpenLink Virtuoso</b>	32 TB per instance (Unlimited via elastic cluster)	DB size (or 32 TB)	4 KB	200	2 GB	2 GB	2 <sup>31</sup>	0	9999	100
<b>Oracle</b>	Unlimited (4 GB * block size per tablespace)	4 GB * block size (with BIGFILE tablespace)	8 KB	1,000	128 TB	32,767 B <sup>11</sup>	126 bits	-4712	9999	30
	Max DB size	Max table size	Max row size	Max columns per row	Max Blob/Clob size	Max CHAR size	Max NUMBER size	Min DATE value	Max DATE value	Max column name size
<b>Pervasive PSQL</b>	4 billion objects	256 GB	2 GB	1,536	2 GB	8,000 bytes	64 bits	01-01-0001	12-31-9999	128 bytes
<b>Polyhedra</b>	Limited by available RAM, address space	2 <sup>32</sup> rows	Unlimited	65,536	4 GB (subject to RAM)	4 GB (subject to RAM)	64 bits	0001-01-01	8000-12-31	255
<b>PostgreSQL</b>	Unlimited	32 TB	1.6 TB	250-1600 depending on type	1 GB (text, bytea) <sup>[50]</sup> - stored inline or 4 TB (stored in pg_largeobject) <sup>[51]</sup>	1 GB	Unlimited	-4,713	5,874,897	63
	Max DB size	Max table size	Max row size	Max columns per row	Max Blob/Clob size	Max CHAR size	Max NUMBER size	Min DATE value	Max DATE value	Max column name size

	Max DB size	Max table size	Max row size	Max columns per row	Max Blob/Clob size	Max CHAR size	Max NUMBER size	Min DATE value	Max DATE value	Max column name size
<b>RDM Embedded</b>	Unlimited	2 <sup>48</sup> -1 rows	32 KB	1,000	4 GB	char: 256, varchar: 4 KB	64 bits	0001-01-01	11758978-12-31	31
<b>RDM Server</b>	Unlimited	2 <sup>64</sup> -1 rows	32 KB	32,768	Unlimited	32 KB	64 bits	0001-01-01	11758978-12-31	32
<b>ScimoreDB</b>	Unlimited	16 EB	8,050 B	255	16 TB	8,000 B	64 bits	?	?	?
<b>solidDB</b>	256 TB	256 TB	32 KB + BLOB data	Limited by row size	4 GB	4 GB	64 bits	-32768-01-01	32767-12-31	254
<b>SQL Anywhere</b>	104 TB (13 files, each file up to 8 TB (32 KB pages))	Limited by file size	Limited by file size	45,000	2 GB	2 GB	64 bits	0001-01-01	9999-12-31	?
<b>SQLite</b>	128 TB (2 <sup>31</sup> pages * 64 KB max page size)	Limited by file size	Limited by file size	32,767	2 GB	2 GB	64 bits	No DATE type <sup>9</sup>	No DATE type <sup>9</sup>	Unlimited
<b>Teradata</b>	Unlimited	Unlimited	64 KB w/lobs (64 GB w/lobs)	2,048	2 GB	10,000	64 bits	?	9999-12-31 Select 80991231 (date);	30
<b>UniVerse</b>	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
	<b>Max DB size</b>	<b>Max table size</b>	<b>Max row size</b>	<b>Max columns per row</b>	<b>Max Blob/Clob size</b>	<b>Max CHAR size</b>	<b>Max NUMBER size</b>	<b>Min DATE value</b>	<b>Max DATE value</b>	<b>Max column name size</b>

Note (1): Firebird 2.x maximum database size is effectively unlimited with the largest known database size >980 GB.<sup>[52]</sup> Firebird 1.5.x maximum database size: 32 TB.

Note (2): Limit is 10<sup>38</sup> using DECIMAL datatype.<sup>[53]</sup>

Note (3): InnoDB is limited to 8,000 bytes (excluding VARBINARY, VARCHAR, BLOB, or TEXT columns).<sup>[54]</sup>

Note (4): InnoDB is limited to 1,000 columns.<sup>[54]</sup>

Note (6): Using VARCHAR (MAX) in SQL 2005 and later.<sup>[55]</sup>

Note (7): When using a page size of 32 KB, and when BLOB/CLOB data is stored in the database file.

Note (8): Java array size limit of 2,147,483,648 (2<sup>31</sup>) objects per array applies. This limit applies to number of characters in names, rows per table, columns per table, and characters per CHAR/VARCHAR.

Note (9): Despite the lack of a date datatype, SQLite does include date and time functions,<sup>[56]</sup> which work for timestamps between 0000-01-01 00:00:00 and 5352-11-01 10:52:47.

Note (10): Informix DATETIME type has adjustable range from YEAR only through 1/10000th second. DATETIME date range is 0001-01-01 00:00:00.00000 through 9999-12-31 23:59:59.99999.

Note (11): Since version 12c. Earlier versions support up to 4000 B.

## Tables and views

Information about what tables and views (other than basic ones) are supported natively.

	Temporary table	Materialized view
4th Dimension	Yes	No
ADABAS	?	?
Adaptive Server Enterprise	Yes <sup>1</sup>	Yes - see precomputed result sets
Advantage Database Server	Yes	No (only common views)
Altibase	Yes	No (only common views)
Apache Derby	Yes	No
Clustrix	Yes	No
CUBRID	No	No
Drizzle	Yes	No <sup>4</sup>
DB2	Yes	Yes
Empress Embedded Database	Yes	Yes
EXASolution	Yes	No
Firebird	Yes	No (only common views)
HSQldb	Yes	No
H2	Yes	No
Informix Dynamic Server	Yes	No <sup>2</sup>
Ingres	Yes	No
InterBase	Yes	No
Inter SQL RDBMS	Yes	Yes
LucidDB	No	No
MariaDB	Yes	No <sup>4</sup>
MaxDB	Yes	No
Microsoft Access (JET)	No	No
Microsoft Visual Foxpro	Yes	Yes
Microsoft SQL Server	Yes	Yes
Microsoft SQL Server Compact (Embedded Database)	Yes	No
MonetDB	Yes	No
MySQL	Yes	No <sup>4</sup>
OpenBase SQL	Yes	Yes
Oracle	Yes	Yes
Oracle Rdb	Yes	Yes
OpenLink Virtuoso	Yes	Yes
Pervasive PSQL	Yes	No
Polyhedra DBMS	No	No (only common views)
PostgreSQL	Yes	Yes <sup>5</sup>
RDM Embedded	Yes	No
RDM Server	Yes	No
solidDB	Yes	No (only common views)
SQL Anywhere	Yes	Yes
ScimoreDB	No	No
SQLite	Yes	No
Teradata	Yes	Yes
UniData	Yes	No
UniVerse	Yes	No

Note (1): Server provides tempdb, which can be used for public and private (for the session) temp tables.<sup>[57]</sup>

Note (2): Materialized views are not supported in Informix; the term is used in IBM's documentation to refer to a temporary table created to run the view's query when it is too complex, but one cannot for example define the way it is refreshed or build an index on it. The term is defined in the Informix Performance Guide.<sup>[58]</sup>

Note (4): Materialized views can be emulated using stored procedures and triggers.<sup>[59]</sup>

Note (5): Materialized views are now standard but can be emulated in versions prior to 9.3 with stored procedures and triggers using PL/pgSQL, PL/Perl, PL/Python, or other procedural languages.<sup>[60]</sup>

## Indices

Information about what indices (other than basic B-/B+ tree indices) are supported natively.

	R-/R+ tree	Hash	Expression	Partial	Reverse	Bitmap	GIST	GIN	Full-text	Spatial	FOT
4th Dimension	?	Cluster	?	?	?	?	?	?	Yes	?	?
ADABAS	?	?	?	?	?	?	?	?	?	?	?
Adaptive Server Enterprise	No	No	Yes	No	Yes	No	No	No	Yes	?	?
Advantage Database Server	No	No	Yes	No	Yes	Yes	No	No	Yes	?	?
Apache Derby	No	No	No	No	No	No	No	No	No <sup>[61]</sup>	?	?
Clustrix	No	Yes	No	No	No	No	No	No	No	No	?
CUBRID	No	No	Yes <sup>[62]</sup>	Yes <sup>[62]</sup>	Yes	No	No	No	No	No	No
Drizzle	No	No	No	No	No	No	No	No	No	?	?
DB2	No	?	Yes	No	Yes	Yes	No	No	Yes <sup>[63]</sup>	?	?
Empress Embedded Database	Yes	No	No	Yes	No	Yes	No	No	No	?	?
EXASolution	No	Yes	No	No	No	No	No	No	No	?	?
Firebird	No	No	Yes	No	Yes <sup>1</sup>	No	No	No	No <sup>[64]</sup>	?	?
HSQldb	No	No	No	No	No	No	No	No	No	?	?
H2	No	Yes	No	No	No	No	No	No	Yes <sup>[65]</sup>	Yes <sup>[66]</sup>	?
Informix Dynamic Server	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes <sup>[67]</sup>
Ingres	Yes	Yes	Ingres v10	No	No	Ingres v10	No	No	No	?	?
InterBase	No	No	No	No	No	No	No	No	No	?	?
Inter SQL RDBMS <sup>10</sup>	No	No	No	No	No	No	No	No	Yes <sup>[68]</sup>	No	No
LucidDB	No	No	No	No	No	Yes	No	No	No	?	?
MariaDB	MyISAM tables only	MEMORY, Cluster (NDB), InnoDB, <sup>5</sup> tables only	PERSISTENT virtual columns only <sup>[69]</sup>	No	No	No	No	No	MyISAM tables <sup>[70]</sup> and, since v10.0.5, InnoDB tables <sup>[71]</sup>	MyISAM tables only <sup>[72]</sup>	?
MaxDB	No	No	No	No	No	No	No	No	No	?	?
Microsoft Access (JET)	No	No	No	No	No	No	No	No	No <sup>[73]</sup>	?	?
Microsoft Visual Foxpro	No	No	Yes	Yes	Yes <sup>2</sup>	Yes	No	No	No	?	?
Microsoft SQL Server	?	Non/Cluster & fill factor	Yes <sup>3</sup>	Yes <sup>4</sup>	No <sup>3</sup>	No	No	No	Yes <sup>[74]</sup>	Yes <sup>[75]</sup>	?
Microsoft SQL Server Compact (Embedded Database)	No	No	No	No	No	No	No	No	No <sup>[76]</sup>	?	?
MonetDB	No	Yes	No	No	No	Yes	No	No	No	No	No
MySQL	MyISAM tables only	MEMORY, Cluster (NDB), InnoDB, <sup>5</sup> tables only	No <sup>[77]</sup>	No	No	No	No	No	MyISAM tables <sup>[70]</sup> and, since v5.6.4, InnoDB tables <sup>[78]</sup>	MyISAM tables only <sup>[72]</sup>	?
Oracle	Yes <sup>11</sup>	Cluster Tables	Yes	Yes <sup>6</sup>	Yes	Yes	No	No	Yes <sup>[79]</sup>	Yes <sup>[80]</sup>	?
Oracle Rdb	No	Yes	?	No	No	?	No	No	?	?	?
OpenLink Virtuoso	Yes	Cluster	Yes	Yes	No	Yes	No	No	Yes	Yes (Commercial only)	No
Pervasive PSQL	No	No	No	No	No	No	No	No	No	No	No
Polyhedra DBMS	No	Yes	No	No	No	No	No	No	No	No	?
PostgreSQL	Yes	Yes	Yes	Yes	Yes <sup>7</sup>	Yes <sup>8</sup>	Yes	Yes	Yes <sup>[81]</sup>	PostGIS <sup>[82]</sup>	?
RDM Embedded	No	Yes	No	Yes	Yes	No	No	No	No	No	No
RDM Server	No	No	No	Yes	Yes	No	No	No	No	No	No
ScimoreDB	No	No	No	No	No	No	No	No	Yes <sup>[83]</sup>	?	?
solidDB	No	No	No	No	Yes	No	No	No	No	No	No
SQL Anywhere	No	No	No	No	No	No	No	No	Yes	?	?
SQLite	Yes <sup>[84]</sup>	No	No	Yes <sup>[85]</sup>	Yes	No	No	No	Yes <sup>[86]</sup>	SpatialLite <sup>[87]</sup>	?
Teradata	No	Yes	Yes	Yes	No	Yes	No	No	?[88]	?	?
UniVerse	Yes	Yes	Yes <sup>3</sup>	Yes <sup>3</sup>	Yes <sup>3</sup>	No	No	No	?	Yes <sup>[89]</sup>	?
	R-/R+ tree	Hash	Expression	Partial	Reverse	Bitmap	GIST	GIN	Full-text	Spatial	FOT

Note (1): The users need to use a function from freeAdhocUDF library or similar.<sup>[90]</sup>

Note (2): Can be implemented for most data types using expression-based indexes.

Note (3): Can be emulated by indexing a computed column<sup>[91]</sup> (doesn't easily update) or by using an "Indexed View"<sup>[92]</sup> (proper name not just any view works<sup>[93]</sup>).

Note (4): Can be implemented by using an indexed view.<sup>[94]</sup>

Note (5): InnoDB automatically generates adaptive hash index<sup>[95]</sup> entries as needed.

Note (6): Can be implemented using Function-based Indexes in Oracle 8i and higher, but the function needs to be used in the sql for the index to be used.

Note (7): A PostgreSQL functional index can be used to reverse the order of a field.

Note (8): PostgreSQL will likely support on-disk bitmap indexes in a future version. Version 8.2 supports a related technique known as "in-memory bitmap scans".

Note (10): B+ tree and full-text only for now.

Note (11): R-Tree indexing available in base edition with Locator but some functionality requires Personal Edition or Enterprise Edition with Spatial option.

## Database capabilities



	Union	Intersect	Except	Inner joins	Outer joins	Inner selects	Merge joins	Blobs and Clobs	Common Table Expressions	Windowing Functions	Parallel Query
4th Dimension	Yes	Yes	Yes	Yes	Yes	No	No	Yes	?	?	?
ADABAS	Yes	?	?	?	?	?	?	?	?	?	?
Adaptive Server Enterprise	Yes	?	?	Yes	Yes	Yes	Yes	Yes	?	?	Yes
Advantage Database Server	Yes	No	No	Yes	Yes	Yes	Yes	Yes	?	No	?
Altibase	Yes	Yes	Yes, via MINUS	Yes	Yes	Yes	Yes	Yes	No	No	No
Apache Derby	Yes	Yes	Yes	Yes	Yes	?	?	Yes	No	No	?
Clustrix	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
CUBRID	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes <sup>[62]</sup>	?
Drizzle	Yes	No	No	Yes	Yes	Yes	No	Yes	No	No	No <sup>[96]</sup>
DB2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes <sup>[97]</sup>
Empress Embedded Database	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	?	?	?
EXASolution	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Firebird	Yes	?	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	?
HSQldb	Yes	Yes	Yes	Yes	Yes	Yes	Yes <sup>[98]</sup>	Yes	Yes	No	Yes <sup>[98]</sup>
H2	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	experimental <sup>[99]</sup>	No <sup>[100]</sup>	?
Informix Dynamic Server	Yes	Yes	Yes, via MINUS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes <sup>[101]</sup>
Ingres	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	No	?
InterBase	Yes	?	?	Yes	Yes	?	?	Yes	?	?	?
Inter SQL RDBMS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
LucidDB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	?	?	?
MaxDB	Yes	?	?	Yes	Yes	Yes	No	Yes	?	?	?
Microsoft Access (JET)	Yes	No	No	Yes	Yes	Yes	No	Yes	No	No	?
Microsoft Visual Foxpro	Yes	?	?	Yes	Yes	Yes	?	Yes	?	?	?
Microsoft SQL Server	Yes	Yes (2005 and beyond)	Yes (2005 and beyond)	Yes	Yes	Yes	Yes	Yes	Yes	Yes <sup>[102]</sup>	Yes <sup>[103]</sup>
Microsoft SQL Server Compact (Embedded Database)	Yes	No	No	Yes	Yes	?	No	Yes	No	No	?
MonetDB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MySQL	Yes	No	No	Yes	Yes	Yes	No	Yes	No <sup>[104]</sup>	No	No <sup>[105]</sup>
OpenBase SQL	No	No	No	Yes	Yes	Yes	Yes	Yes	?	?	?
OpenLink Virtuoso	Yes	?	?	Yes	Yes	Yes	?	Yes	?	?	?
Oracle	Yes	Yes	Yes, via MINUS	Yes	Yes	Yes	Yes	Yes	Yes <sup>1</sup>	Yes	Yes <sup>[106]</sup>
Oracle Rdb	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	?	?	?
Pervasive PSQL	Yes	No	No	Yes	Yes	?	?	Yes	No	No	No
Polyhedra DBMS	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No
PostgreSQL	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes <sup>[107]</sup>
RDM Embedded	No	No	No	Yes	Yes	No	No	Yes	No	No	No
RDM Server	Yes	No	No	Yes	Yes	Yes	No	Yes	No	No	No
ScimoreDB	Yes	?	?	Yes	LEFT only	Yes	Yes	Yes	?	?	?
SmallSQL	?	?	?	?	?	?	?	?	?	?	?
solidDB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
SQL Anywhere	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SQLite	Yes	Yes	Yes	Yes	LEFT only	Yes	No	Yes	3.8.3+ <sup>[108]</sup>	No	No
Teradata	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UniVerse	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	?
	Union	Intersect	Except	Inner joins	Outer joins	Inner selects	Merge joins	Blobs and Clobs	Common Table Expressions	Windowing Functions	Parallel Query

Note (1): Recursive CTEs introduced in 11gR2 supersedes similar construct called CONNECT BY.

## Data types

	Type system	Integer	Floating point	Decimal	String	Binary	Date/Time	Boolean	Other
<b>4th Dimension</b>	Static	UUID (16-bit), SMALLINT (16-bit), INT (32-bit), BIGINT (64-bit), NUMERIC (64-bit)	REAL, FLOAT	REAL, FLOAT	CLOB, TEXT, VARCHAR	BIT, BIT VARYING, BLOB	DURATION, INTERVAL, TIMESTAMP	BOOLEAN	PICTURE
<b>Altibase<sup>[109]</sup></b>	Static	SMALLINT (16-bit), INTEGER (32-bit), BIGINT (64-bit)	REAL(32-bit), DOUBLE(64-bit)	DECIMAL, NUMERIC, NUMBER, FLOAT	CHAR, VARCHAR, NCHAR, NVARCHAR, CLOB	BLOB, BYTE, NIBBLE, BIT, VARBIT	DATE		GEOMETRY
<b>Clustrix<sup>[110]</sup></b>	Static	TINYINT (8-bit), SMALLINT (16-bit), MEDIUMINT (24-bit), INT (32-bit), BIGINT (64-bit)	FLOAT (32-bit), DOUBLE	DECIMAL	CHAR, BINARY, VARCHAR, VARBINARY, TEXT, TINYTEXT, MEDIUMTEXT, LONGTEXT	TINYBLOB, BLOB, MEDIUMBLOB, LONGBLOB	DATETIME, DATE, TIMESTAMP, YEAR	BIT(1), BOOLEAN	ENUM, SET,
<b>CUBRID<sup>[111]</sup></b>	Static	SMALLINT (16-bit), INTEGER (32-bit), BIGINT (64-bit)	FLOAT, REAL(32-bit), DOUBLE(64-bit)	DECIMAL, NUMERIC	CHAR, VARCHAR, NCHAR, NVARCHAR, CLOB	BLOB	DATE, DATETIME, TIME, TIMESTAMP	BIT	MONETARY, BIT VARYING, SET, MULTISSET, SEQUENCE, ENUM
<b>Drizzle<sup>[112]</sup></b>	Static	INT (32-bit), BIGINT (64-bit)	DOUBLE (aka REAL) (64-bit)	DECIMAL	BINARY, VARCHAR, VARBINARY, TEXT,	BLOB	DATETIME, DATE, TIMESTAMP		ENUM, SERIAL
<b>Empress Embedded Database</b>	Static	TINYINT, SQL_TINYINT, or INTEGER8; SMALLINT, SQL_SMALLINT, or INTEGER16; INTEGER, INT, SQL_INTEGER, or INTEGER32; BIGINT, SQL_BIGINT, or INTEGER64	REAL, SQL_REAL, or FLOAT32; DOUBLE PRECISION, SQL_DOUBLE, or FLOAT64; FLOAT, or SQL_FLOAT; EFLOAT	DECIMAL, DEC, NUMERIC, SQL_DECIMAL, or SQL_NUMERIC; DOLLAR	CHARACTER, ECHARACTER, CHARACTER VARYING, NATIONAL CHARACTER, NATIONAL CHARACTER VARYING, NLSCHARACTER, CHARACTER LARGE OBJECT, TEXT, NATIONAL CHARACTER LARGE OBJECT, NLSTEXT	BINARY LARGE OBJECT or BLOB; BULK	DATE, EDATE, TIME, ETIME, EPOCH_TIME, TIMESTAMP, MICROTIMESTAMP	BOOLEAN	SEQUENCE 32, SEQUENCE
<b>EXASolution</b>	Static	TINYINT, SMALLINT, INTEGER, BIGINT,	REAL, FLOAT, DOUBLE	DECIMAL, DEC, NUMERIC, NUMBER	CHAR, NCHAR, VARCHAR, VARCHAR2, NVARCHAR, NVARCHAR2, CLOB, NCLOB	N/A	DATE, TIMESTAMP, INTERVAL	BOOLEAN, BOOL	GEOMETRY
<b>HSQldb<sup>[113]</sup></b>	Static	TINYINT (8-bit), SMALLINT (16-bit), INTEGER (32-bit), BIGINT (64-bit)	DOUBLE (64-bit)	DECIMAL, NUMERIC	CHAR, VARCHAR, LONGVARCHAR, CLOB	BINARY, VARBINARY, LONGVARBINARY, BLOB	DATE, TIME, TIMESTAMP, INTERVAL	BOOLEAN	OTHER (object), BIT, BIT VARYING, ARRAY
<b>Informix Dynamic Server<sup>[114]</sup></b>	Static	SMALLINT (16-bit), INT (32-bit), INT8 (64-bit proprietary), BIGINT (64-bit)	SMALLFLOAT (32-bit), FLOAT (64-bit)	DECIMAL (32 digits float/fixed), MONEY	CHAR, VARCHAR, NCHAR, NVARCHAR, LVARCHAR, CLOB, TEXT	TEXT, BYTE, BLOB, CLOB	DATE, DATETIME, INTERVAL	BOOLEAN	SET, LIST, MULTISSET, ROW, TIMESERIES, SPATIAL, JSON, BSON, USER DEFINED TYPES
<b>Ingres<sup>[115]</sup></b>	Static	TINYINT (8-bit), SMALLINT (16-bit), INTEGER (32-bit), BIGINT (64-bit)	FLOAT4 (32-bit), FLOAT (64-bit)	DECIMAL	C, CHAR, VARCHAR, LONG VARCHAR, NCHAR, NVARCHAR, LONG NVARCHAR, TEXT	BYTE, VARBYTE, LONG VARBYTE (BLOB)	DATE, ANSIDATE, INGRESDATE, TIME, TIMESTAMP, INTERVAL	N/A	MONEY, OBJECT_KEY, TABLE_KEY, USER-DEFINED DATA TYPES (via OME)
<b>Linter SQL RDBMS</b>	Static	SMALLINT (16-bit), INTEGER (32-bit), BIGINT (64-bit)	REAL(32-bit), DOUBLE(64-bit)	DECIMAL, NUMERIC	CHAR, VARCHAR, NCHAR, NVARCHAR, BLOB	BYTE, VARBYTE, BLOB	DATE	BOOLEAN	GEOMETRY, EXTFILE
<b>Microsoft SQL Server<sup>[116]</sup></b>	Static	TINYINT, SMALLINT, INT, BIGINT	FLOAT, REAL	NUMERIC, DECIMAL, SMALLMONEY, MONEY	CHAR, VARCHAR, TEXT, NCHAR, NVARCHAR, NTEXT	BINARY, VARBINARY, IMAGE, FILESTREAM	DATE, DATETIMEOFFSET, DATETIME2, SMALLDATETIME, DATETIME, TIME	BIT	CURSOR, TIMESTAMP, HIERARCHYID, UNIQUEIDENTIFIER, SQL_VARIANT, XML, TABLE, Geometry, Geography
<b>Microsoft SQL Server Compact (Embedded Database)<sup>[117]</sup></b>	Static	TINYINT, SMALLINT, INT, BIGINT	FLOAT, REAL	NUMERIC, DECIMAL, MONEY	NCHAR, NVARCHAR, NTEXT	BINARY, VARBINARY, IMAGE	DATETIME	BIT	TIMESTAMP, ROWVERSION, UNIQUEIDENTIFIER, IDENTITY, ROWGUIDCOL
<b>MonetDB</b>	Static	TINYINT, SMALLINT, INT, BIGINT	FLOAT, REAL, DOUBLE	NUMERIC, DECIMAL	VARCHAR(n), CHAR(n), CLOB	BLOB	DATE, TIME, DATETIME, TIMESTAMP	BIT	TIME WITH TIME ZONE, TIMESTAMP WITH TIME ZONE, DAY, MONTH, YEAR, INTERVAL
<b>MySQL<sup>[110]</sup></b>	Static	TINYINT (8-bit), SMALLINT (16-bit), MEDIUMINT (24-bit), INT (32-bit), BIGINT (64-bit)	FLOAT (32-bit), DOUBLE (aka REAL) (64-bit)	DECIMAL	CHAR, BINARY, VARCHAR, VARBINARY, TEXT, TINYTEXT, MEDIUMTEXT, LONGTEXT	TINYBLOB, BLOB, MEDIUMBLOB, LONGBLOB	DATETIME, DATE, TIMESTAMP, YEAR	BIT(1), BOOLEAN (aka BOOL) = synonym for TINYINT	ENUM, SET, GIS data types (Geometry, Point, Curve, LineString, Surface, Polygon, GeometryCollection, MultiPoint, MultiCurve,
	Type system	Integer	Floating point	Decimal	String	Binary	Date/Time	Boolean	Other

	Type system	Integer	Floating point	Decimal	String	Binary	Date/Time	Boolean	Other
									MultiLineString, MultiSurface, MultiPolygon)
<b>OpenLink Virtuoso</b> <sup>[118]</sup>	Static + Dynamic	INT, INTEGER, SMALLINT	REAL, DOUBLE PRECISION, FLOAT, FLOAT('INTNUM')	DECIMAL, DECIMAL('INTNUM'), DECIMAL('INTNUM','INTNUM'), NUMERIC, NUMERIC('INTNUM'), NUMERIC('INTNUM','INTNUM')	CHARACTER, CHAR('INTNUM'), VARCHAR, VARCHAR('INTNUM'), NVARCHAR, NVARCHAR('INTNUM')	BLOB	TIMESTAMP, DATETIME, TIME, DATE	n/a	GEOMETRY, REFERENCE (URI), UDT (User Defined Type)
<b>Oracle</b> <sup>[119]</sup>	Static + Dynamic (through ANYDATA)	NUMBER	BINARY_FLOAT, BINARY_DOUBLE	NUMBER	CHAR, VARCHAR2, CLOB, NCLOB, NVARCHAR2, NCHAR, LONG (deprecated)	BLOB, RAW, LONG RAW (deprecated), BFILE	DATE, TIMESTAMP (with/without TIMEZONE), INTERVAL	N/A	SPATIAL, IMAGE, AUDIO, VIDEO, DICOM, XMLType
<b>Pervasive PSQl</b> <sup>[120]</sup>	Static	BIGINT, INTEGER, SMALLINT, TINYINT, UBIGINT, UINTEGER, USMALLINT, UTINYINT	BFLOAT4, BFLOAT8, DOUBLE, FLOAT	DECIMAL, NUMERIC, NUMERICSA, NUMERICSLB, NUMERICSL, NUMERICSTB, NUMERICSTS	CHAR, LONGVARCHAR, VARCHAR	BINARY, LONGVARBINARY, VARBINARY	DATE, DATETIME, TIME	BIT	CURRENCY, IDENTITY, SMALLIDENTITY, TIMESTAMP, UNIQUEIDENTIFIER
<b>Polyhedra</b> <sup>[121]</sup>	Static	INTEGER8 (8-bit), INTEGER(16-bit), INTEGER (32-bit), INTEGER64 (64-bit)	FLOAT32 (32-bit), FLOAT (aka REAL; 64-bit)	N/A	VARCHAR, LARGE VARCHAR (aka CHARACTER LARGE OBJECT)	LARGE BINARY (aka BINARY LARGE OBJECT)	DATETIME	BOOLEAN	N/A
<b>PostgreSQL</b> <sup>[122]</sup>	Static	SMALLINT (16-bit), INTEGER (32-bit), BIGINT (64-bit)	REAL (32-bit), DOUBLE PRECISION (64-bit)	DECIMAL, NUMERIC	CHAR, VARCHAR, TEXT	BYTEA	DATE, TIME (with/without TIMEZONE), TIMESTAMP (with/without TIMEZONE), INTERVAL	BOOLEAN	ENUM, POINT, LINE, LSEG, BOX, PATH, POLYGON, CIRCLE, CIDR, INET, MACADDR, BIT, UUID, XML, JSON, arrays, composites, ranges, custom
<b>RDM Embedded</b> <sup>[123]</sup>	Static	tinyint, smallint, integer, bigint	real, float, double	N/A	char, varchar, wchar, varwchar, long varchar, long varwchar	binary, varbinary, long varbinary	date, time, timestamp	bit	N/A
<b>RDM Server</b> <sup>[124]</sup>	Static	tinyint, smallint, integer, bigint	real, float, double	decimal, numeric	char, varchar, wchar, varwchar, long varchar, long varwchar	binary, varbinary, long varbinary	date, time, timestamp	bit	rowid
<b>solidDB</b>	Static	TINYINT (8-bit), SMALLINT (16-bit), INTEGER (32-bit), BIGINT (64-bit)	REAL (32-bit), DOUBLE (64-bit), FLOAT (64-bit)	DECIMAL, NUMERIC (51 digits)	CHAR, VARCHAR, LONG VARCHAR, WCHAR, WVARCHAR, LONG WVARCHAR	BINARY, VARBINARY, LONG VARBINARY	DATE, TIME, TIMESTAMP		
<b>SQLite</b> <sup>[125]</sup>	Dynamic	INTEGER (64-bit)	REAL (aka FLOAT, DOUBLE) (64-bit)	N/A	TEXT (aka CHAR, CLOB)	BLOB	N/A	N/A	N/A
<b>UniData</b>	Dynamic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>UniVerse</b>	Dynamic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Type system	Integer	Floating point	Decimal	String	Binary	Date/Time	Boolean	Other

## Other objects

Information about what other objects are supported natively.

	Data Domain	Cursor	Trigger	Function <sup>1</sup>	Procedure <sup>1</sup>	External routine <sup>1</sup>
4th Dimension	Yes	No	Yes	Yes	Yes	Yes
ADABAS	?	Yes	?	Yes?	Yes?	Yes
Adaptive Server Enterprise	Yes	Yes	Yes	Yes	Yes	Yes
Advantage Database Server	Yes	Yes	Yes	Yes	Yes	Yes
Altibase	Yes	Yes	Yes	Yes	Yes	Yes
Apache Derby	No	Yes	Yes	Yes <sup>2</sup>	Yes <sup>2</sup>	Yes <sup>2</sup>
Clustrix	No	Yes	No	Yes	Yes	Yes
CUBRID	Yes	Yes	Yes	Yes	Yes <sup>2</sup>	Yes
Drizzle	Yes	Yes	Yes <sup>4</sup>	Yes <sup>4</sup>	Yes <sup>4</sup>	Yes <sup>4</sup>
Empress Embedded Database	Yes via RANGE CHECK	Yes	Yes	Yes	Yes	Yes
EXASolution	Yes	No	No	Yes	Yes	Yes
DB2	Yes via CHECK CONSTRAINT	Yes	Yes	Yes	Yes	Yes
Firebird	Yes	Yes	Yes	Yes	Yes	Yes
HSQldb	Yes	No	Yes	Yes	Yes	Yes
H2	Yes	No	Yes <sup>2</sup>	Yes <sup>2</sup>	Yes <sup>2</sup>	Yes
Informix Dynamic Server	Yes via CHECK	Yes	Yes	Yes	Yes	Yes <sup>5</sup>
Ingres	Yes	Yes	Yes	Yes	Yes	Yes
InterBase	Yes	Yes	Yes	Yes	Yes	Yes
Lintor SQL RDBMS	No	Yes	Yes	Yes	Yes	No
LucidDB	No	Yes	No	Yes <sup>2</sup>	Yes <sup>2</sup>	Yes <sup>2</sup>
MaxDB	Yes	Yes	Yes	Yes	Yes	?
Microsoft Access (JET)	Yes	No	No	No	Yes, But single DML/DDDL Operation	Yes
Microsoft Visual Foxpro	No	Yes	Yes	Yes	Yes	Yes
Microsoft SQL Server	Yes (2000 and beyond)	Yes	Yes	Yes	Yes	Yes
Microsoft SQL Server Compact (Embedded Database)	No	Yes	No	No	No	No
MonetDB	No	No	Yes	Yes	Yes	Yes
MySQL	No <sup>3</sup>	Yes	Yes	Yes	Yes	Yes
OpenBase SQL	Yes	Yes	Yes	Yes	Yes	Yes
Oracle	Yes	Yes	Yes	Yes	Yes	Yes
Oracle Rdb	Yes	Yes	Yes	Yes	Yes	Yes
OpenLink Virtuoso	Yes	Yes	Yes	Yes	Yes	Yes
Pervasive PSQL	Yes	Yes	Yes	Yes	Yes	No
Polyhedra DBMS	No	No	Yes	Yes	Yes	Yes
PostgreSQL	Yes	Yes	Yes	Yes	Yes	Yes
RDM Embedded	No	Yes	No	No	Yes	Yes
RDM Server	No	Yes	Yes	No	Yes	Yes
ScimoreDB	No	No	No	No	Yes	Yes
solidDB	Yes	Yes	Yes	Yes	Yes	Yes
SQL Anywhere	Yes	Yes	Yes	Yes	Yes	Yes
SQLite	No	No	Yes	No	No	Yes
Teradata	No	Yes	Yes	Yes	Yes	Yes
UniData	No	No	Yes	Yes	Yes	Yes
UniVerse	No	No	Yes	Yes	Yes	Yes
	Data Domain	Cursor	Trigger	Function <sup>1</sup>	Procedure <sup>1</sup>	External routine <sup>1</sup>

Note (1): Both **function** and **procedure** refer to internal routines written in SQL and/or procedural language like PL/SQL. **External routine** refers to the one written in the host languages, such as C, Java, Cobol, etc. "Stored procedure" is a commonly used term for these routine types. However, its definition varies between different database vendors.

Note (2): In Derby, H2, LucidDB, and CUBRID, users code **functions** and **procedures** in Java.

Note (3): ENUM datatype exist. CHECK clause is parsed, but not enforced in runtime.

Note (4): In Drizzle the user codes **functions** and **procedures** in C++.

Note (5): Informix supports external functions written in Java, C, & C++.

## Partitioning

Information about what partitioning methods are supported natively.

	Range	Hash	Composite (Range+Hash)	List	Expression
4th Dimension	?	?	?	?	?
ADABAS	?	?	?	?	?
Adaptive Server Enterprise	Yes	Yes	No	Yes	?
Advantage Database Server	No	No	No	No	?
Altibase	Yes	Yes	No	Yes	?
Apache Derby	No	No	No	No	?
Clustrix	Yes	No	No	No	No
CUBRID	Yes	Yes	No	Yes	?
IBM DB2	Yes	Yes	Yes	Yes	?
Empress Embedded Database	No	No	No	No	?
EXASolution	No	Yes	No	No	No
Firebird	No	No	No	No	?
HSQldb	No	No	No	No	?
H2	No	No	No	No	?
Informix Dynamic Server	Yes	Yes	Yes	Yes	Yes
Ingres	Yes	Yes	Yes	Yes	?
InterBase	No	No	No	No	?
Inter SQL RDBMS	No	No	No	No	?
MaxDB	No	No	No	No	?
Microsoft Access (JET)	No	No	No	No	?
Microsoft Visual Foxpro	No	No	No	No	?
Microsoft SQL Server	Yes	No	No	No	?
Microsoft SQL Server Compact (Embedded Database)	No	No	No	No	?
MonetDB	No	No	No	No	No
MySQL	Yes	Yes	Yes	Yes	?
OpenBase SQL	?	?	?	?	?
Oracle	Yes	Yes	Yes	Yes	?
Oracle Rdb	Yes	Yes	?	?	?
OpenLink Virtuoso	Yes	Yes	Yes	Yes	Yes
Pervasive PSQL	No	No	No	No	No
Polyhedra DBMS	No	No	No	No	No
PostgreSQL	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	?
RDM Embedded	Yes <sup>2</sup>	Yes <sup>2</sup>	Yes <sup>2</sup>	No	?
RDM Server	No	No	No	No	?
ScimoreDB	No	Yes	No	No	?
solidDB	Yes	No	No	No	?
SQL Anywhere	No	No	No	No	?
SQLite	No	No	No	No	?
Teradata	Yes	Yes	Yes	Yes	?
UniVerse	Yes	Yes	Yes	Yes	?
	<b>Range</b>	<b>Hash</b>	<b>Composite (Range+Hash)</b>	<b>List</b>	<b>Expression</b>

Note (1): PostgreSQL 8.1 provides partitioning support through check constraints. Range, List and Hash methods can be emulated with PL/pgSQL or other procedural languages.<sup>[126]</sup>

Note (2): RDM Embedded 10.1 requires the application programs to select the correct partition (using range, hash or composite techniques) when adding data, but the *database union* functionality allows all partitions to be read as a single database.<sup>[127]</sup>

## Access control

Information about access control functionalities (*work in progress*).

	Native network encryption <sup>1</sup>	Brute-force protection	Enterprise directory compatibility	Password complexity rules <sup>2</sup>	Patch access <sup>3</sup>	Run unprivileged <sup>4</sup>	Audit	Resource limit	Separation of duties (RBAC) <sup>5</sup>	Security Certification	Label Based Access Control (LBAC)
4D	Yes (with SSL)	?	Yes	?	Yes	Yes	?	?	?	?	?
Adaptive Server Enterprise	Yes (optional; to pay)	Yes	Yes (optional ?)	Yes	Partial (need to register; depend on which product) <sup>[128]</sup>	Yes	Yes	Yes	Yes	Yes (EAL4+ <sup>1</sup> )	?
Advantage Database Server	Yes	No	No	No	Yes	Yes	No	No	Yes	?	?
DB2	Yes	?	Yes (LDAP, Kerberos...)	Yes	?	Yes	Yes	Yes	Yes	Yes (EAL4+ <sup>6</sup> )	?
Empress Embedded Database	?	?	No	No	Yes	Yes	Yes	No	Yes	No	?
EXASolution	No	No	Yes (LDAP)	No	Yes	Yes	Yes	Yes	Yes	No	?
Firebird	No	Yes <sup>[129]</sup>	Yes (Windows trusted authentication)	No	Partial (no security page) <sup>[130]</sup>	Yes	No	No	No <sup>7</sup>	?	?
HSQLDB	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	No	?
H2	Yes	Yes	?	No	?	Yes	?	Yes	Yes	No	?
Informix Dynamic Server	Yes	?	Yes <sup>10</sup>	? <sup>10</sup>	Yes	Yes	Yes	Yes	Yes	?	Yes
Lintor SQL RDBMS	Yes (with SSL)	Yes	Yes	Yes (length only)	No	Yes	Yes	Yes	Yes	Yes	Yes
MariaDB	Yes (SSL)	No	Yes (with 5.2, but not on Windows servers)	No	Partial (no security page)	Yes	?	?	? <sup>8</sup>	No	?
Microsoft SQL Server	Yes	?	Yes (Microsoft Active Directory)	Yes	Yes	Yes	Yes (From 2008)	Yes	Yes	Yes (EAL4+ <sup>11</sup> )	?
Microsoft SQL Server Compact (Embedded Database)	No (not relevant, only file permissions)	No (not relevant)	No (not relevant)	No (not relevant)	Yes	Yes (file access)	Yes	Yes	No	?	?
MySQL	Yes (SSL with 4.0)	No	Yes (with 5.5, but only in commercial edition)	No	Partial (no security page) <sup>[131]</sup>	Yes	?	?	? <sup>8</sup>	No	?
OpenBase SQL	Yes	?	Yes (Open Directory, LDAP)	No	?	?	?	?	?	?	?
OpenLink Virtuoso	Yes	Yes	Yes	Yes (optional)	Yes (optional)	Yes	Yes (optional)	Yes (optional)	Yes	No	?
Oracle	Yes	Yes	Yes	Yes	?	Yes	Yes	Yes	Yes	Yes (EAL4+ <sup>1</sup> )	?
Pervasive PSQL	Yes	?	No	No	Yes	Yes	Yes <sup>12</sup>	No	No	No	?
Polyhedra DBMS	Yes (with SSL, Optional)	No	No	No	No	Yes	Yes <sup>13</sup>	Yes	Yes <sup>13</sup>	No	?
PostgreSQL	Yes	Yes (for 9.1)	Yes (LDAP, Kerberos... <sup>9</sup> )	Yes (as of 9.0 with passwordcheck module)	Yes <sup>[132]</sup>	Yes	No	Yes	Yes	Yes (EAL1 <sup>1</sup> )	?
RDM Embedded	No	No	No	No	No	Yes	No	No	No	No	?
RDM Server	Yes	No	No	No	No	Yes	Yes	No	Yes	No	?
solidDB	No	No	Yes	No	No	Yes	Yes	No	No	No	No
SQL Anywhere	Yes	?	Yes (Kerberos)	Yes	?	Yes	Yes	No	Yes	Yes (EAL3+ <sup>1</sup> as Adaptive Server Anywhere)	?
SQLite	No (not relevant, only file permissions)	No (not relevant)	No (not relevant)	No (not relevant)	Partial (no security page) <sup>[133]</sup>	Yes (file access)	Yes	Yes	No	No	?
	Native network encryption <sup>1</sup>	Brute-force protection	Enterprise directory compatibility	Password complexity rules <sup>2</sup>	Patch access <sup>3</sup>	Run unprivileged <sup>4</sup>	Audit	Resource limit	Separation of duties (RBAC) <sup>5</sup>	Security Certification	Label Based Access Control (LBAC)

Note (1): Network traffic could be transmitted in a secure way (not clear-text, in general SSL encryption). Precise if option is default, included option or an extra modules to buy.

Note (2): Options are present to set a minimum size for password, respect complexity like presence of numbers or special characters.

Note (3): How do you get security updates? Is it free access, do you need a login or to pay? Is there easy access through a Web/FTP portal or RSS feed or only through offline access (mail CD-ROM, phone).

Note (4): Does database process run as root/administrator or unprivileged user? What is default configuration?

Note (5): Is there a separate user to manage special operation like backup (only dump/restore permissions), security officer (audit), administrator (add user/create database), etc.? Is it default or optional?

Note (6): Common Criteria certified product list.<sup>[134]</sup>

Note (7): FirebirdSQL seems to only have SYSDBA user and DB owner. There are no separate roles for backup operator and security administrator.

Note (8): User can define a dedicated backup user but nothing particular in default install.<sup>[135]</sup>

Note (9): Authentication methods.<sup>[136]</sup>

Note (10): Informix Dynamic Server supports PAM and other configurable authentication. By default uses OS authentication.

Note (11): Authentication methods.<sup>[137]</sup>

Note (12): With the use of Pervasive AuditMaster.

Note (13): User-based security is optional in Polyhedra, but when enabled can be enhanced to a role-based model with auditing.<sup>[138]</sup>

## Databases vs schemas (terminology)

The SQL specification makes clear what an "SQL schema" is; however, different databases implement it incorrectly. To compound this confusion the functionality can, when incorrectly implemented, overlap with that of the parent-database. An SQL schema is simply a namespace within a database, things within this namespace are addressed using the member operator dot ". ". This seems to be a universal amongst all of the implementations.

A true fully (database, schema, and table) qualified query is exemplified as such: `SELECT * FROM database.schema.table`

Now, the issue, both a schema and a database can be used to isolate one table, "foo" from another like named table "foo". The following is pseudo code:

- `SELECT * FROM db1.foo` VS. `SELECT * FROM db2.foo` (no explicit schema between db and table)
- `SELECT * FROM [db1.]default.foo` VS. `SELECT * FROM [db1.]alternate.foo` (no explicit db prefix)

The problem that arises is that former MySQL users will create multiple databases for one project. In this context, MySQL databases are analogous in function to Postgres-schemas, inasmuch as Postgres lacks off-the-shelf cross-database functionality that MySQL has. Conversely, PostgreSQL has applied more of the specification implementing cross-table, cross-schema, and then left room for future cross-database functionality.

MySQL aliases *schema* with *database* behind the scenes, such that `CREATE SCHEMA` and `CREATE DATABASE` are analogs. It can therefore be said that MySQL has implemented cross-database functionality, skipped schema functionality entirely, and provided similar functionality into their implementation of a database. In summary, Postgres fully supports schemas but lacks some functionality MySQL has with databases, while MySQL does not even attempt to support true schemas.

Oracle has its own spin where creating a user is synonymous with creating a schema. Thus a database administrator can create a user called PROJECT and then create a table PROJECT.TABLE. Users can exist without schema objects, but an object is always associated with an owner (though that owner may not have privileges to connect to the database). With the Oracle 'shared-everything' RAC architecture, the same database can be opened by multiple servers concurrently. This is independent of replication, which can also be used, whereby the data is copied for use by different server. In the Oracle view, the 'database' is a set of files which contains the data while the 'instance' is a set of processes (and memory) through which a database is accessed.

Informix supports multiple databases in a server instance, like MySQL. It supports the `CREATE SCHEMA` syntax as a way to group DDL statements into a single unit creating all objects created as a part of the schema as a single owner. Informix supports a database mode called ANSI mode which supports creating objects with the same name but owned by different users.

The end result is confusion between the database factions. The Postgres and Oracle communities maintain that one database is all that is needed for one project, per the definition of database. MySQL and Informix proponents maintain that schemas have no legitimate purpose when the functionality can be achieved with databases. Postgres adheres to the SQL specification, in a more intuitive fashion (bottom-up), while MySQL's pragmatic counterargument allows their users to get the job done while creating conceptual confusion.

## See also

- Relational database management system (includes market share data)
- List of relational database management systems
- Comparison of object-relational database management systems
- Comparison of database tools
- Object Database - some of which have relational (SQL/ODBC) interfaces.

## References

- <sup>1</sup> <sup>^</sup> *4D* (<http://www.4d.com>)
- <sup>2</sup> <sup>^</sup> "Apache Derby: Downloads" ([http://db.apache.org/derby/derby\\_downloads.html](http://db.apache.org/derby/derby_downloads.html)). Retrieved 2014-07-06.
- <sup>3</sup> <sup>^</sup> *NHN Corp.* (<http://www.nhncorp.com>)
- <sup>4</sup> <sup>^</sup> Stevens, O. (Oct–Dec 2009). "The History of Datacom/DB" (<http://ieeexplore.ieee.org/xpl/articleDetails.jsp?reload=true&arnumber=5370783>). *Annals of the History of Computing (IEEE)* **31** (4): 87–91. doi:10.1109/MAHC.2009.108 (<http://dx.doi.org/10.1109/62FMAHC.2009.108>). ISSN 1058-6180 (<https://www.worldcat.org/issn/1058-6180>). Retrieved 2014-07-06.
- <sup>5</sup> <sup>^</sup> "CA Datacom - CA Technologies" (<http://www.ca.com/us/opcenter/ca-datacom.aspx>).
- <sup>6</sup> <sup>^</sup> "Datacom Product Sheet" (<http://www.ca.com/us/~media/Files/ProductBriefs/cs2277-ca-datacom-v14-ps.pdf>).
- <sup>7</sup> <sup>^</sup> *Empress* (<http://www.empress.com/>)
- <sup>8</sup> <sup>^</sup> *EXASolution* (<http://www.exasol.com/>)
- <sup>9</sup> <sup>^</sup> *Firebird SQL* (<http://www.firebirdsql.org/>)
- <sup>10</sup> <sup>^</sup> *IPL* (<http://www.firebirdsql.org/index.php?op=doc&id=ipl>), Firebird SQL
- <sup>11</sup> <sup>^</sup> *IDPL* (<http://www.firebirdsql.org/index.php?op=doc&id=idpl>), Firebird SQL
- <sup>12</sup> <sup>^</sup> [1] ([http://sourceforge.net/projects/hsqldb/files/hsqldb/hsqldb\\_2\\_3/](http://sourceforge.net/projects/hsqldb/files/hsqldb/hsqldb_2_3/))
- <sup>13</sup> <sup>^</sup> *Eigenbase* (<http://www.eigenbase.org/>)
- <sup>14</sup> <sup>^</sup> [2] (<https://blog.mariadb.org/mariadb-10-0-14-now-available/>), MariaDB 10.0.14 now available
- <sup>15</sup> <sup>^</sup> *VisualFoxPro* ([http://en.wikipedia.org/wiki/Visual\\_FoxPro](http://en.wikipedia.org/wiki/Visual_FoxPro))
- <sup>16</sup> <sup>^</sup> *MonetDB Public License* (<http://www.monetdb.org/Legal/MonetDBLicense>) (1.1), CWI
- <sup>17</sup> <sup>^</sup> *mSQL* (<http://www.hughes.com.au/products/msql/>), Products, AU: Hughes
- <sup>18</sup> <sup>^</sup> *Nexus DB* (<http://www.nexusdb.com/>)
- <sup>19</sup> <sup>^</sup> *Omnis* (<http://www.omnis.net/>)
- <sup>20</sup> <sup>^</sup> *OpenBase* (<http://www.openbase.com/>)
- <sup>21</sup> <sup>^</sup> *OpenLink Software* (<http://www.openlinksw.com/>)
- <sup>22</sup> <sup>^</sup> *Oracle Rdb Product Family Compatibility Matrix* (<http://www.oracle.com/technetwork/database/rdb/learnmore/rdb-pmatrix-rdb-086351.html>), Oracle Corporation
- <sup>23</sup> <sup>^</sup> *Corel* (<http://www.corel.com/>)
- <sup>24</sup> <sup>^</sup> *PostgreSQL development group* (<http://www.postgresql.org/developer/>), PostgreSQL community
- <sup>25</sup> <sup>^</sup> "PostgreSQL Maintenance Releases: 9.3.4, 9.2.8, 9.1.13, 9.0.17, and 8.4.21" (<http://www.postgresql.org/about/news/1511/>). *PostgreSQL*. The PostgreSQL Global Development Group. 2014-03-20. Retrieved 2014-03-20.
- <sup>26</sup> <sup>^</sup> *License* (<http://www.postgresql.org/about/licence>), PostgreSQL Community
- <sup>27</sup> <sup>^</sup> *r:Base* (<http://www.rbase.com/>)
- <sup>28</sup> <sup>^</sup> *RDM* (<http://www.raima.com/products/rdme/>), Raima Inc
- <sup>29</sup> <sup>^</sup> *RDM Server* (<http://www.raima.com/products/rdms/>), Raima Inc.
- <sup>30</sup> <sup>^</sup> *Saphana.com* (<http://saphana.com>)
- <sup>31</sup> <sup>^</sup> *Scimore* (<http://www.scimore.com/>)
- <sup>32</sup> <sup>^</sup> *SQLBase* (<http://www.unify.com/Products/SQLBase>), Products, Unify
- <sup>33</sup> <sup>^</sup> *SQLite Release History* (<http://www.sqlite.org/changes.html>), SQLite
- <sup>34</sup> <sup>^</sup> "Building MariaDB on Mac OS X using Homebrew" (<http://kb.askmonty.org/en/building-mariadb-on-mac-os-x-using-homebrew>). *AskMonty KnowledgeBase*. Retrieved September 30, 2011.
- <sup>35</sup> <sup>^</sup> <http://techotv.com/run-apache-mysql-php-http-web-server-android-os-phone-tablet/> Run Apache, Mysql, Php – Web server on Android mobile or Tablet
- <sup>36</sup> <sup>^</sup> <http://www.oss4zos.org/mediawiki/index.php?title=PostgreSQL%z.2FOS>
- <sup>37</sup> <sup>^</sup> DB2 for Linux UNIX and Windows 9.7.0>Fundamentos de DB2>Performance tuning>Factors affecting performance>Application design>Concurrency issues>Isolation levels ([http://www-01.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0.com.ibm.db2.luw.admin.perf.doc/doc/c0004121.html](http://www-01.ibm.com/support/knowledgecenter/SSEPGG_9.7.0.com.ibm.db2.luw.admin.perf.doc/doc/c0004121.html))
- <sup>38</sup> <sup>^</sup> *a b c* Transactional DDL in PostgreSQL: A Competitive Analysis ([http://wiki.postgresql.org/wiki/Transactional\\_DDL\\_in\\_PostgreSQL:\\_A\\_Competitive\\_Analysis](http://wiki.postgresql.org/wiki/Transactional_DDL_in_PostgreSQL:_A_Competitive_Analysis))
- <sup>39</sup> <sup>^</sup> SQL Server Transaction Locking and Row Versioning Guide (<http://technet.microsoft.com/en-us/library/jj856598.aspx>)
- <sup>40</sup> <sup>^</sup> MySQL :: MySQL 5.6 Reference Manual :: 8.10.1 Internal Locking Methods (<http://dev.mysql.com/doc/refman/5.6/en/internal-locking.html>)
- <sup>41</sup> <sup>^</sup> Oracle Row Lock and Row Level Locking ([http://www.dba-oracle.com/l\\_locks\\_row\\_level\\_locking\\_update.htm](http://www.dba-oracle.com/l_locks_row_level_locking_update.htm))
- <sup>42</sup> <sup>^</sup> [developer.polyhedra.com/history/polyhedra-8-7 Polyhedra 8.7 new headline feature: locking]
- <sup>43</sup> <sup>^</sup> PostgreSQL: Documentation: devel: Explicit Locking (<http://www.postgresql.org/docs/devel/static/explicit-locking.html>)
- <sup>44</sup> <sup>^</sup> File Locking And Concurrency In SQLite Version 3 (<https://www.sqlite.org/lockingv3.html>)
- <sup>45</sup> <sup>^</sup> SQLite Full Unicode support is optional and not installed by default in most systems (<http://www.sqlite.org/faq.html#q18>) (like Android, Debian...)
- <sup>46</sup> <sup>^</sup> "MySQL - The InnoDB Storage Engine" (<http://dev.mysql.com/doc/refman/5.5/en/innodb-storage-engine.html>).
- <sup>47</sup> <sup>^</sup> "InnoDB - Oracle Wiki" (<http://wiki.oracle.com/page/InnoDB>).
- <sup>48</sup> <sup>^</sup> "MySQL 5.6 Reference Manual" (<http://dev.mysql.com/doc/refman/5.6/en/create-table.html>).
- <sup>49</sup> <sup>^</sup> "Identifier Names" ([https://mariadb.com/kb/en/mariadb/documentation/\\_sql-language-structure/identifier-names/](https://mariadb.com/kb/en/mariadb/documentation/_sql-language-structure/identifier-names/)). MariaDB KnowledgeBase. Retrieved 26 September 2014.
- <sup>50</sup> <sup>^</sup> *Library* (<http://msdn.microsoft.com/en-us/library/ms187746.aspx>)
- <sup>51</sup> <sup>^</sup> <http://www.postgresql.org/docs/9.3/static/lo-intro.html>
- <sup>52</sup> <sup>^</sup> *Technical Specifications* (<http://www.firebirdsql.org/index.php?op=guide&id=techspec>), Guide, Firebird SQL
- <sup>53</sup> <sup>^</sup> *Library* (<http://msdn.microsoft.com/en-us/library/ms187746.aspx>). MSDN, Microsoft
- <sup>54</sup> <sup>^</sup> *a b c* "Column count limit" (<http://dev.mysql.com/doc/refman/5.1/en/column-count-limit.html>), *Reference Manual*, MySQL Documentation (5.1), Oracle
- <sup>55</sup> <sup>^</sup> "Row-Overflow Considerations" (<http://technet.microsoft.com/en-us/library/ms186981.aspx>), *TechNet Library*, SQL Server Documentation (2012), Microsoft
- <sup>56</sup> <sup>^</sup> "Date functions" ([http://www.sqlite.org/lang\\_datefunc.html](http://www.sqlite.org/lang_datefunc.html)), *Language*, SQLite
- <sup>57</sup> <sup>^</sup> *Online books* ([http://sybooks.sybase.com/onlinebooks/group-as/sg1250e/sag/@Generic\\_BookTextView/3225/](http://sybooks.sybase.com/onlinebooks/group-as/sg1250e/sag/@Generic_BookTextView/3225/)), Sybase
- <sup>58</sup> <sup>^</sup> *Informix Performance Guide* ([http://publib.boulder.ibm.com/infocenter/idshelp/v115/index.jsp?topic=/com.ibm.perf.doc/ids\\_prf\\_534.htm](http://publib.boulder.ibm.com/infocenter/idshelp/v115/index.jsp?topic=/com.ibm.perf.doc/ids_prf_534.htm)), Info Centre, IBM
- <sup>59</sup> <sup>^</sup> *Archives* (<http://pure.rednoize.com/archives/13/>), Pure (13), Red Noize
- <sup>60</sup> <sup>^</sup> "Materialized Views" ([http://jonathangardner.net/PostgreSQL/materialized\\_views/matviews.html](http://jonathangardner.net/PostgreSQL/materialized_views/matviews.html)), *PostgreSQL*, Jonathan Gardner
- <sup>61</sup> <sup>^</sup> "Derby" (<https://issues.apache.org/jira/browse/DERBY-472>), *Full Text Indexing, Search*, Issues, Apache
- <sup>62</sup> <sup>^</sup> *a b c* "CUBRID 9.0 release" (<http://www.cubrid.org/blog/news/announcing-cubrid-9-0-with-3x-performance-increase-and-sharding-support>).
- <sup>63</sup> <sup>^</sup> *Full-text search with DB2 Text Search* (<http://www.ibm.com/developerworks/data/tutorials/dm-0810shettar/>), Developer Works, IBM
- <sup>64</sup> <sup>^</sup> *Does Firebird support full-text search?* (<http://www.firebirdfaq.org/faq328/>), Firebird FAQ
- <sup>65</sup> <sup>^</sup> *Fulltext Search* (<http://www.h2database.com/html/tutorial.html#fulltext>), Tutorial, H2 Database
- <sup>66</sup> <sup>^</sup> *Create Spatial Index* ([http://www.h2database.com/html/grammar.html#create\\_index](http://www.h2database.com/html/grammar.html#create_index)), Grammar, H2 Database
- <sup>67</sup> <sup>^</sup> *Forest of Trees Index* ([http://publib.boulder.ibm.com/infocenter/idshelp/v117/index.jsp?topic=/%2Fcom.ibm.perf.doc%2Fids\\_prf\\_763.htm](http://publib.boulder.ibm.com/infocenter/idshelp/v117/index.jsp?topic=/%2Fcom.ibm.perf.doc%2Fids_prf_763.htm)), Informix Infocenter, IBM
- <sup>68</sup> <sup>^</sup> *Full Text Search Functions* ([http://linter.ru/en/documentation/\\_pdf/phrasex.pdf](http://linter.ru/en/documentation/_pdf/phrasex.pdf)) (PDF), Documentation, RU: Linter
- <sup>69</sup> <sup>^</sup> <https://mariadb.com/kb/en/virtual-columns/> Missing or empty |title= (help)
- <sup>70</sup> <sup>^</sup> *a b c* "Feature request #13979: InnoDB engine doesn't support FULLTEXT" (<http://bugs.mysql.com/bug.php?id=13979>), *Bugs*, MySQL, Oracle
- <sup>71</sup> <sup>^</sup> "MariaDB v10.0.5 Release Notes" (<https://mariadb.com/kb/en/mariadb-1005-release-notes/>), *Release Notes*, MariaDB, MariaDB
- <sup>72</sup> <sup>^</sup> *a b c* *Creating Spatial Indexes* (<http://dev.mysql.com/doc/refman/5.0/en/creating-spatial-indexes.html>), MySQL, Oracle
- <sup>73</sup> <sup>^</sup> *Does Microsoft Access have Full Text Search?* (<http://stackoverflow.com/questions/399406/does-microsoft-access-have-full-text-search>), Questions, Stack Overflow
- <sup>74</sup> <sup>^</sup> "Microsoft SQL Server Full-Text Search" (<http://msdn.microsoft.com/en-us/library/ms142571.aspx>), *Library*, MSDN, Microsoft
- <sup>75</sup> <sup>^</sup> "Spatial Indexing Overview" (<http://technet.microsoft.com/en-us/library/bb964712.aspx>), *Library*, Tech Net, Microsoft
- <sup>76</sup> <sup>^</sup> "Microsoft SQL Server Compact Full-text search is not available" (<http://social.msdn.microsoft.com/Forums/en-US/sqlce/thread/4a8af1a6-c644-41a5-8637-c7c5a6d73a4c>), *Forums*, MSDN, Microsoft
- <sup>77</sup> <sup>^</sup> "Feature request #4990: Functional Indexes" (<http://bugs.mysql.com/bug.php?id=4990>), *Bugs*, MySQL, Oracle
- <sup>78</sup> <sup>^</sup> "MySQL v5.6.4 Release Notes" (<http://dev.mysql.com/doc/relnotes/mysql/5.6/en/news-5-6-4.html>), *Release Notes*, MySQL, Oracle
- <sup>79</sup> <sup>^</sup> *Does Oracle support full text search?* (<http://stackoverflow.com/questions/202623/does-oracle-support-full-text-search>), Questions, Stack Overflow

80. ^ "Location Features for Database 11g" (<http://www.oracle.com/technetwork/database/options/spatial/>), *Spatial & Locator*, Tech Network, Oracle
81. ^ *Full Text Search* (<http://www.postgresql.org/docs/8.4/static/textsearch.html>), Documentation (8.4), PostgreSQL community
82. ^ "4" (<http://postgis.refractions.net/documentation/manual-1.5/ch04.html#id2638705>), *Manual*, PostGIS, Refractions
83. ^ *Free text search queries in SQL* (<http://www.scimore.com/howto/getstarted/google-like-sql-freetext/>), ScimoreDB Unknown parameter `{DUPLICATE_title= ignored (help)`
84. ^ The SQLite R\*Tree Module (<http://www.sqlite.org/rtree.html>)
85. ^ SQLite Partial Indexes (<http://sqlite.org/partialindex.html>)
86. ^ SQLite FTS3 Extension (<http://www.sqlite.org/fts3.html>)
87. ^ *SpatiaLite* (<http://www.gaia-gis.it/spatialite/>) (2.3.1), IT: Gaia GIS
88. ^ *Full-Text Search* (<http://www.info.teradata.com/FullText/eFull-Text-Srch.cfm>), Online Publications, Teradata
89. ^ geospatial
90. ^ *UDF* ([http://www.udf.adhoc-data.de/index\\_eng.html](http://www.udf.adhoc-data.de/index_eng.html)), Ad Hoc Data
91. ^ "Create DB" ([http://msdn.microsoft.com/library/default.asp?url=/library/en-us/createdb/cm\\_8\\_des\\_05\\_8os3.asp](http://msdn.microsoft.com/library/default.asp?url=/library/en-us/createdb/cm_8_des_05_8os3.asp)), *Library*, MSDN, Microsoft
92. ^ "SQL" ([http://msdn.microsoft.com/en-us/library/aa933124\(SQL.80\).aspx](http://msdn.microsoft.com/en-us/library/aa933124(SQL.80).aspx)), *Library*, MSDN, Microsoft
93. ^ Petkovic, Dusan (2005). *Microsoft SQL Server 2005: A Beginner's Guide*. McGraw-Hill Professional. p. 300. ISBN 978-0-07-226093-9.
94. ^ "Indexed Views" (<http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnsq12k/html/indexedviews1.asp>), *Library*, MSDN
95. ^ "InnoDB adaptive Hash" (<http://dev.mysql.com/doc/refman/5.0/en/innodb-adaptive-hash.html>), *Reference manual*, Development documentation (5.0), Oracle
96. ^ How does Drizzle handle parallel "things"? (<https://answers.launchpad.net/drizzle/+question/135548>)
97. ^ "Article" (<http://www.ibm.com/developerworks/data/library/techarticle/dm-0608mcinermey/>), *Library*, Developer Works, IBM
98. ^ *a b* New Features in HyperSQL 2.2 (<http://hsqldb.org/web/features200.html>)
99. ^ H2 > Advanced > Recursive Queries ([http://h2database.com/html/advanced.html#recursive\\_queries](http://h2database.com/html/advanced.html#recursive_queries))
100. ^ H2 Roadmap (<http://www.h2database.com/html/roadmap.html>)
101. ^ Informix parallel data query (PDQ) (<http://portal.acm.org/citation.cfm?id=382443>)
102. ^ *Only very limited functions available before SQL Server 2012* (<http://msdn.microsoft.com/en-US/library/ms189798%28v=sql.105%29>), Microsoft
103. ^ "SQL Server Parallel Query Processing" (<http://msdn.microsoft.com/en-us/library/ms178065.aspx>), *Library*, MSDN, Microsoft
104. ^ "Feature request #16244: SQL-99 Derived table WITH clause (CTE)" (<http://bugs.mysql.com/bug.php?id=16244>), *Bugs*, MySQL, Oracle
105. ^ "Feature request #1542: Parallel query" (<http://bugs.mysql.com/bug.php?id=1542>), *Bugs*, MySQL, Oracle
106. ^ *Parallel Query* ([http://www.orafaq.com/wiki/Parallel\\_Query\\_FAQ](http://www.orafaq.com/wiki/Parallel_Query_FAQ)), Wiki, Ora FAQ
107. ^ *Parallel Query Execution* ([https://wiki.postgresql.org/wiki/Parallel\\_Query\\_Execution](https://wiki.postgresql.org/wiki/Parallel_Query_Execution)), PostgreSQL
108. ^ SQLite Query Language: WITH clause ([http://sqlite.org/lang\\_with.html](http://sqlite.org/lang_with.html))
109. ^ "Data Types" (<http://atc.altibase.com/sub09/611b/html/GeneralReference/ch01s01s01.html>), *General Reference*, HDB, Altibase
110. ^ *a b* "Data Types" (<http://docs.clustrix.com/display/CLXDOC/Data+Types>), *System Administrator's Guide* (5.0), Clustrix
111. ^ "Data Types" ([http://www.cubrid.org/manual/syntax/syntax\\_datatype\\_num\\_def.htm](http://www.cubrid.org/manual/syntax/syntax_datatype_num_def.htm)), *CUBRID SQL Guide*, Reference Manual, CUBRID
112. ^ *Built-in Column Types* (<http://docs.drizzle.org/columntypes.html>), Documents, Drizzle
113. ^ "General: HSQLDB data types" ([http://hsqldb.org/doc/2.0/guide/sqlgeneral-chapt.html#sqlgeneral\\_types\\_ops-sect](http://hsqldb.org/doc/2.0/guide/sqlgeneral-chapt.html#sqlgeneral_types_ops-sect)), *Guide*, Documents (2.0), HSQLDB
114. ^ "IBM Informix Guide to SQL: Reference, v11.50 (SC23-7750-04)" (<http://www-05.ibm.com/e-business/linkweb/publications/servelet/pbi.wss?CTY=US&FNC=SRX&PBL=SC23-7750-04>), Publications. IBM. Retrieved August 7, 2013.
115. ^ "3: Understanding SQL Data Types" (<http://docs.ingres.com/Ingres/9.3/SQL%20Reference%20Guide/understandingsqldatatypes.htm#o3623>), *SQL Reference Guide*, Documents (9.3), Ingres
116. ^ "SQL Server Data Types" (<http://msdn.microsoft.com/en-us/library/ms187752.aspx>), *Library*, MSDN, Microsoft
117. ^ "SQL Server Compact Data Types" (<http://msdn.microsoft.com/en-us/library/ms172424.aspx>), *Library*, MSDN, Microsoft
118. ^ "Datatypes" (<http://docs.openlinksw.com/virtuoso/sqlrefDATATYPES.html>), *SQL Reference*, OpenLink Software
119. ^ "Data Types" ([http://download.oracle.com/docs/cd/E11882\\_01/server.112/e10592/sql\\_elements001.htm#45441](http://download.oracle.com/docs/cd/E11882_01/server.112/e10592/sql_elements001.htm#45441)), *SQL Reference*, Server documents (11.2), Oracle
120. ^ "Data Types" (<http://docs.pervasive.com/products/database/psqlv11/wwhelp/wwhimpl/js/html/wwhelp.htm#href=sqlrefSQLDtype.10.1.html#134765>), *Pervasive SQL Supported Data Types*, Product documentation, Pervasive
121. ^ *Polyhedra SQL Reference Manual* (<http://developer.polyhedra.com/manuals/rtrdb-reference-manual/sql-reference-manual>), Product documentation, Enea AB
122. ^ "Data Types" (<http://www.postgresql.org/docs/8.4/interactive/datatype.html>), *Manual*, Documents (8.4), PostgreSQL community
123. ^ "Defining a Database" ([http://docs.raima.com/rdme/10\\_1/Content/SQL/Chapter4.htm#Create\\_Domain](http://docs.raima.com/rdme/10_1/Content/SQL/Chapter4.htm#Create_Domain)), *SQL Reference* (10.1), Raima
124. ^ "Defining Table Columns" ([http://docs.raima.com/rdms/8\\_3/Content/UG/Chapter6.htm#6.3.3.3\\_Define\\_Table\\_Columns](http://docs.raima.com/rdms/8_3/Content/UG/Chapter6.htm#6.3.3.3_Define_Table_Columns)), *SQL Reference* (8.3), Raima
125. ^ *Datatypes* (<http://www.sqlite.org/datatype3.html>) (3), SQLite
126. ^ "Release" (<http://developer.postgresql.org/docs/postgres/release.html#RELEASE-8-1>), *Documents*, Developer (8.1), PostgreSQL community
127. ^ "5.11 Database Unions" ([http://docs.raima.com/rdme/10\\_1/Content/UG/Chapter5.htm#5.11\\_Database\\_Unions](http://docs.raima.com/rdme/10_1/Content/UG/Chapter5.htm#5.11_Database_Unions)), *User's Guide* (10.1), Raima
128. ^ *Support* (<http://downloads.sybase.com/swd/base.do?client=support>), Downloads, Sybase
129. ^ "Release" ([http://www.firebirdsql.org/index.php?op=devel&sub=engine&id=fb20\\_release](http://www.firebirdsql.org/index.php?op=devel&sub=engine&id=fb20_release)), *Engine*, Development (2.0), Firebird SQL
130. ^ *Files* (<http://www.firebirdsql.org/index.php?op=files>), Firebird SQL
131. ^ "Downloads" (<http://dev.mysql.com/downloads/>), *Development*, MySQL, Oracle
132. ^ *Security* (<http://www.postgresql.org/support/security.html>), Support, PostgreSQL community
133. ^ *Download* (<http://www.sqlite.org/download.html>), SQLite
134. ^ *DB* ([http://www.commoncriteriaportal.org/products\\_DB.html#DB](http://www.commoncriteriaportal.org/products_DB.html#DB)), Products, Common Criteria Portal
135. ^ *Backup MySQL* ([http://gentoo-wiki.com/HOWTO\\_Backup\\_MySQL](http://gentoo-wiki.com/HOWTO_Backup_MySQL)), How to, Gentoo wiki
136. ^ *Authentication methods* (<http://www.postgresql.org/docs/8.4/interactive/auth-methods.html>), Documents (8.1), PostgreSQL community
137. ^ *Common Criteria (CC, ISO15408)* (<http://www.microsoft.com/en-us/sqlserver/common-criteria.aspx#tab6>), Microsoft
138. ^ *Adding audit trails to a Polyhedra IMDB database* (<http://developer.polyhedra.com/how-to-guides/auditing>), White Paper, Enea AB

## External links

- Comparison of different SQL implementations against SQL standards (<http://troels.arvin.dk/db/rdbms/>). Includes Oracle, DB2, Microsoft SQL Server, MySQL and PostgreSQL. (08Jun/2007)
- Features, strengths and weaknesses comparison between Oracle and MSSQL (independent). ([http://www.wisdomforce.com/resources/docs/MSSQL2005\\_ORACLE10g\\_compare.pdf](http://www.wisdomforce.com/resources/docs/MSSQL2005_ORACLE10g_compare.pdf))
- The SQL92 standard (<http://www.contrib.andrew.cmu.edu/~shadow/sql/sql1192.txt>)

Retrieved from "http://en.wikipedia.org/w/index.php?title=Comparison\_of\_relational\_database\_management\_systems&oldid=634522021"

Categories: Database management systems | Database software comparisons | Relational database management systems

- This page was last modified on 19 November 2014 at 11:35.
- Text is available under the Creative Commons Attribution-ShareAlike License; additional terms may apply. By using this site, you agree to the Terms of Use and Privacy Policy. Wikipedia® is a registered trademark of the Wikimedia Foundation, Inc., a non-profit organization.

