



# DexterityDB Technology Overview/Roadmap

## Introduction

DexterityDB is a high-performance database storage engine technology that can boost data processing speed by over 100x. DexterityDB achieves its competitive edge by storing data in revolutionary, patent-pending data structures that are tuned for modern day data needs. It is designed for OLAP (Online Analytical Processing) applications on very large datasets. Furthermore, the DexterityDB team is working on many developments that will make the engine a more robust solution for additional use cases, including write-heavy and even OLTP (Online Transaction Processing) applications. DexterityDB's core tech has been implemented as a plugin and integrated into popular database solutions such as MySQL and MariaDB to bring its speed benefits to existing markets. A simple standalone version also exists that can be used for basic queries and for testing raw performance of the engine.

## The Need for More Sophisticated Software without Specialized Hardware Dependency

As the volume of data collected from various sources increases, companies struggle to make sense of it all. Tools exist to analyze this data and display it in a more useful format, but are often bottlenecked by the performance of the database where the data resides.

In recent years, the solution to this problem has often been to switch to better and more specialized hardware. Among others, In-Memory databases and GPU databases have made a name for themselves as popular alternatives to traditional databases for accelerating data analytics. These solutions have their advantages, but they are not solving the root of the problem; they are band aids. Prominent engineer, Henry Petroski, mentions how ignoring

software inefficiencies and attempting to solve problems by using better hardware can be a temporary fix to a growing problem:

*“The most amazing achievement of the computer software industry is its continuing cancellation of the steady and staggering gains made by the computer hardware industry.”*

*- Henry Petroski*

The computer world evolves at an extraordinary pace, so building a database around a specific hardware component can make updating an infrastructure difficult and costly. **The best solution is one that derives its main value from software. Software is flexible and can be modified to run on any kind of hardware. It can evolve over time and be seamlessly updated in production environments.**

## Benefits

DexterityDB has numerous benefits with a focus centered around speed and efficiency:

### Optimized Analytics

DexterityDB uses a patent-pending indexing system and fetch-less computation technique to accelerate filtering and aggregations by bypassing costly operations and getting to relevant data quicker and more efficiently. These are unique features that results in faster analytics, even on incredibly large datasets.

### Adapts to its Surroundings

DexterityDB optimizes itself based on the hardware that it is installed on. By analyzing the hardware characteristics of the server, such as CPU core count, DexterityDB can automatically partition (chunk) and store data in the most efficient way. This automatic chunking technology allows for easy linear vertical scaling, resulting in significant speed benefits in both reads and writes.

### Plugs into Existing Ecosystems

Since DexterityDB's speed comes from more efficiently storing and accessing data, the DexterityDB team has chosen to implement its technology as a set of plugins, which are available for popular database management systems such as MySQL and MariaDB. They replace the default storage engine (InnoDB) and allow users to utilize the speed benefits of the

DexterityDB engine without giving up the ecosystem that they are used to. No additional training is required and most of the tools used for these databases will continue to work as normal after the plugin is installed. The goal is to provide massive value in the simplest way possible. For more information on these plugins, see the dedicated DexterityDB plugin technical overview for your DBMS.

## Performance Updates

As mentioned before, DexterityDB is a software solution, and with additional performance updates, it is expected that speeds will be improved by multiple orders of magnitude over the already impressive speed benefits that DexterityDB currently provides. Some of these improvements have already been tested in the standalone engine and just need to be integrated into the plugins. There is no need to purchase upgraded or specialized hardware to see these benefits; they will be delivered via software updates to existing systems.

## Technical Roadmap and Milestones

DexterityDB is ever-evolving and changing to provide a faster and more fluid experience for its users. There are many features and performance updates that are on the roadmap. Below are some of the features/milestones that the DexterityDB team plans to achieve over time:

### Native Aggregations

Currently, DexterityDB relies on the aggregation functionality that is supplied by the databases that it plugs into and does a good job of speeding up those analytical features. However, native aggregations would allow DexterityDB to harness more of its own computational optimizations in order to make aggregations even faster and provide even bigger benefits to analytical use cases.

### Plugin Optimizations

Although DexterityDB already provides amazing speed benefits as a plugin to popular databases, there are still certain bottlenecks in those databases that cap its performance benefits. By bypassing certain database functionalities and building them into the DexterityDB engine, it is possible to get around these bottlenecks and leverage DexterityDB's true performance, even in plugin form.

### Compression

The DexterityDB team is working on a unique form of compression that cuts the size of data storage by over 10x, while leaving it in a format that can be operated on without

decompression. This allows more data to fit in memory, speeding up operations and cutting down on disk I/O.

## Full Transactional Support

DexterityDB exhibits good write performance and already conforms to some ACID requirements, giving it partial transactional support. However, further development will provide full ACID compliance, making DexterityDB a great choice for transactional and HTAP use cases.

## Find Out More

To learn more, contact us at [contact@dexteritydb.com](mailto:contact@dexteritydb.com)