

PostgreSQL vs MySQL: The Critical Differences



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While every new release brings MySQL and PostgreSQL closer together with respect to their offerings, certain distinct characteristics of these database systems mean that, for certain use cases, one might just be better than the other.

The Critical Differences of Postgres vs MySQL:

- PostgreSQL is a feature-rich database that can handle complex queries and massive databases.
- MySQL is a simpler database that's fast, reliable, well-understood, and easy to set up and manage.

database (RDBMS).

Most developers will tell you that [MySQL](#) is better for websites and online transactions, while PostgreSQL is better for large and complicated analytical processes. They’ll also note that [PostgreSQL](#) comes with “[a slew of great features](#)” – like extensibility and native NoSQL capabilities to help you deal with challenging database circumstances. Finally, they’ll remind you that MySQL is light on features so it can focus on “[speed and reliability](#)”.

These perspectives are largely right regarding PostgreSQL vs MySQL. Even though every new release is bringing MySQL and PostgreSQL closer together with respect to their offerings (see table), the distinct characteristics of these database systems mean that – for certain use cases – one could be better than the other.

Feature Comparison	PostgreSQL 10	MySQL 8
Common Table Expression (CTE)	Yes	Yes (Newly Added)
Declarative Partitioning	Yes (Newly Added)	Yes
Full-text Search	Yes	Yes
Geographic Information System (GIS) / Spatial Reference System (SRS)	Yes	Yes (Upgraded)
JSON	Yes	Yes (Upgraded)
Logical Replication	Yes (Newly Added)	Yes

Window Functions	Yes	Yes (Newly Added)

In this guide, we'll help you understand the different characteristics of MySQL and PostgreSQL, so you can determine which one is better for your use case. Feel free to skip to the sections that interest you most:

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General Overview of PostgreSQL vs MySQL

Choosing the right database system for your project can be a daunting task. With so many options available, it can be hard to decide which one is best suited for your specific needs. Comparing PostgreSQL vs MySQL is an essential step in making this important decision.

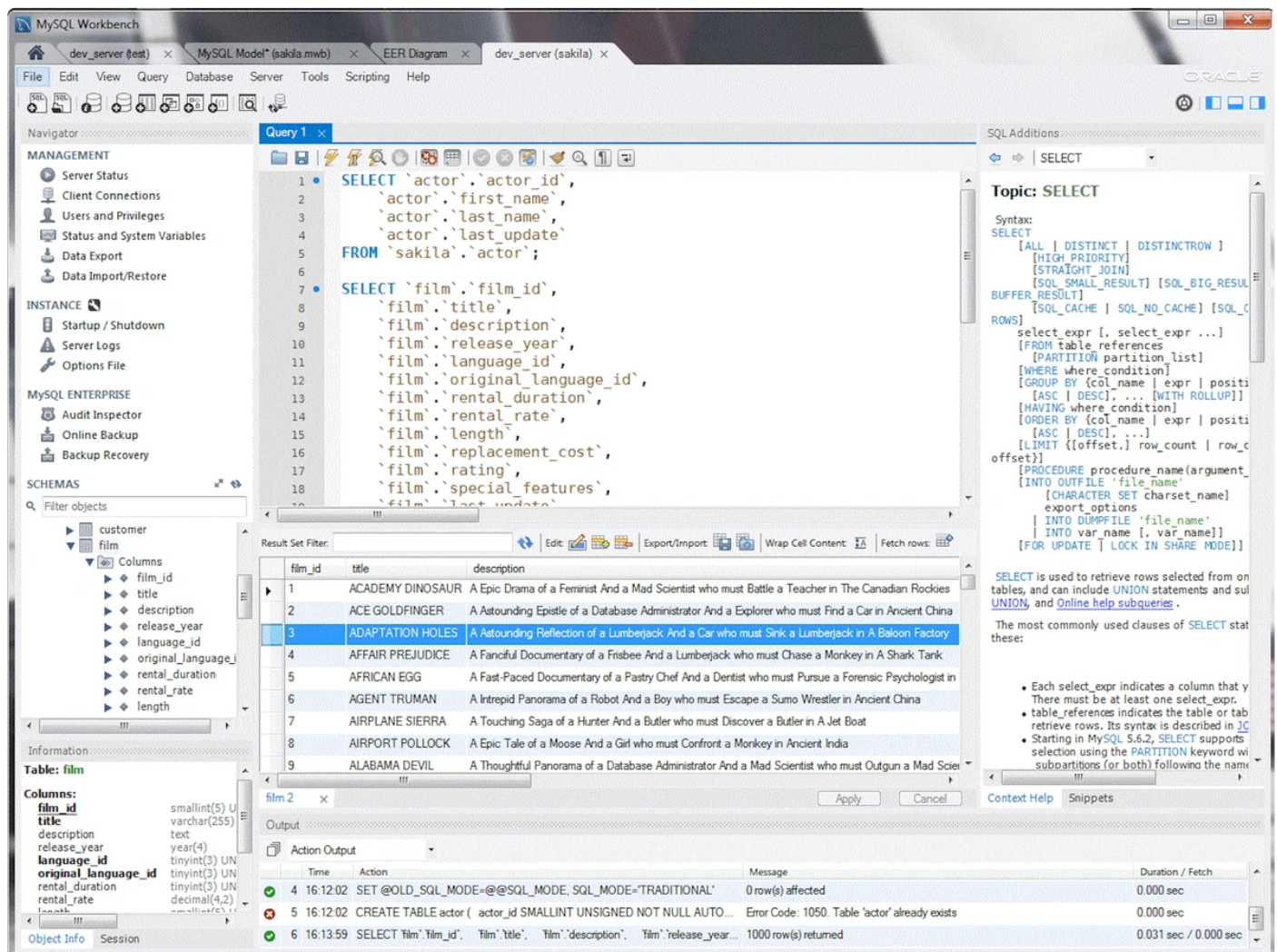
What is MySQL?

MySQL is an open-source, object-relational database management system (RDBMS).

MySQL is the leading object-relational database, providing organizations worldwide with reliable and powerful data storage capabilities. Boasting a [46% usage rate among developers](#) in 2022, this open-source RDBMS has been an integral part of companies' operations for many years.

It has powerful data security features and supports a broad range of data types including numeric, date/time, character, JSON, boolean, and enumerated. MySQL also supports various indexes such as B-tree, hash, R-tree, and inverted indexes. It is capable of handling a high volume of reads and writes, thereby ensuring top performance. It also provides multiple encrypted options for access control, offering reliable security. MySQL enables users to have access to technical support, as well as community and paid support from certain vendors.

In fact, MySQL is the go-to choice for scalable web applications—partly because it comes standard in the LAMP stack: an open-source suite of web applications that consists of Linux, Apache HTTP Server, MySQL, and PHP. In addition, content management systems like Drupal, Joomla, and WordPress rely on MySQL, so you find MySQL virtually everywhere.



History of MySQL

MySQL has been around for more than two decades, starting out as an open-source project in [1995](#). It was originally developed by Swedish computer scientist [Michael "Monty" Widenius](#) and his team at the Finnish software company MySQL AB.

The first version of MySQL was released in 1995 with the intention of creating a stable, reliable, and affordable database management system. MySQL was acquired by Sun Microsystems in 2008 and then Oracle Corporation in 2010.

extends the features of MySQL while keeping compatibility with existing applications.

Today, MySQL remains popular among developers and businesses of all sizes. It's used in web applications like WordPress and Joomla, as well as mission-critical operations at companies such as [Facebook](#), [Twitter](#), and Netflix. It's also frequently used with PHP to create dynamic websites and applications. MySQL can handle large datasets quickly and efficiently thanks to its relational database structure, making it a great choice for companies that need to store and process large amounts of data. MySQL is also relatively easy to learn and provides scalability options for larger businesses. It's fast, reliable, secure, and low-cost – all qualities that make it an attractive choice for many developers.

Here are some additional characteristics of [MySQL](#):

- Open source: MySQL is a free and open-source [relational database management system](#) (RDBMS).
- Maintained by Oracle: Oracle owns and maintains MySQL, and it offers premium versions of MySQL with additional services, proprietary plugins, extensions, and user support.
- Supportive community: A devoted community of volunteers exists to help with troubleshooting.
- Stable and reliable: [Users agree that MySQL is a very stable RDBMS](#) as long as you keep your databases “tidy” and perform regular maintenance.
- MVCC features: MySQL offers [multi-version concurrency control](#) (MVCC) features.
- Frequent updates: MySQL benefits from frequent updates with new features and security improvements. The most recent update was [Version 8.0.32](#) on January 24, 2023.
- 4.4-Star Rating: MySQL has a [4.4-star](#) rating (out of 5 stars) from 1,585 reviews on G2Crowd.

MySQL boasts some notable users:

- Facebook
- Google
- Flickr
- GitHub

- Spotify
- Tesla
- Twitter
- Uber
- US Navy
- WeChat
- Wikipedia
- YouTube
- Zappos
- Zendesk

For more information on Integrate.io's native MySQL connector, visit our [Integration page](#).

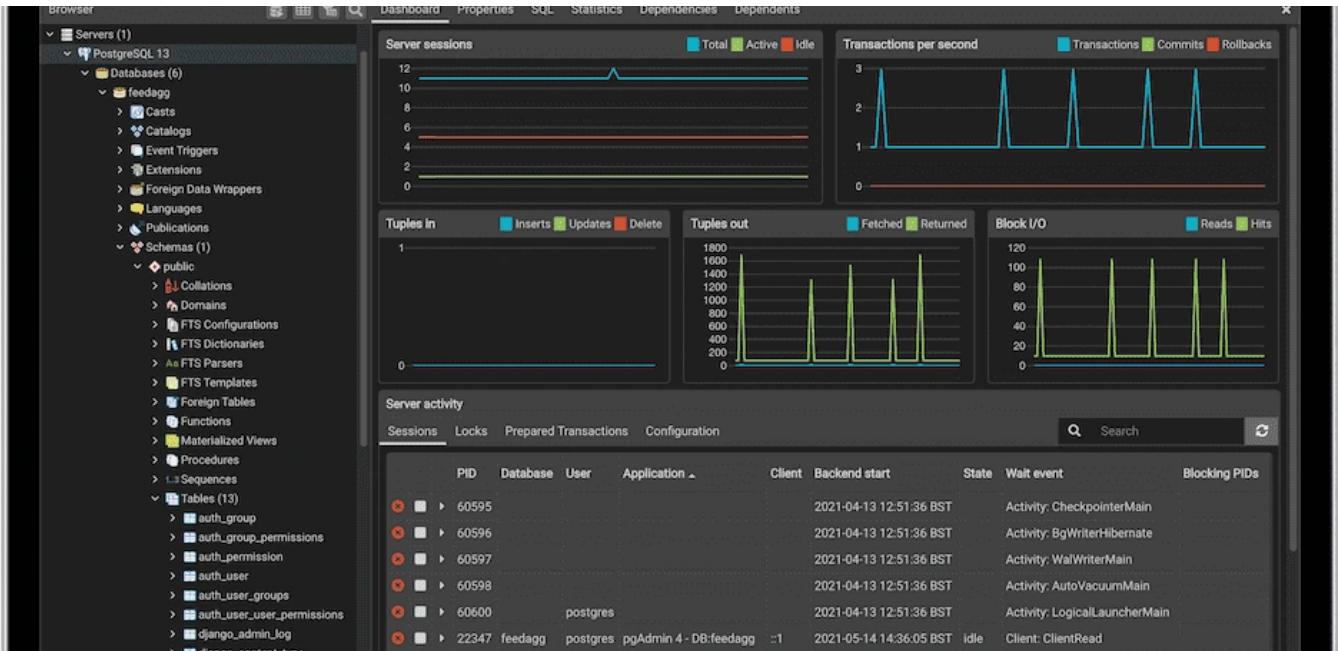
What is PostgreSQL?

PostgreSQL is an open-source, object-relational database system with more than 30 years of active development. It supports a wide range of data types, including integers, strings, dates, timestamps, and binary objects. PostgreSQL also includes support for user-defined functions and stored procedures. PostgreSQL is a popular choice for web applications, and its scalability makes it well-suited for enterprise applications.

[PostgreSQL](#) is perceived as a go-to solution for performing complicated, high-volume data operations. That's because when it comes to PostgreSQL vs MySQL, the former is better at handling extraordinary database situations. PostgreSQL has more features than other database management systems. Also, PostgreSQL is [extensible](#) because its operation is catalog-driven. In other words, it doesn't just store information about tables and columns; it also lets you define data types, index types, and functional languages.

Additional points that set PostgreSQL apart are the fact it is object-relational, ACID-compliant, highly concurrent, and offers NoSQL support. MySQL also offers NoSQL support since Version 8.0.

Finally, PostgreSQL did [win the Database of the Year Award](#) in 2020 for being the fastest-growing DBMS of its time. However, both PostgreSQL and MySQL [were beaten by Snowflake](#) in 2021 and 2022.



History of PostgreSQL

PostgreSQL was developed in the late 1980s at the [University of California, Berkeley](#). It is derived from the Ingres relational database system, and its development was led by a team of computer scientists, including [Michael Stonebraker](#).

The first release of PostgreSQL was in [1989](#) and it quickly gained popularity due to its features such as transactions, triggers, stored procedures, and views. The latest version of PostgreSQL was released in 2022 and it supports a wide variety of languages, including Python and JavaScript. It also has a strong focus on security and scalability, making it an ideal choice for high-volume applications.

Here are some additional characteristics of [PostgreSQL](#):

- Open source: PostgreSQL is a free and open-source [object-relational database management system](#) (ORDBMS). As an ORDBMS rather than an RDBMS, PostgreSQL allows for object-oriented and relational database functionality.
- Customizable: You can customize PostgreSQL by developing plugins to make the DBMS fit your requirements. PostgreSQL also lets you incorporate custom functions made with other programming languages like C/C++, Java, and more.
- Frequent updates: The most recent stable PostgreSQL update was [Version 15.1](#) on November 10, 2022.

- MVCC Features: PostgreSQL was the first DBMS to implement [multi-version concurrency control](#) (MVCC) features.
- A supportive community: PostgreSQL has a devoted community of developers and volunteers. Private, third-party support services are also available. The same community supports PostgreSQL and updates the platform via the [PostgreSQL Global Development Group](#).
- 4.4-Star Rating: Has a [4.4-star](#) review (out of 5 stars) from 565 reviews on G2Crowd.

PostgreSQL users include:

- Apple
- BioPharm
- Cisco
- Debian
- Etsy
- Facebook
- Fujitsu
- IMDB
- Instagram
- Macworld
- Red Hat
- Skype
- Spotify
- Sun Microsystem
- Yahoo

Integrate.io also provides a native PostgreSQL connector. Visit our [Integration page](#) for more information.

Comparison of PostgreSQL vs MySQL:

Here is a comparison table to help you understand the different characteristics of PostgreSQL vs MySQL:

Factor	PostgreSQL	MySQL
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Supported Data Types	Date/time Character JSON Boolean Enumerated XML Geometric Arrays Ranges Network address HSTOREComposite	Numeric Date/time Character JSON Spatial
Supported Indexes	B-tree Hash GiST SP-GiST GIN BRIN	B-tree Hash R-tree Inverted indexes
Security	Handles a high volume of reads and writes well	Handles a high volume of reads well
Performance	Access control Multiple encrypted options	Access control Encrypted options
Technical Support	Community support Paid support available from certain vendors	Community support Paid support available from certain vendors

Why Do Developers Choose One Over the Other?

As the “feature-rich” choice, PostgreSQL gets lots of fanfare from developers. While it comes with all the bells and whistles, when it comes to database design, MySQL’s simplicity, ease, and other characteristics are more valuable for certain use cases. In this respect, DBMSs excel in different areas.

Let’s look at the key features of PostgreSQL vs MySQL from the perspective of why DBMS developers choose one over the other.

Why Do Developers Choose MySQL?

Here are the main advantages of MySQL:

supports the following storage engines:

- InnoDB
- MyISAM
- Memory
- CSV
- Archive
- Blackhole
- NDB/NDBCLUSTER
- Merge
- Federated
- Example

Focus on speed and reliability: By not including certain SQL features, MySQL stays light to prioritize speed and reliability. MySQL's speed is especially apparent when it comes to highly concurrent, read-only functions. This makes it an excellent choice for certain business intelligence purposes. However, if you need to run a lot of complicated queries under heavy loads, PostgreSQL may be a better choice.

Options for server optimization: MySQL offers various options for tweaking and optimizing your MySQL server by adjusting variables like `sort_buffer_size`, `read_buffer_size`, `max_allowed_packet`, etc.

Easy to use and popular: The popularity of MySQL means it's easy to find database admins with MySQL experience. Users also report that it's easier to set up and doesn't require as much fine-tuning as other DBMS solutions. [This tutorial](#) shows how easy it is for beginners to set up their first MySQL database. Plus, a number of front-ends, like Adminer, MySQL Workbench, HeidiSQL, and dbForge Studio, add a graphical interface to MySQL, offering a user-friendly experience.

A cloud-ready DBMS: MySQL is cloud-ready, and many cloud platforms offer MySQL services where they'll install and maintain your MySQL database for a fee.

Multi-version concurrency control (MVCC) and ACID compliance are available with the InnoDB engine: The default engine for current versions of MySQL is InnoDB. This adds MVCC and ACID compliance. However, problems with corrupted tables may still arise

Why Do Developers Choose PostgreSQL?

Here are some of the most important advantages of PostgreSQL vs MySQL. Already, you might notice why this DBMS requires a little more technical knowledge.

ORDBMS not just RDBMS: PostgreSQL is an object-relational programming language (ORDBMS), so it serves as a bridge between object-oriented programming and relational/procedural programming as C++ does. This allows you to define objects and table inheritance, translating to more complicated data structures. An ORDBMS is brilliant when you're dealing with data that doesn't mesh with a strictly relational model.

Excellent for complex queries: When you need to perform complicated read-write operations while using data that requires validation, PostgreSQL is an excellent choice. However, the ORDBMS could experience slowdowns while dealing with read-only operations.

Supports NoSQL and a large variety of data types: PostgreSQL is a popular choice for NoSQL features. It natively supports [a rich variety of data types](#), including [JSON](#), [hstore](#), and [XML](#). You can define original data types and set up custom functions, too.

Designed for extra-large database management: PostgreSQL doesn't restrict the size of your databases. According to a database administrator for [Adjust.com](#), his firm uses PostgreSQL to manage "[around 4PB \[petabytes\] of data](#)". That's 4,000 terabytes. He further claims, their "environment processes (and then logs) 100k to 250k requests from outside a second."

Multi-version concurrency control (MVCC): MVCC is one of the most important reasons businesses choose PostgreSQL. MVCC permits different readers and writers to interact with and manage the PostgreSQL database simultaneously. This eliminates the need for a read-write lock each time someone needs to interact with the data—thus improving efficiency. MVCC achieves this through "snapshot isolation." Snapshots represent the state of the data at a certain moment.

ACID compliance: PostgreSQL prevents data corruption and preserves the integrity of data at the transactional level. Read more about [the value of PostgreSQL's ACID](#)

User Support for PostgreSQL and MySQL

When it comes to PostgreSQL vs MySQL, both RDBMS have helpful communities to provide support to users, in addition to paid support from the DBMS owner or third-party providers.

MySQL User Support

As an open-source project, MySQL has a large volunteer community that's ready to help with free support and recommendations. The best way to seek this kind of support is on the [MySQL](#) website.

[Reviews on G2Crowd](#) appreciate that MySQL has lots of free community support online, thanks to users willing to solve common issues. Oracle also offers paid support anytime you need it.

PostgreSQL User Support

As you compare PostgreSQL vs MySQL, you'll find that PostgreSQL also has a large community of volunteers who give free advice to users on [IRC](#) and via the following [mailing lists](#). You can also purchase paid support through [third-party providers](#). Or, you can do your own troubleshooting by reading numerous PostgreSQL manuals and books [found here](#).

[Users on G2Crowd](#) state that the popular database has lots of users who are happy to answer questions on forums. However, they mention it's slightly harder to get community support for PostgreSQL compared to MySQL.

Still not sure which database is right for you? Integrate.io supports a variety of platforms, including MongoDB and MariaDB, so you'll never have to worry about gaps in your visibility ever again. Try our no-code data pipeline tools for yourself and [get started with a 14-day free trial](#).

PostgreSQL vs MySQL: Which Is Faster?

speed tests often contradictorily report. For example, [Vintage Online](#) says that MySQL is faster, and [Benchw](#) says that PostgreSQL is faster. Ultimately, speed will depend on the way you're using the database. PostgreSQL is known to be faster for handling massive data sets, complicated queries, and read-write operations. Meanwhile, MySQL is known to be faster with read-only commands.

Whether you decide to use PostgreSQL, MySQL, or another database solution like MongoDB, Integrate.io provides the seamless connectivity your business demands with the power of ETL and reverse ETL capabilities. After you [sign up for your 14-day trial](#), [schedule your ETL Trial meeting](#) so our team can walk you through our platform's powerful features.

Which Programming Languages Do PostgreSQL and MySQL Support?

As you compare PostgreSQL vs MySQL, note that they support many of the same languages, with slight variances.

MySQL Supported Languages

MySQL offers support for the following languages:

- C/C++
- Delphi
- Erlang
- Go
- Java
- Lisp
- Node.js
- Perl
- PHP
- R
- PostgreSQL Supported Languages

- C/C++
- Delphi
- Erlang
- Go
- Java
- JavaScript
- Lisp
- .Net
- Python
- R
- Tcl
- Other programming languages

What Operating Systems Do PostgreSQL and MySQL Work With?

Here's what you need to know about operating system requirements for PostgreSQL vs MySQL:

MySQL OS Compatibility

MySQL offers cloud-based support and on-premises installations, and it's compatible with [the following operating systems and formats](#):

- Microsoft Windows
- MacOS
- Linux (Ubuntu, Debian, Generic, SUSE Linux Enterprise Server, Red Hat Enterprises, Oracle)
- Oracle Solaris
- Fedora
- FreeBSD
- Open Source Build

PostgreSQL OS Compatibility

RESTful API according to [the PostgreSQL website](#).

"PostgREST is a standalone web server that turns your PostgreSQL database directly into a RESTful API. The structural constraints and permissions in the database determine the API endpoints and operations."

PostgreSQL is [available for the following operating systems](#):

- MacOS
- Solaris
- Microsoft Windows
- BSD (FreeBSD, OpenBSD)
- Linux (Red Hat family Linux including CentOS/Fedora/Scientific/Oracle variants, Debian GNU/Linux and derivatives, Ubuntu Linux and derivatives, SuSE and OpenSuSE, other Linux operating systems)

PostgreSQL vs MySQL: How Do They Index?

Indexes improve database performance by speeding up SQL queries when dealing with large tables of data. Without indexing a database, queries would be slow and taxing for the DBMS. Regarding PostgreSQL vs MySQL, they offer different indexing options.

MySQL Indexing Types

MySQL supports the following index types:

- Indexes stored on B-trees, such as INDEX, FULLTEXT, PRIMARY KEY, and UNIQUE.
- Indexes stored on R-trees, such as indexes found on spatial data types.
- Hash indexes and inverted lists when using FULLTEXT indexes.

PostgreSQL Index Types

PostgreSQL supports the following index types:

- Expression indexes that create an index recording from expression functions as opposed to column values.

How Is Coding Different in PostgreSQL vs MySQL?

Here are three areas of difference between coding with PostgreSQL vs MySQL:

- Case sensitivity
- Default character sets and strings
- IF and IFNULL vs. CASE statements

Case Sensitivity

MySQL is not case-sensitive. When writing queries, you don't need to capitalize strings as they appear in the database. PostgreSQL is case-sensitive. You need to capitalize strings exactly as they appear in the database or the query will fail.

Default Character Sets and Strings

With certain versions of MySQL, it is necessary to convert character sets and strings to UTF-8. With PostgreSQL, it is not necessary to convert character sets and strings to UTF-8. Moreover, UTF-8 syntax isn't allowed in PostgreSQL.

IF and IFNULL vs. CASE Statements

In MySQL, it's perfectly fine to use IF and IFNULL statements. In PostgreSQL, IF and IFNULL statements don't work. You need to use a CASE statement instead.

Choosing Between PostgreSQL and MySQL

In conclusion, choosing between PostgreSQL vs MySQL often boils down to the following questions:

- Do you need a simpler database that's easy to set up and manage, fast, reliable, and well-understood? MySQL is ideal.

As you've seen, your decision could be a little more nuanced than your answers to these simple questions. At Integrate.io, we're curious to know which of these DBMS solutions you're using, and why you chose one over the other. Feel free to drop us a line and let us know!

Once you have your database of choice set up, why not connect it to a single source of truth to unlock ultimate data visibility? [Get started with a 14-day free trial](#) of integrate.io and try our platform for yourself.

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