

Database 101

An Exposé of Database Terminology and Popular Databases



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CHAPTER ONE

Glossary of Database Terminology

Let's start with some background for people that know nothing about databases. If you already know this stuff you might be bored, or it may be good information for a junior DBA or tech person. These are some basic terms you should know if you want to speak databases to people. This is in no way an all-inclusive or in any way advanced topic list.

Database – This is an electronically organized collection of data. Technically, without adding the “electronic,” a Rolodex is a database (if you're old enough to know what that is).

Relational Database – This is still an organized collection of data, but the organization has defined relationships between the data allowing it to be used in different ways.

RDBMS – This is an initialism for Relational Database Management System: it's a Relational Database, usually in the form of a software package.

Engine – Sometimes used as “Database Engine.” Each vendor has their own, it's a software package that manipulates that data that you want to put into or pull out of the database.

SQL – Another acronym, this time for Structured Query Language. Think of it as the language you use to work with an RDBMS. But, you need to be careful what SQL you are talking about since each vendor makes their own tweaks or extensions to it. Some basic examples of SQL statements would be things like “select ...,” “insert ...,” “update ...,” and “delete ...”

Bonus SQL tidbit - You might want to know how to pronounce “SQL.” Do you say the letters “S-Q-L” or do you say “Sequel?” There is plenty of debate, you can Google it and have a boatload of reading material, but it pretty much comes down to saying it however you like. The ISO Standard describing the language says you say the letters “S-Q-L.” Depending on which software vendor you choose, they might go either way. There actually used to be a “SEQUEL,” which was shortened to “SQL” once lawyers got involved, which is why people still pronounce it with all the extra vowels.

ANSI SQL – Or ANSI Database SQL, this is the standard defined for SQL, that again, not all vendors exactly meet for various reasons. Just know that not all SQL is portable between vendor database platforms, you most likely need to tweak it and in some cases rewrite it.

Query – This is how you ask a database a question using SQL; that is, it's the actual question. How you ask (execute) it will be different (and how you write it due to the above-mentioned SQL differences) for each database vendor.

Table – This is an organized set of related data stored within a database and is made up of columns and rows. An example might be all the names or addresses in an address book database.

Row – This is a set of grouped related data in a table in a relational database. Like your entry in an address book, your name, address, telephone number, and email address in the address book table. Also referred to as a “tuple.”

Column – This is a set of data values representing the same item across multiple rows in a table of a relational database. So, in the address book example, where we had your name, address, telephone number, and email address being a row in a table, all the email addresses across all the “address book” rows would be considered a column.

Schema – This is the definition of the database you are working with. It defines all the tables, rows, columns, and other mysterious things that make up the database.

Index – This is a feature of most database engines that provides you a shortcut way (think “faster”) to find your data in the tables. Think about it in the address book example, again, to find someone you would need to go row by row. With an index, you can jump to all the names that start with an “S.”

Encryption – Same as with your mobile phone (you have your phone encrypted, right?), except it encrypts stuff in the database to make it harder for people to see or steal, but allows you to still work with the data when you need to.

NULL – this is nothing, literally. When talking about databases and the value of something, it's not true or false, it's not a positive, negative or zero number, it's not a zero-length string of characters. It's nothing, nada, the value is nonexistent.

OLTP – An initialism for Online Transaction Processing. This is usually used to define how a database is used. If the database processes mostly transactions (units of work, like credit card charge records) it's considered OLTP.

OLAP – An acronym for Online Analytical Processing, which usually defines a database system that is designed to process data for reporting as opposed to doing transactions. These are the kind of databases all those TPS reports run against.

NoSQL – Basically a non-relational database where the “relationship” aspect of organizing data is not used. It's newer technology than relational and there are many reasons why you would want one. If you have a lot of different types of data you want to store together, like images, PDF files, or videos where the structure of the data isn't just numbers and strings of letters, a NoSQL database is probably a better choice.

Backup/Archive – This is how you archive your database and keep it safe so that you can get it back (“restore” it) if there is an issue and avoid any loss of data. You should always, and I mean always, have a backup. Make sure you not only know how to restore it, but test the process regularly.

Replication – At the basic level related to a database, replication is storing your data in more than one spot. Most database engines have a native method to put another copy on another server for reporting, redundancy, or other reasons.

Disaster Recovery – Otherwise known as DR, this encompasses all the tools and procedures involved with protecting your database investment. In terms of a database, it's how you keep it running when there is a software problem, the computer crashes, or a disk drive goes bad. You have a database disaster, so how do you recover from it? You should always have a DR plan.

High Availability – Very often abbreviated as just HA, it covers the qualities of a database (or other) system that allows it to be resilient and keep providing service to its users. This could involve redundant hardware and/or redundant copies of the data (replication). Think about having the ability to have your regular processing failover to another place so it can keep going.

Administrator – Otherwise known as a DBA (Database Administrator), that's the person that takes care of your database. They make sure it's backed up, tuned to run fast, and resilient so it's always available. (That's what we do for people like you.)

Tuning – Tuning is something that the XTIVIA team excels at and, usually, something DBAs take care of for you. It's making sure the database runs as fast as it can. Very often, when you ask the database a question (query) the database needs some help, maybe an "index" or some other tweaking to make the answer come back really fast. Think: what they used to do to car engines before they all got onboard computers.

Maintenance – For a database, maintenance is taking care of it by doing all the stuff a DBA does. In a car, this is changing the oil, filters, and checking the tire pressure when the car has no "check engine" light and you can't see the tires. A database with no maintenance might be slow, you might lose data, or it might just not work. (We do this for clients all the time.)

RTO – An initialism for Recovery Time Objective. When used in the context of a database it basically means how long a business can afford to have a database not functioning if it stops working and stay in business.

RPO – An initialism for Recovery Point Objectives, and when talking databases refers to the amount of data – as a period of time – a business can afford to lose if there's a problem. Is it okay if we lose a day's worth of data (think credit card transactions), even if it's only for a few hours or a few seconds?

So, you need a database or have a database, but what you need is an expert that knows how to wrangle that database. Maybe you have a team of DBAs and they need an extra set of hands or you need someone to be on call when your staff is off-duty. We can help you set it up right from the start and manage it going forward. You need to spend time managing your business, not learning how to tune or troubleshoot a database – that's where XTIVIA comes in to be part of your team.

CHAPTER TWO

Popular Databases

Now that you know the terminology, here are some popular databases that the Virtual-DBA team at XTIVIA supports along with some feature highlights (usually relative to the most recent version of said databases), history, and more terminology.

Part One | Microsoft SQL Server

Microsoft SQL Server is a Relational Database Management System (RDBMS), as the name implies, from Microsoft. Just so you know, in this case, it's usually pronounced "Sequel Server." This database is easy to install, use, and develop applications around, yet it can scale to support massive Petabyte (PB) workloads. For more than 30 years, SQL Server has been a leader in the RDBMS field. Used by hundreds of thousands of companies across the globe, SQL Server is the go-to database for a wide variety of industries from computer software and IT to education, retail, and insurance.



Whether your company has 30 employees or 50,000, SQL Server has all the features to nurture small business database needs while having the capacity for larger workloads for bigger businesses. This is one of the main reasons that SQL Server is used by roughly 21 percent of businesses around the world. Another reason for its popularity comes from Microsoft's focus on security and protection; for almost two decades, SQL Server has had a reputable security track record.

When it comes to specific features, SQL Server doesn't skimp on innovation and improvement. With each upgrade (especially with the current SQL Server 2016 and 2017 versions) SQL Server gets stronger and faster. With Always Encrypted and row level security, businesses can feel comfortable knowing their data has multiple layers of protection.

Additionally, SQL Server has introduced new DMOs and Query Store, improved analytics, and can now be run on Linux.

Microsoft SQL Server is available in many editions to meet your licensing needs, and XTIVIA can help you support and license all of them.

Editions (presented alphabetically, list subject to change at Microsoft's whim):

- Analytics Platform System (APS)
- Azure
- Azure SQL Data Warehouse
- Azure SQL Database
- Business Intelligence
- Compact (SQL CE)
- Data Warehouse Appliance Edition
- Embedded SQL Server 2005 Embedded (SSEE)
- Enterprise
- Express
- LocalDB
- SQL Server Developer
- SQL Server Evaluation Edition]
- SQL Server Fast Track
- Standard
- Web
- Workgroup

High Availability: Always On

Replication: Transactional replication, Merge replication, and Snapshot replication

Operating System: Windows, Linux (Linux is new, I think there was dancing)

Cloud: You can run SQL Server in almost any computing instance you spin up in the cloud or you can use the cloud vendor supplied managed instances below. Either way, the XTIVIA team can help you build, tune, and manage your investment:

- Azure SQL Database (Many options)
- Amazon RDS for SQL Server

History: 1989 Microsoft and Sybase join to create SQL Server and release it for OS/2. Then, about 1993 Microsoft went their own way and SQL Server 6.0 was the first version split from Sybase, designed for Windows NT, and did not include any new direction from Sybase. The end of working with Sybase on SQL Server was in 1995. SQL Server was totally rewritten in 2005 converting any remnants of Sybase code into Microsoft code. And finally in 2017 only running on Windows became a thing of the past when the ability of running SQL Server on Linux was added (remember, there was most likely dancing involved).

Part Two | Oracle

Oracle is another popular database the Virtual-DBA team supports. With more than 310,000 businesses in 175 different countries using Oracle Database – many of them on the Fortune 100 list – it's one of the most widely used databases in the world.



Oracle Database (commonly known as just “Oracle”) is a multi-model relational database management system (RDBMS). The first commercial version came more than 40 years ago in 1979 when Oracle v2 was released as the very first available SQL-based RDBMS for business and private enterprise. Since then, Oracle has delivered more than 20 versions of their database system. The latest edition of Oracle (Oracle Database 18c) can be operated on various systems and is available on-premise, on cloud, or for hybrid on-prem-cloud environments.

Oracle supports standard SQL and offers reliable services around storage (predefined types of data/massive data), database recovery, and data management. Additionally, users get access to a wide range of features and options for scalability, analytics, performance, availability, and integration. Oracle also boasts streamlined key identification, easy security set up for both systems and application data, and innovative portability.

As a result of its keen adaptability and practicality for managing data and handling software applications, Oracle is a popular RDBMS choice for big business processing and software applications. When a business is overflowing with data from numerous systems and applications, Oracle can help with big data warehousing jobs and online transaction processing (OLTP). Oracle also offers strong SQL- and PL/SQL-centered application development servers that cover numerous capabilities from transactions and globalization to application programming interfaces (API) and datatypes.

Although it's seen as a staple for big data and larger enterprises, Oracle can be used by organizations of all types with data/workloads of any kind. Whatever your needs are, Oracle has developed several editions of their database to engage the necessary functions of any business. Using XTIVIA's services, our experienced experts can help you support and license any edition in the Oracle catalogue.

Editions (presented alphabetically, list subject to change at Oracle's whim):

Oracle Database 18c (latest version offered in several editions):

- Oracle Database Enterprise Edition (EE)
- Oracle Database Express Edition (XE)
- Oracle Database Personal Edition (PE)
- Oracle Database Standard Edition 2 (SE2)

Oracle also offers users the ability to develop their own applications in Java and PL/SQL via the following tools:

- Oracle Forms
- Oracle JDeveloper
- Oracle Reports

High Availability: Oracle Real Application Cluster (RAC)

HA Storage Solution: Automatic Storage Management (ASM)

Replication: Oracle Data Guard/Active Data Guard, Oracle Golden Gate, Oracle Advanced Replication, and Oracle Streams.

Backup and Recovery: Oracle Recovery Manager (RMAN), Zero Data Loss Recovery Appliance (ZDLRA)

Database Appliances: Oracle Exadata and Oracle Database Appliance (ODA)

Operating System: Oracle Database 12c and 18c are supported on several OS platforms and combinations, including: Linux on x86-64 (Red Hat Enterprise Linux, Oracle Linux, and SUSE distributions), Microsoft Windows on x86-64, Oracle Solaris on SPARC and x86-64, IBM AIX on POWER Systems, Linux on IBM zEnterprise Systems, HP-UX on Itanium

Cloud: Oracle Database Cloud Services, currently supporting Oracle Database 11g, 12c, or 18c

- Database Cloud Service - Virtual Machines
- Database Cloud Service - Bare Metal
- Exadata Cloud Service
- Exadata Cloud at Customer

History: Originally founded in 1977 as Software Development Laboratories (SDL), Oracle cycled through several names and offered a number of pioneering products between 1979 and 1995. They offered the first commercial SQL RDBMS, the first database with read-consistency, full applications implementation methodology, and the first 64-bit RDBMS. In 1995, the name changed permanently to Oracle Corporation and they continued to break ground on numerous projects throughout the

late '90s and early 2000s. As of 2018, their strategic acquisition and product development have allowed Oracle to become the third largest software maker (by revenue) in the world accruing nearly \$38 million in 2017 with their 138,000 employees.

Part Three | MySQL

For more than two decades, MySQL has been a staple of the open-source database community. As a brainchild of the database greats, David Axmark and Michael Widenius, MySQL has been a prominent database choice for millions of users since the mid-'90s.



MySQL is a free Relational Database Management System (RDBMS) initially developed by MySQL AB and currently developed by the Oracle Corporation. Under the terms of the GNU General Public License, MySQL is an open source software with optional proprietary licensing available (Enterprise Server). The database is a part of the original LAMP software stack (Linux, APache, MySQL, and Perl/PHP/Python) and used by almost 130,000 companies across the globe, making it “the world’s most popular open-source database.”

MySQL is generally offered for deployment as a binary package (more easily done in Linux systems than others), but MySQL’s simple source code can be used for installation on a variety of systems. The software can be quickly installed with little effort on a plethora of different operating systems.

Users favor the reliability, low-costs, and speed of MySQL server (not to mention its versatility when it comes to operating systems and support of ODBC interfaces), but there are limitations when it comes to processing XML data and OLAP functions. In comparison to the numerous features that have made MySQL so popular, the setbacks are minimal and generally cause little disruption to users.

MySQL has immense potential for all database needs and XTIVIA has an expert team of professional and knowledgeable MySQL DBAs to help you license MySQL products.

Editions (presented alphabetically, list subject to change at MySQL's/Oracle's whim):

MySQL Classic Edition

MySQL Cluster Carrier Grade Edition

MySQL Community Edition

MySQL Embedded (OEM/ISV)

MySQL Enterprise Edition

MySQL Standard Edition

MySQL Workbench 8.0.13

MySQL Workbench integrates the various MySQL operations into one stage for operations and development. This service was originally provided by the MySQL GUI Tools service, but Workbench replaced it with an easier-to-use interface in 2005.

High Availability: MySQL Cluster (NDB Cluster), MySQL InnoDB Cluster, MySQL Fabric (an open source integrated system that offers server management as well as a base for users to structure high availability)

Replication: The two main formats of replication in MySQL are Statement Based Replication (SBR) and Row Based Replication (RBR), but users can also apply Mixed Based Replication (MBR).

Operating System: With more than a dozen options for users to run it on, MySQL is one of the most versatile databases when it comes to operating system platforms (listed in alphabetical order): AIX, BSDi, eComStation, FreeBSD, HP-UX, i5/OS, IRIX, Linux, MacOS, Microsoft Windows, NetBSD, Novell NetWare, OpenBSD, OpenSolaris, OpenVMS, OS/2 Warp, Oracle Solaris, QNX, Sanos, SCO OpenServer, SCO UnixWare, SunOS, Symbian, and Tru64.

Cloud: Oracle MySQL Cloud Service, Microsoft Azure, Google Cloud SQL, Amazon RDS/EC2, Oracle Cloud Infrastructure (Primary supports Oracle tools such as MySQL Query Analyzer, MySQL Enterprise Backup, MySQL Enterprise Monitor)

History: Created by the Swedish company, MySQL AB, MySQL was first released internally in 1995 for personal use by authors, David Axmark and Michael "Monty" Widemius. At the end of 1996, MySQL AB released MySQL to the public as a free open source RDBMS and has maintained steady usage and development ever since. In 2008, MySQL AB was acquired by Sun Microsystems, and then in 2010 Sun Microsystems was acquired by the tech giant, Oracle Corporation. Under Oracle, MySQL has been updated four different times with the current version, MySQL 8.0.13, having been released in October of 2018 with a variety of new sorting and JSON table functions.

Part Four | IBM Informix

Informix is an RDBMS, that coincidentally started its life from a company by the name of Relational Database Systems or RDS. The database product was acquired by IBM in 2001 and is now fondly referred to as IBM Informix. Informix is ideal for situations where minimal database administration efforts are required. It is generally considered to provide stable uptime as well as high transaction throughput. It also provides data type extensions which are not included in the basic SQL specification. Time series and spatial data types are available in the current versions which enable not only optimized storage for the extended data types but high performance query models as well. XTIVA has many clients still using Informix for their mission critical environments and over the years we have had several calls from people that found an unknown Informix server that was running unattended for quite a while.



The Informix server supports the object-relational model, which has permitted IBM to offer extensions that support data types that are not a part of the SQL standard. The most widely used of these are the time series and spatial extensions, which provide both data type support and language extensions that permit high performance domain specific queries and efficient storage for datasets based on time series and spatial data.

Informix is generally considered to be optimized for environments with very low or no database administration, including use as an embedded database. It has a long track record of supporting very high transaction rates and providing uptime characteristics needed for mission critical applications such as manufacturing lines and reservation systems. Informix has been widely deployed in the retail sector, where the low administration overhead makes it useful for in-store deployments.

With the ability to deeply embed Informix in gateways and routers, time series support, small footprint, and low administration requirements, Informix is also targeted at Internet-of-Things solutions, where many of the data-handling requirements can be managed with gateways that embed Informix and connect sensors and devices to the internet.

Informix is available in many editions to meet your licensing needs, and XTIVIA can help you support and license all of them.

Editions (presented alphabetically, list subject to change at IBM's whim):

- IBM Informix (12.10.xC1 – 12.10.xC9)
 - Developer Edition (and Advanced Edition)
 - Enterprise Edition (and Advanced Edition)
 - Express Edition (and Advanced Edition)
 - Innovator-C Edition
 - Workgroup Edition (and Advanced Edition)

Other Informix products:

- Informix Client Software Development Kit (version 4.10.xC1 – 4.10 xC9)
- Informix Connect (version 4.10.xC1 – 4.10.xC9)
- Informix JDBC Driver (version 4.10.JC1 – 4.10.JC9)
- Data Server Driver for JDBC and SQLJ (version 3.59)
- Data Server Driver for ODBC and CLI (version 10.1.2)
- Data Server Provider for .NET (version 10.1.2)
- DataBlade Developers Kit (DBDK) (version 4.20.xC1)
- Informix BladeManager(version 4.20.xC1)
- Informix OLE DB Provider (version 4.10.xC1 – 4.10.xC9)
- Informix Warehouse Accelerator (version 12.10.xC1 – 12.10.xC9)
- Informix SQL Warehousing Tool (supported by 11.50.xC3 and later versions) IBM
- Data Studio (3.2 - 4.1)

High Availability: Informix High-Availability Data Replication (HDR), Enterprise Replication

Replication: Transactional replication, HDR, Shared Disk (SDS) secondary, and Remote Standalone (RSS) secondary

Operating System: Linux, Unix, AIX, HP-UX, Solaris, Microsoft Windows, and MacOS

Cloud: You can run IBM Informix in a number of computing instances for the cloud or you can use the cloud vendor supplied managed instances below. Whichever direction you take your cloud initiatives, XTIVIA's experienced experts can help you build, tune, and manage your investment.

- IBM Cloud Informix on Cloud
- HCL's Azure Virtual Machine Image for Informix
- HCL's Amazon Machine Image (AMI) for Informix

History: In 1981, RDS, Inc. released Informix (INFORMation on unIX) and by 1986 as the RDBMS market grew, they changed their name to Informix Corporation. They experienced great success with acquisitions and product development until 1997 when the company was severely shaken by fraud and illegal insider trading. Between '97 and

2000, Informix rebuilt their image and network with solid products and significant acquisitions including data companies like Red Brick Systems and Ardent. Informix was rebranded as Ascential Software following IBM's purchase of the Informix database subsidiary, Informix Software, in 2001. In 2005, IBM fully acquired Ascential Software, and in 2017 the organization partnered with HCL in a 15-year intellectual property license to co-develop, support, and market Informix Software.

Part Five | IBM Db2

IBM's Db2 (previously DB2 up until 2017) is a popular Relational Database Management System used by businesses of all sizes in the computer software and IT service industries. Originally developed for the relational model, IBM has extended Db2's support to object-relational and non-relational structures over the last 10 years.

IBM Db2

Db2 is available in two main "flavors," so to speak — mainframe (z-Series [z/OS] and i-series [AS/400]) and midrange (LUW) — and has several NoSQL functions like graph store, Extensible Markup Language (XML), JavaScript Object Notation (JSON), and more. In relation to other RDBMS, Db2 has significant system performance enhancers like increased query and CPU processing. It also offers unparalleled scalability, allowing you to use a free version for small servers and seamlessly upgrade that free version to handle the world's largest data volumes or transactional volumes. Db2 excels in cloud environments as well, with an ease of licensing that has it leading the pack. On top of other things, users consider Db2 one of the industry's leaders when it comes to quality of optimizer and speed of data access.

With the most recent version of Db2, IBM focused their efforts toward improving features added in Version 10.5 like BLU acceleration for analytical workloads, High Availability Disaster Recovery (HADR) in pureScale, and other performance and availability enhancers. Version 11.1 can process large data loads with impressive analytical capabilities and stability; not only is data utilization mastered with Db2, it's done quickly and safely. Accompanying its numerous practical advantages, IBM also offers peak support for Db2 users with easier administration and maintenance.

When it comes to cloud, Db2 has an interesting competitive advantage over other databases. For instance, unlike Oracle, Db2 is easy to run on any cloud. The Direct editions are licensed by Virtual CPU, which means you can move VMs running Db2

anywhere you like without worrying about licensing the hosts. Databases like Oracle require that you have each physical CPU licensed, requiring those in public and private clouds to use only focused hosts with the proper licensing.

There are a number of reasons businesses use Db2 as their primary database system and the list of advanced components goes on and on. No matter what that reason may be for your organization, the XTIVIA team can help you with all of your licensing and database administration needs.

Editions (presented alphabetically, list subject to change at IBM's whim):

- Db2 Advanced Enterprise Server Edition
- Db2 Advanced Workgroup Server Edition
- Db2 Developer Edition (available for free on small servers)
- Db2 Direct Advanced Edition
- Db2 Direct Standard Edition
- Db2 Enterprise Server Edition
- Db2 Workgroup Server Edition

High Availability: Db2 High Availability Feature/Db2 High Availability Disaster Recovery (HADR), and Db2 PureScale

Replication: Q-Replication , SQL-Replication, CDC Replication

Operating System: z/OS, Linux, Unix, and Microsoft Windows

Cloud: There are three options for cloud services (IBM Bluemix):

- Db2 on Cloud
- Db2 Warehouse on Cloud
- Db2 Hosted
- Db2 is available on any cloud using Bring Your Own License (BYOL)

History: Previously known as SQL/DS, Db2 (originally “DB2”) was first introduced to the market by IBM in 1983 as a Database Management System (DBMS) on multiple version storage (MVS) platform. Initially, Db2 was only available for operation through IBM mainframes, but throughout the ‘90s it was launched on new platforms like OS/2, Unix, Microsoft Windows, and finally, Linux. As it landed on new platforms, Db2 was re-worked and relaunched to fit database progress of the time. Additionally, acquisitions by IBM – such as the purchasing of the Informix Corporation in 2001 – over the years have also lead to advancing the abilities of Db2. As of 2017, there are nearly 6,500 companies in the U.S. using one of the multiple versions of Db2.

Part Six | PostgreSQL

Commonly referred to as “Postgres,” PostgreSQL is a free open source object-relational database management system (ORDBMS) with an interface for creating fail-safe environments and committed to preserving data integrity. Since its initial release in 1996, Postgres has been a popular database choice for companies supporting various data types (IP, CIDR, XML, JSON, and more). As of 2017, PostgreSQL is used by more than 32,700 companies – primarily in the United States – in the computer software and IT services industry.



Postgres is fully compliant with ACID and ANSI SQL standard and has several attractive features that make it a common database. In addition to its compliance, Postgres works on a variety of different platforms – Linux, Unix, MS Windows, Solaris, OpenBSD, AIX, and others – for users utilizing most major languages and middleware. With concurrency control for multiple versions, migrating from one version to the other, or transferring data between different versions of Postgres is a breeze.

Just like other database platforms, Postgres offers all the features for building optimal environments safely and securely; standby server, log-/trigger-based replication, high availability, and impressive locking mechanisms. As a LAPP stack option, Postgres has vast potential for running complex web applications with dynamic features.

Though it is free, developers of Postgres are dedicated to giving users the full spectrum of a high-quality database without the expenses. Even when it comes to installation and use, the costs are significantly reduced compared to other databases. Installation is as easy as a download, and because it’s easier to learn than more dense databases, training fees are minimal.

There’s a lot of reasons why Postgres has become a popular database. And, whatever your reason is for choosing it, the DBA team at XTIVIA can help you with licensing, maintenance, or any other service you may need with the following versions.

Editions (presented alphabetically, list subject to change at PostgreSQL's whim):

- PostgreSQL 11.1
- PostgreSQL 10.6
- PostgreSQL 9.6.11
- PostgreSQL 9.5.15
- PostgreSQL 9.4.20
- PostgreSQL 9.3.25

High Availability: Point-in-Time-Recovery (PITR), Active Standby

Replication: Asynchronous Replication, Synchronous Replication, Logical Replication, Pgpool, citus, and Postgres-XL

Operating System: Linux, Microsoft Windows (2000 SP4 and later), FreeBSD, OpenBSD, NetBSD, AIX, HP-UX, Solaris, Unix, and MacOS X

Cloud: Amazon RDS/Aurora/EC2, Google Cloud SQL, Microsoft Azure, EnterpriseDB Cloud, ElephantSQL

History: As an offshoot of the Ingres database project at the University of California, Berkeley, the POSTGRES was developed and tested from 1986 to 1988 before its soft release to select users in June of 1989. For five years, students involved with the POSTGRES project continued to improve the query engine, rewrite system rules, and add system support and features until the project ended after the release of version 4.2 in 1994. Later that year, graduate students revived the project by replacing the POSTQUEL query language with SQL, which eventually became PostgreSQL (1996). And since the release of Postgre 6.0, a group of volunteer developers (The PostgreSQL Global Development Group) have maintained upkeep on the software.

Part Seven | MongoDB

MongoDB is a document-oriented NoSQL database that uses the Binary Serialization Object Notation (BSON) file format — similar to JavaScript Object Notation (JSON) — for versatile structuring and easy database storage. MongoDB has been popularly used by companies needing highly scalable storage for large sets of distributed data, and its efficient language has also made it an attractive option.



Released under the Affero General Public License (AGPL) MongoDB is free to use and, as of 2018, is the fifth most popular database choice for businesses around the world. As opposed to the traditional relational database format, NoSQL databases are used for companies with big data. Additionally, typical SQL-based RDBMS have rigid predefined schema, vertical scalability, and are table based whereas NoSQL document-oriented databases like MongoDB have dynamic schematics for unstructured data, horizontal scalability, and a variety of options for storing data (e.g., column-/document-oriented, graph-based, etc.).

Accompany flexible data storage, MongoDB offers a number of database functions for big data/big business; ad hoc queries and indexing, practical aggregation, and the MongoDB Management Service (MMS). Using ad hoc queries to request specified fields and JavaScript functions, MongoDB returns information efficiently. Additionally, the primary and secondary indexing tools allows efficient query resolution.

When it comes to aggregation, MongoDB uses their MapReduce programming model for filtering, sorting, and summarizing operations. In short, MapReduce gives users a way to process massive amounts of data across numerous servers/machines.

Another key feature is the MongoDB Management Service, which was introduced to the database in 2011. Since then, it's become a popular cloud-based service suite for tracking and managing the various deployments and machines. Users can also employ MMS to monitor hardware metrics, database performance, and create alerts to warn about issues.

For databases with slow performance brought on by big data, MongoDB is a common choice to solve that problem. Whatever your reason is for using this highly powerful

and effective database, the database team at XTIVIA can help you license, deploy, and manage MongoDB for any of the following versions.

Editions (presented alphabetically, list subject to change at MongoDB’s whim):

- MongoDB Community Server Edition
- MongoDB Enterprise Server Edition

Other products:

- MongDB Atlas (DBaaS)
- MongoDB Stitch (serverless platform: “QueryAnywhere,” “Functions,” Triggers,” and “Mobile Sync”)
- Ops Manager (on-prem manager)
- Cloud Manager
- MongoDB Compass (GUI)
- MongoDB Connector (BI)

High Availability/Replication: Replica Sets and Sharded Cluster

Operating System: MongoDB can be ran on Microsoft Windows (Vista and later), Linux, Solaris, FreeBSD, and MacOS X (10.7 and later), but the recommended Operating System is Ubuntu.

Cloud: MongoDB Atlas, MongoDB Stitch, Microsoft Azure, Amazon RDS/Aurora, and Google Cloud Platform (GCP)

History: Development on MongoDB began in 2007 by the software company, 10gen, for use as a part of a platform as a service (PaaS) product. Hoping to offer commercial support and specific services, 10gen opted for an open source development model, and in 2013 the company name was changed to MongoDB Inc. and the database software was offered as an open source, cross-platform document-oriented NoSQL database program. Popular and multifunctional usage of MongoDB allowed for significant growth and profits for MongoDB Inc., and they became a publicly traded company in 2017 (“MDB” on NASDAQ). The company releases new updates and products each year (including their most recent serverless platform product, MongoDB Stitch), and as of 2018, MongoDB has been downloaded more than 40 million times.

CHAPTER THREE

XTIVIA's Database Services

Showcasing popular databases is meant to provide an introduction to database information and also XTIVIA's exceptional database services. With the introductions out of the way, we'd like to share a little bit about our company and what we do.

Since 1992, the Virtual-DBA team, powered by XTIVIA, has been providing state-of-the-art database services for the world's most prominent databases — that is, the ones we've highlighted in Database 101. Set up and training, monitoring and maintaining database architecture, we supply your team with everything you need to optimize your database. We don't replace your team, we provide value to improve your business.

Whether you use Oracle or MongoDB, we can know all there is to know about database management and servicing. The following is just a few examples of the kinds of ways we can provide value to your database, team, and business:

Health Checks

As the foundation of enterprise applications and business insights, the health of your database should always be a concern. Some problems may come up as an error alert, but there are subtle issues you may not always catch: degrading performance, leaking memory, inefficient data structure, old hardware, and more. These problems can linger unnoticed in the background stealing time, money, and valuable resources. Luckily, our team has the experience to check the health of your database environment and deliver a written report detailing any prescriptions needed to make things healthy. We can do a checkup when you start to feel some aches and pains or design a plan for regular health checks to keep your database in tip-top shape at all times.

Performance Tuning

The effectiveness and efficiency of your database is paramount to the success of your business. Our team provides thorough assessments of database systems, their application, capacity, and hardware performance to determine how well your database performs. After assessing your system, we'll create a strategy to maximize the potential of your database to improve operations and increase Return on Investment (ROI).

Database Management

Management services are our bread and butter. All databases need management and maintenance, we can do it for you, or help you make sure it's done right – If you have the regular management and maintenance covered, then we are here to help with architecture, backup (and recovery), installation, consultation, migrations, replication, or virtualization. It can all be done under the Virtual-DBA service umbrella or as stand-alone professional service consulting engagements. We can evaluate your business needs and provide a customized service plan to provide you with a solution that fits your situation. Managed services or just someone to do the heavy lifting, our team will get you where you need to be.

DBA Professional Services

At times, you may need a trusted partner to turn to for consultation and direction. We provide expert consulting services to help our clients better understand, make use of and improve their database systems, cloud deployment, DW and BI actions, and more. When you have a question, we're here to not only provide answers but also to help you decide on the best course of action and get the work done for you. We can also get you long term onsite staffing if that's what you need.

IT Managed Services

We want to provide value to your team, not replace it. When it comes to maintaining your IT infrastructure, we aim to become an extension of your operations as your managed service partner. We offer a variety of managed service plans for monitoring and managing a number of IT equipment. With an understanding of policies/procedures and your time-frame requirements, we'll set up response standards and seamlessly integrate into your IT procedures as virtual employees.

Cloud Services

If you've already made the leap to cloud services – like Microsoft Azure or Amazon Web Services (AWS) – check with us to see if we can save you money on your cloud investments or help manage and maintain them. If your computing resources are still firmly planted on the ground, talk to us; we can help you migrate to cloud solutions that are tailored to fit your business needs.

Data Warehousing and Business Intelligence

We have superior methods and techniques for building a Data Warehouse (DW) that supports your business needs and constraints. Whatever your system requirements call

for, we'll design, build, and manage the perfect DW for your business. Similarly, we can steer you in the right direction toward a pristine Business Intelligence (BI) platform and strategy. With a custom BI tool to fit your company, we can provide you with business insights into data to create reports and improve company-wide processes. A successful BI initiative is critical for improving revenue, enhancing methodology, and reducing business risk. Whether it's a DW or BI, our team has the expertise to exceed your expectations with either one.

Software Licensing and Subscriptions

Discounts and special offers based on year-end discounts can fluctuate and the year-end wind may leave you high and dry. Our team will not only work hard for the best price for licensing, but we'll guide you through the relicensing process. Whatever you use, we'll help you save time and money. Talk to us when you need new software licenses or subscriptions or when it's renewal time.

Urgent DBA Support

Whether you go with a basic, premium, or a custom plan, we offer 24x7 support plans for all of our customers, even if you're not on a service plan or a regular subscriber. We're frequently called on by organizations needing immediate help for issues with their critical database systems. Trouble-shooting, system revival, performance tuning, upgrades, migration, etc. — our DBAs are always on-call to do some heavy lifting where you need the strength.

Mainly, to sum up, what we support is you — our client — in having the right database to suit your business needs, having that database be as optimized as possible, and support your staff with expertise and when they are off (because we want to help your team dance too!). No matter what database you're using, we aim to service your systems and applications in any way we can. If you need anything for your database, reach out to us at info@xtivia.com. We'd love to help.

There's a lot of other ways we can step in and assist your team too, not just our primary services. We toss a wide net and also offer our clients support for the following (supported through either our managed services or our consulting/staffing services):

Sharepoint Monitoring and Administration

Think about having someone take care of your Sharepoint install with the same care and attention we put toward your SQL Server DBA needs. That just about sums up how

we can help you address your Sharepoint administration, monitoring, and maintenance tasks. If you need regular administrative assistance, need help with upgrades, or installations, we are here to help.

Redis

If you're using Redis on-prem or in the cloud who do you have taking care of it? Our team can manage your Redis instances just like we take care of your regular database instances. If you need help with a one off install, upgrade, or would rather have our team on call to jump in as needed that's what we do.

Active Directory/Domain Name System

Most likely, you're running Active Directory Domain Services (AD DS) with a Domain Name System (DNS) someplace in your environment. We're able to manage and/or monitor the performance and operation of the AD and DNS service as well as the server infrastructure to determine system availability if it's in your office or in the cloud.

Oracle E-Business Suite DBA

Need someone to help with your Oracle E-Business Suite environment, including the normal Oracle DBA and Oracle Applications DBA (ADBA) functions? You already know our team has the Oracle DBA side covered, but we assist our clients with their ADBA needs as well.

IBM License Metric Tool

You may not have a choice to run the IBM License Metric Tool (ILMT). It's required in most cases if you are using sub-capacity licensing. In general, it's there to help you manage your IBM software licensing, and to keep you ready to respond to any IBM audits. XTIVIA is available to help you setup, maintain, and configure the ILMT. Mainly, to sum up, what we support is you – our client – in having the right database to suit your business needs, having that database be as optimized as possible, and support your staff with expertise and when they are off (because we want to help your team dance too!). No matter what database you're using, we aim to service your systems and applications in any way we can.

If you need any help with your database, reach out to us at info@xtivia.com. We'd love to become a part of your team.



www.xtivia.com | (888) 685-3101 ext.2

***If you can imagine the business outcome,
we can create it through technology.***

XTIVIA does what it takes to ensure customer success through adaptive technology solutions. Our earned reputation is for delivering the right IT solutions and support that meet our customers' specific requirements, regardless of project complexity. Our passion, combined with a dedicated leadership team and unparalleled technical staff, creates customer relationships that stand the test of time.

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