# IBM Db2 Database

Support modern data workloads with an AI-powered next-gen database, seamlessly deployable across hybrid cloud environments for optimal performance and scalability.

**Highlights**

Vector data store and similarity search

AI-powered query optimization

Always-on availability

Built-in security and governance

Unified data types, one database

Limitless scalability for transactions and analytics

While enterprises look to use data and AI to broaden their competitive advantage, they're still faced with unprecedented data challenges that make it difficult to build new applications, dashboards and AI models. At the same time, mission-critical workloads need to always be on. They also require continuous availability, security and resiliency of data—no matter where it's stored. Data leaders and consumers need a simple way to manage complexity with a single, trusted, cloud-native database engine built for any workload, data type and skillset that's available everywhere across on-premises, hybrid and SaaS on IBM Cloud and Amazon RDS.

IBM Db2® Database is the AI-powered database for low latency applications with always-on analytics, providing near infinite scalability and near-zero downtime migration to keep your business running with a single engine, for any data, anywhere - on any cloud or on-premises. With support for mixed transactional and analytics workloads and integrations with your data warehouse and lakehouse architecture, IBM Db2 Database provides a single place for DBAs, enterprise architects and developers to keep apps running, store and query anything, and simplify development.

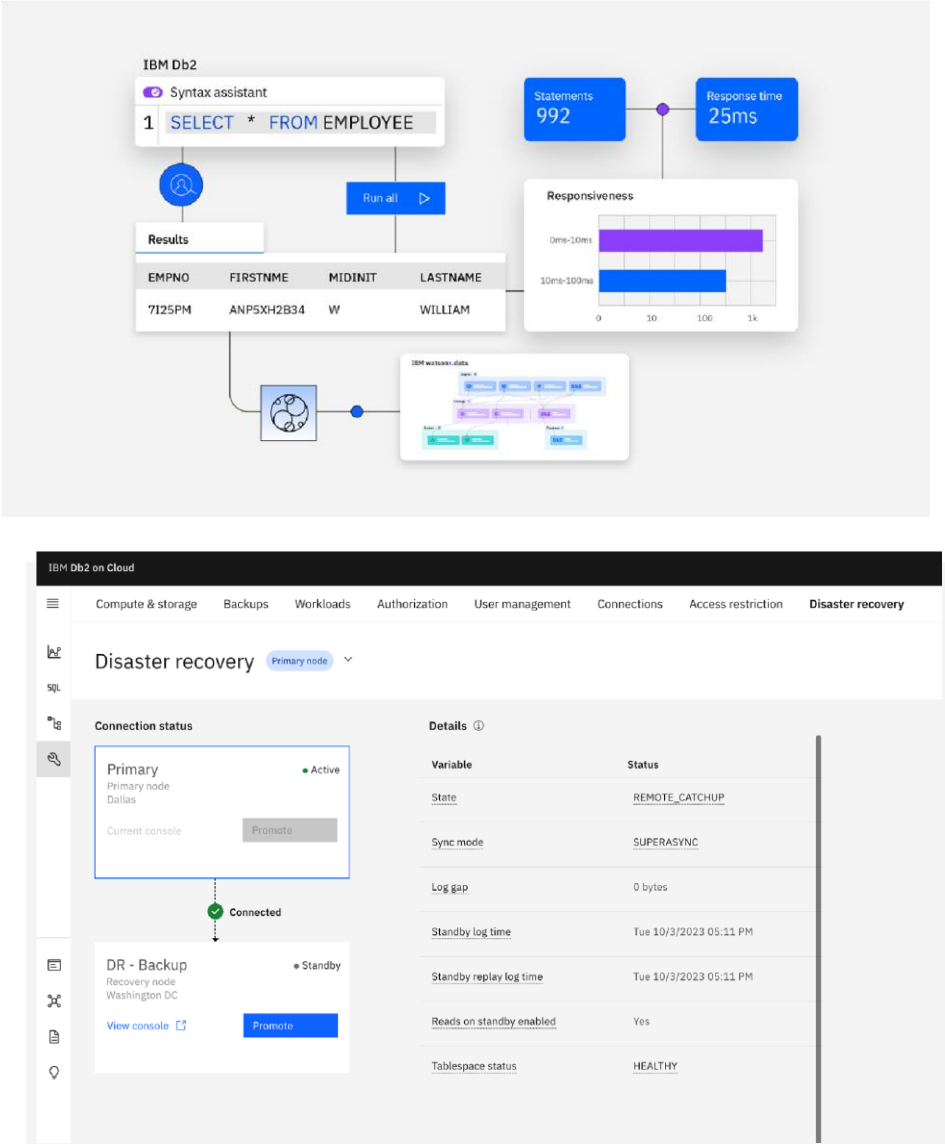


Figure 1. Keep critical applications always on with continuous availability and HADR capabilities.

**AI-Ready with Vector Data and Similarity Search**

The introduction of a native VECTOR data type enables storage and management of vector embeddings directly within the database. This empowers AI applications such as semantic search, recommendation engines, and Retrieval-Augmented Generation (RAG), allowing developers to use familiar SQL to conduct similarity searches based on vector distances. With this AI-native functionality, enterprises can build, train, tune, and deploy machine learning models using governed data directly inside Db2, without requiring data movement. Tools like Python, R, and Jupyter Notebooks integrate directly with the database engine for model development.

**AI-powered query optimization**

AI Query Optimizer enhances the key functions of the traditional query optimizer to provide query execution plans with improved cardinality estimations and more stable performance. It automates model creation through a process of model discovery and model retraining and ultimately chooses the best columns within a table to calculate cardinality estimates, eliminating the need for you to determine the best statistics and optimization controls. This allows the engine to generate informed query plans with optimized efficiency and accuracy.

**Always-on availability**

With IBM Db2 Database, you can deploy high availability (HA) nodes to achieve ultimate redundancy, availability and scalability with support for active and passive deployment, multiple deployment options, HA replicas and automatic failover. Built-in disaster recovery covers the “last mile” availability in the event of a local availability zone (AZ) or region failure. For mission-critical workloads that require continuous, always-on availability, eliminate unplanned downtime while achieving high performance with IBM Db2 Database pureScale. It leverages the IBM Db2 Database parallel sysplex architecture, providing mainframe-class, 99.999% availability that runs both on premises and on AWS.

Sample.java

```
39      password = args[2];
40      try
41      {
42        // Load the driver
43        Class.forName("com.ibm.db2.jcc.DB2Driver");
44        System.out.println("**** Loaded the JDBC driver");
45
46        // Create the connection using the IBM Data Server Driver for JDBC and SQ
47        con = DriverManager.getConnection (url, user, password);
48        // Commit changes manually
49        con.setAutoCommit(false);
50        System.out.println("**** Created a JDBC connection to the data source");
51
52        // Create the Statement
53        stmt = con.createStatement();
54        System.out.println("**** Created JDBC Statement object");
55
56        // Execute a query and generate a ResultSet instance
57        rs = stmt.executeQuery("SELECT EMPNO FROM EMPLOYEE");
58        System.out.println("**** Created JDBC ResultSet object");
59
60        // Print all of the employee numbers to standard output device
61        while (rs.next()) {
62          empNo = rs.getString(1);
63          System.out.println("Employee number = " + empNo);
64        }
65        System.out.println("**** Fetched all rows from JDBC ResultSet");
```

Figure 2. Let’s build something great. Connect to IBM
Db2 Database using our selection of drivers and code repositories to start building your next

IBM Db2 Database provides flexibility, not only to replicate a cluster to another region, but to choose what gets replicated and deployed anywhere. Support high-volume, low-latency replication with the Q replication capability of IBM Db2 Database, powered by IBM MQ message queues to transmit transactions between source and target databases. IBM Db2 Database provides best-in-class reliability with self-service-managed backups and point-in-time recovery.[1] Schedule your backups to run when it's most convenient for your business and use point-in-time restoration with database logs backed up to object storage.

**Built-in security and governance**

Automatically secure data in motion and at rest, monitor and detect unknown behaviors, and support the privacy of your data with built-in end-to-end governance and security capabilities. Direct governed access to live data sets, services and applications. IBM Db2 Database controls data visibility and masks for different levels of authority. Enable granular control over who has access to the data in your table rows or columns—no matter how data is accessed—with separation of duties over security management. Manage Health Insurance Portability and Accountability Act (HIPAA) and General Data Protection Regulation (GDPR) compliance with native encryption in motion and at rest, row-column access, data masking and more.

**Unified data types, one database**

Support analytics and AI use cases with support for querying multiple open table and data formats including Iceberg, Parquet, AVRO, ORC and more directly from Db2. Develop new applications with support for Java, .Net, Ruby, Python, R, Perl, C, C++, pureXML, XQuery, Mongo, FLWOR Expression and JSON. You can also connect your web, mobile and cloud applications with IBM

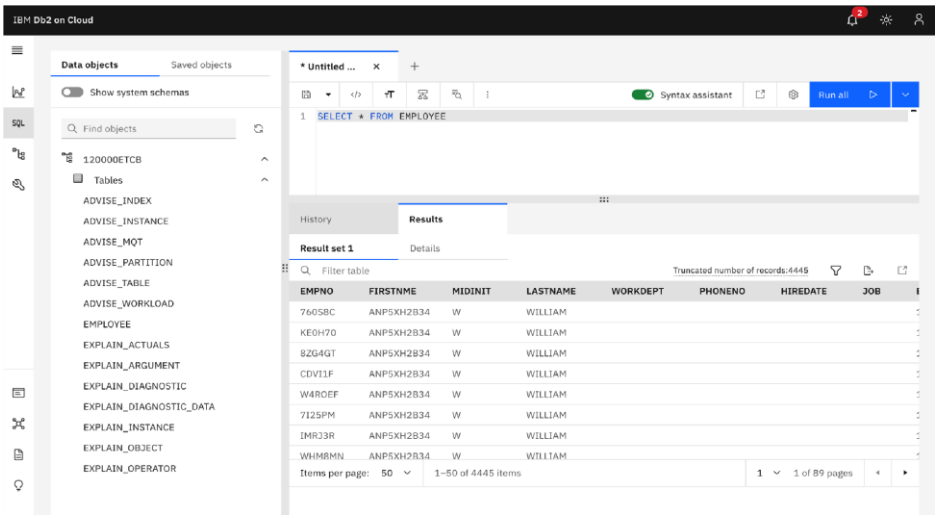


Figure 3. Use a simple UI and SQL-based, high-performance query engine to analyze your data

Db2 Database data through a set of scalable, seamless RESTful APIs fully integrated in the IBM Db2 Database distributed data facility (DDF). With Amazon RDS for Db2, connect transactional data with IBM Db2 Warehouse available as SaaS on AWS and IBM Cloud, and watsonx.data lakehouse, available as SaaS on AWS for analytics and AI use cases in the cloud.

**Limitless scalability for transactions & analytics**

IBM Db2 Database enables multiple high-performing, mission-critical workloads— transactional, analytics and operational—running against the same database. The built-in workload management of IBM Db2 Database automatically manages job scheduling and concurrency for IBM Db2 Database and allows you to define custom policies and resource limits for varying workloads. Enable faster data retrieval and high-performance applications with best-in-class compression, scalable storage and compute in the cloud.[1] For cloud-native workloads, choosing Amazon RDS for Db2 or IBM Db2 Warehouse on Cloud makes it easy to set your scaling options and control your cloud costs using push-button scaling with a few clicks. Amazon RDS for Db2 hourly-based consumption licenses are available through the AWS Marketplace to further simplify workload management and cloud provisioning.

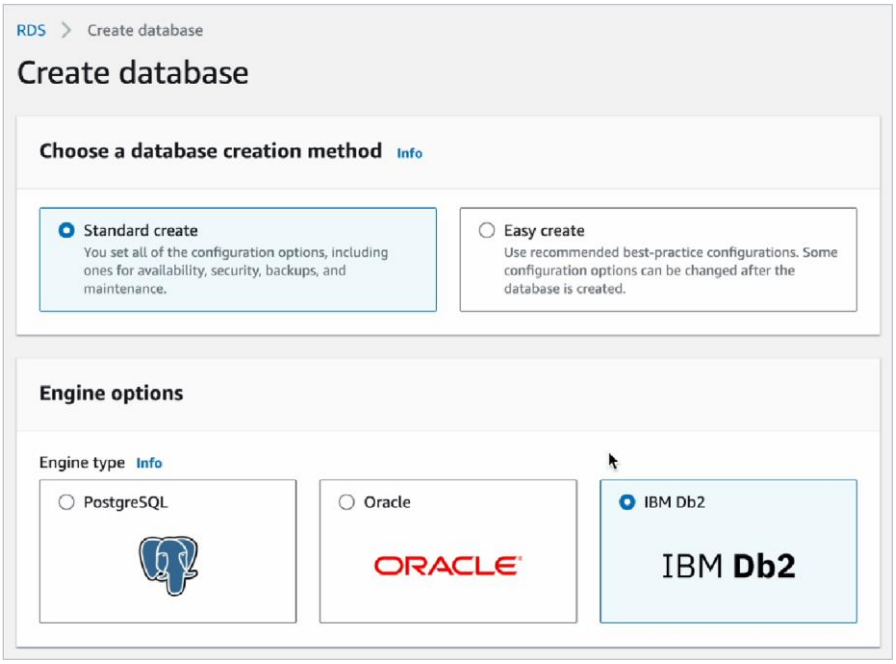


Figure 4. Set up, operate and scale an IBM Db2 Database on Amazon RDS in just a few clicks

## Conclusion

Build once, deploy anywhere. No matter the volume or complexity of your workload, make your applications secure, high-performing and resilient anywhere with IBM Db2 Database. Begin experiencing what IBM Db2 Database has to offer today with our fully managed SaaS, software or hybrid deployments. Get started on Amazon RDS for Db2 or IBM Cloud® free trial, IBM Db2 Warehouse on Cloud free trial (on IBM Cloud and AWS),or download the free IBM® Community Edition today.

## Why IBM?

IBM is trusted to manage the most mission-critical data and applications for our clients. Our experience with innovation in enterprise data solutions includes market-making database solutions and enterprise-ready AI. We help our clients run solutions in almost any cloud or on-premises environment and believe that our clients' data belongs to them 100%.

## For more information

To learn more about IBM Db2 Database and available cloud deployments, including AWS RDS for IBM Db2 Database, contact your IBM representative or IBM Business Partner or visit ibm.com/db2.