

WHITEPAPER



Why Do You Need Hybrid Database Management?



Your Data is Everywhere

Enterprises increasingly need to handle diverse and complex data requirements of modern business applications. A hybrid database system enables organizations to manage both structured and unstructured data across on-premises and cloud environments. This ensures that enterprises can adapt to changing workloads and data demands without sacrificing performance or security.

Introduction

Hybrid databases—deployments of databases with some nodes on-prem in data centers, others in commercial clouds, and even resources in edge locations—are becoming increasingly common. Driving factors for this include the need to reduce latency, modernize infrastructure, decrease investment in physical assets, and simply to take advantage of the flexibility of cloud-based assets. Many organizations need to maintain existing legacy infrastructure for a variety of reasons. These can include regulatory compliance, cost management, and simple data gravity. This has led to organizations adopting hybrid models, allowing organizations to place different types of data in the most suitable environment based on factors like security, performance, scalability, and cost.

A hybrid database approach also allows organizations to integrate various database technologies—relational, NoSQL, graph, or vector—depending on the needs of specific applications, providing enhanced flexibility and customization over traditional, single-environment databases.

Enter hybrid database management

Hybrid database management refers to a data management approach that combines these multiple database architectures— on-premises and cloud-based solutions—into a single, unified system.

The growing complexity and variety of data— structured data, unstructured data such as social media posts, videos, and IoT feeds, and graph data—has created a need for more versatile data management systems. Traditional database management systems (DBMS) often fall short in addressing these needs, especially when businesses scale.

Hybrid DB management enables organizations to tackle many of the complexities that arise from managing diverse assets in multiple environments. Some of the needs driving hybrid DB solutions are:

Data diversity

Organizations today manage a wide range of data types: structured data (including sales and customer info), unstructured data (logs, email, even videos or recordings), graph data, and others. A hybrid database enables businesses to tailor their data storage and processing methods to each type of data, ensuring they have the optimal solution for each application

Scale and flexibility

As companies grow, their data needs evolve. This requires a flexible system that can scale both to meet demand but also maximize efficiency. Hybrid databases provide businesses with the flexibility to use

the cloud for its inherent ability to scale while meeting requirements for storage of sensitive data on-premises. This hybrid approach ensures businesses can manage data efficiently, without the constraints of a purely on-premises or cloud-only system.

Security and compliance

Security is a top concern for all organizations and hybrid systems offer the best of both worlds. On-premises solutions can be used to maintain complete control over highly sensitive or existing historical data, while the cloud offers robust security measures and scalability built in, reducing the work needed to ensure compliance with regulations like HIPAA, PCI, and GDPR.

Use cases

Hybrid database management isn't a theory—it's in use today. There are many industries thriving with hybrid database systems that improve their position in the market.

E-commerce

Some of the earliest adopters, retailers needed to add e-commerce to their existing operations. The fluctuating demand inherent in retail can benefit from hybrid database solutions. During holiday seasons, retailers can scale up their cloud resources to handle increased traffic and orders while maintaining critical customer data and inventory management on-premises for added security and faster response times.

Finance

Financial institutions, which maintain a mix of highly regulated, confidential data and large-scale transactional data, can use hybrid systems to store sensitive financial records in private, on-prem databases while utilizing the cloud for real-time analytics and reporting. Hybrid DB systems enable financial services companies to provide the on-demand services customers require while maintaining existing systems and regulatory demands.

Healthcare

Healthcare providers can struggle with diverse systems resulting from mergers, leaving them with heterogeneous infrastructure estates that need to interact. In healthcare, privacy and data security are critical. Hybrid database management enables providers to store sensitive patient information on secure, on-premises databases while using cloud platforms to share data across platforms, giving both practitioners and patients access to data easily. This approach balances security, compliance, and flexibility.

MSPs

Managed service providers (MSPs) who manage multiple customers' IT environments can use hybrid database management to centrally govern hybrid and multi-cloud infrastructures. Hybrid systems make it possible and cost effective for MSPs to offer comprehensive database services for clients running diverse IT environments.

Challenges in adoption

Embracing hybrid DB management isn't without its difficulties. Fortunately, the bulk of the challenges are associated with making the change to hybrid. Once in place, hybrid DB systems tend to require less overhead and resources as compared with on-prem DB solutions.

Integration complexity

The initial investment to migrate from a single or multiple on-prem DB solutions to hybrid can be significant. Effectively designing reliable, fault-tolerant hybrid solutions and performing migrations can require significant resources and specialized technical expertise.

Data consistency

Keeping data synchronized across platforms and geos can present challenges. Meeting the demands of applications using the data, minimizing latency, and ensuring data integrity across multiple environments is critical.

Security and compliance

Security can also require operational adjustment as commercial cloud providers often build in and control security. This is a more hands-off approach than traditional on-prem security teams are accustomed to and requires evolution of the reporting and security tools.

Remote management options in hybrid database systems

One of the major advantages of hybrid database management is the ability to manage on-premises and cloud-based systems via a unified platform. Remote management tools enable IT teams to monitor, maintain, and optimize hybrid databases from anywhere, ensuring system availability and performance without the need for on-site intervention. This is particularly beneficial in the modern work environment, where teams might be distributed across different locations or even operating with limited on-site resources.

The features and benefits remote database management systems offer include:

Unified monitoring and control

Remote management tools enable IT teams to oversee multiple databases—whether on-premises or in the cloud—from a single, centralized platform. A unified view helps teams to track system performance, security alerts, and data integrity across all environments. This eliminates the need to maintain multiple, bespoke monitoring systems that require specific skills as well as system maintenance.

Simplified data management

Hybrid systems often involve high volumes of data that need to be managed, updated, and synchronized across multiple environments. With remote management, SREs can perform real-time data management tasks like backups, restores, or migrations, regardless of their location. This ensures that the database systems are always up-to-date, secure, and maintained consistently across platforms.

Improved incident response

For distributed teams or organizations with multiple data centers, remote management provides the ability for SREs and IT personnel to collaborate across time zones and locations. Troubleshooting becomes more efficient as issues can be identified and addressed quickly, leveraging automation and reducing mean time to resolution (MTTR). Remote collaboration tools (including shared dashboards or issue tracking systems) can facilitate faster resolution, which is critical for minimizing disruptions.

The flexible, scalable solution for evolving data requirements

The increasing prevalence of data as a commodity in today's environment means businesses can't afford to rely on outdated, rigid database systems. Hybrid database management provides the flexibility, scalability, and performance necessary to handle diverse and growing data requirements. Combining the best of both on-premises and cloud technologies enables businesses to optimize data availability and improve security while managing TCO.

Remote management tools enable organizations to make the most of their hybrid database systems—whether they are monitoring cloud resources or managing on-premises solutions—without the need for managing multiple monitoring solutions. This ability to manage complex data environments remotely is one more way hybrid database management is empowering businesses to stay competitive and responsive in an increasingly data-critical market.