

MemSQL Helios

The World's Fastest Fully-Managed Cloud Database

Written by: Nithin Krishna Reghunathan, Technical Evangelist

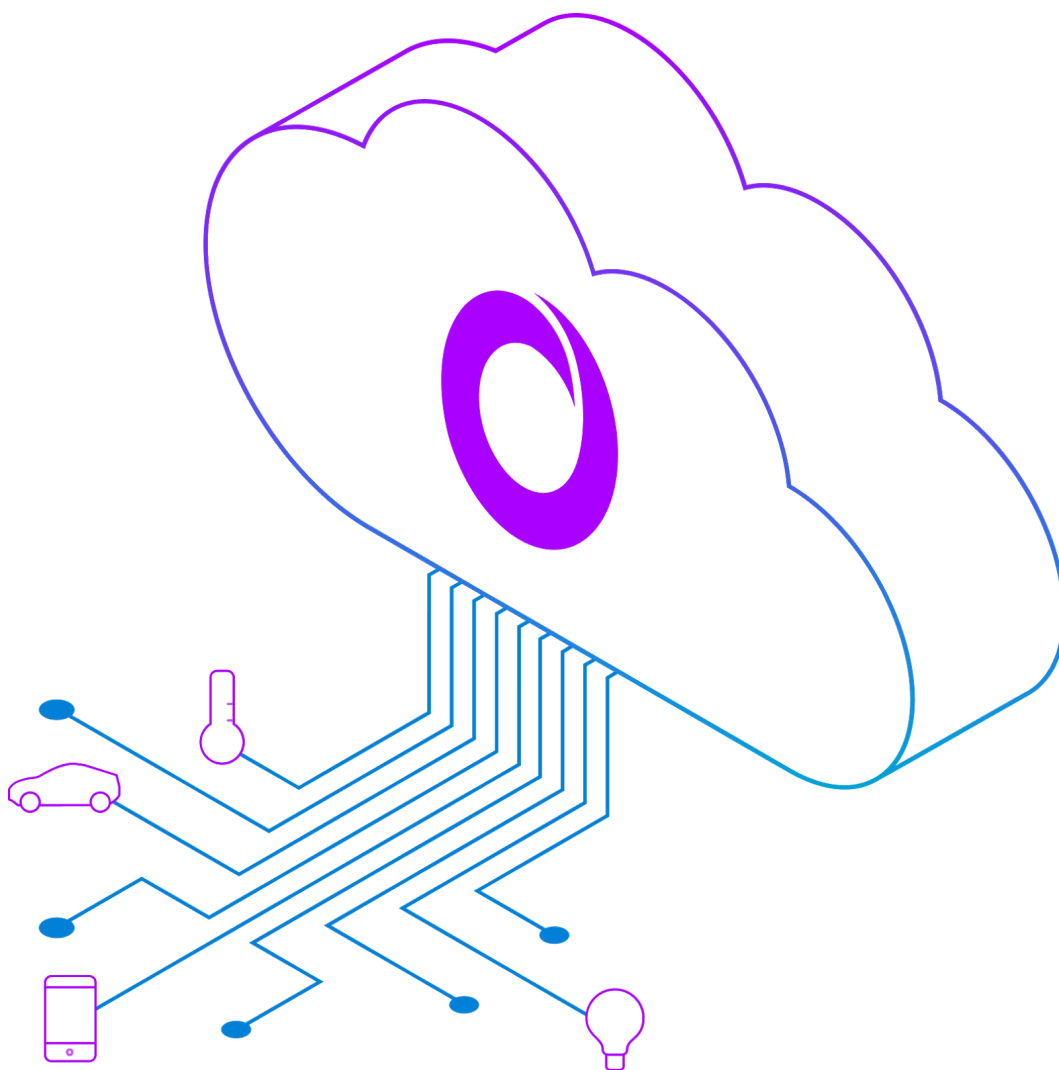


Table of Contents

1. MemSQL Helios Overview	3
1.1 Why Use MemSQL Helios	3
2. Deploy in Public and Private Clouds	5
3. Highlights	6
4. Customer Benefits	9
5. Customer Success Stories	10
5.1 John L. Scott	10
5.2 Medaxion	11
6. Conclusion	12

1. MemSQL Helios Overview

Our mission at MemSQL is to deliver The Database of Now™ providing speed, scale, and SQL in a cloud-native solution. [MemSQL](#) simplifies data infrastructure by providing a converged data platform that is optimized for real-time applications in cloud and hybrid environments.

MemSQL's database-as-a-service offering is called *MemSQL Helios*. MemSQL Helios gives you the full capabilities of [MemSQL](#) without the operational overhead and complexity of managing it yourself. MemSQL Helios is a fully-managed, on-demand, and elastic cloud database. With MemSQL Helios, deployment, management, upgrades, and troubleshooting are handled by MemSQL. This reduces operational expenses and allows you to focus on generating insights rather than managing your data. MemSQL Helios can handle both OLTP and OLAP workloads in a single system, which fits with the direction of new applications to combine transactional and analytical requirements.

Customers using MemSQL Helios are responsible for the logical management of their data, including schema design and implementation (DDL/DML), index and query tuning, assigning proper security permissions, requesting a database restore if needed, and requesting an increase or decrease in cluster capacity.

1.1 Why Use MemSQL Helios

MemSQL Helios delivers instant, effortless access to the world's fastest, most scalable data platform for operational

Key Features

Fast Streaming Ingest: Native parallel data ingestion from external sources such as Apache Kafka, Amazon S3, Azure Blob, file systems, Google Cloud Storage and HDFS, using MemSQL Pipelines.

MemSQL SingleStore™: SingleStore architecture allows you to support large-scale Online Transaction Processing (OLTP) and Hybrid Transactional and Analytical Processing (HTAP) at lower TCO.

Record-breaking Query Response: Built-in distributed optimizer compiles, vectorizes, and caches queries to maximize CPU efficiency and deliver unmatched query performance.

MySQL-compatible: Fully compatible with MySQL, advanced features such as distributed SQL, geospatial data, JSON data, window functions, and time series functions.

Lock-free Data: Modern data structures and multi-version concurrency control (MVCC) mean data remains highly accessible, even amidst a high volume of concurrent reads and writes.

Enterprise Security: Best-in-class security using authentication, encryption, and role-based access control (RBAC) at every layer to protect your data.

MemSQL Studio: Visual user interface tool that allows you to easily monitor, debug and interact with all of your MemSQL clusters.

analytics, machine learning and AI. MemSQL Helios is known for its best-in-class speed, scale, and capability without the headaches of installing, configuring, and maintaining software.

MemSQL Helios can ingest millions of events per second, with support for ACID transactions, while simultaneously supporting analytics, applications, machine learning model queries, and AI queries on trillions¹ of data rows. MemSQL Helios can support running transactional and analytical workloads under high concurrency, all while supporting the widely used ANSI SQL standard. MemSQL Helios is considered as an ideal solution for use cases that require ultra-fast data ingest, highly reliable low-latency analytics, and elastic scaling, with familiar, relational SQL.

The following diagram shows the high level architecture of Helios by MemSQL:

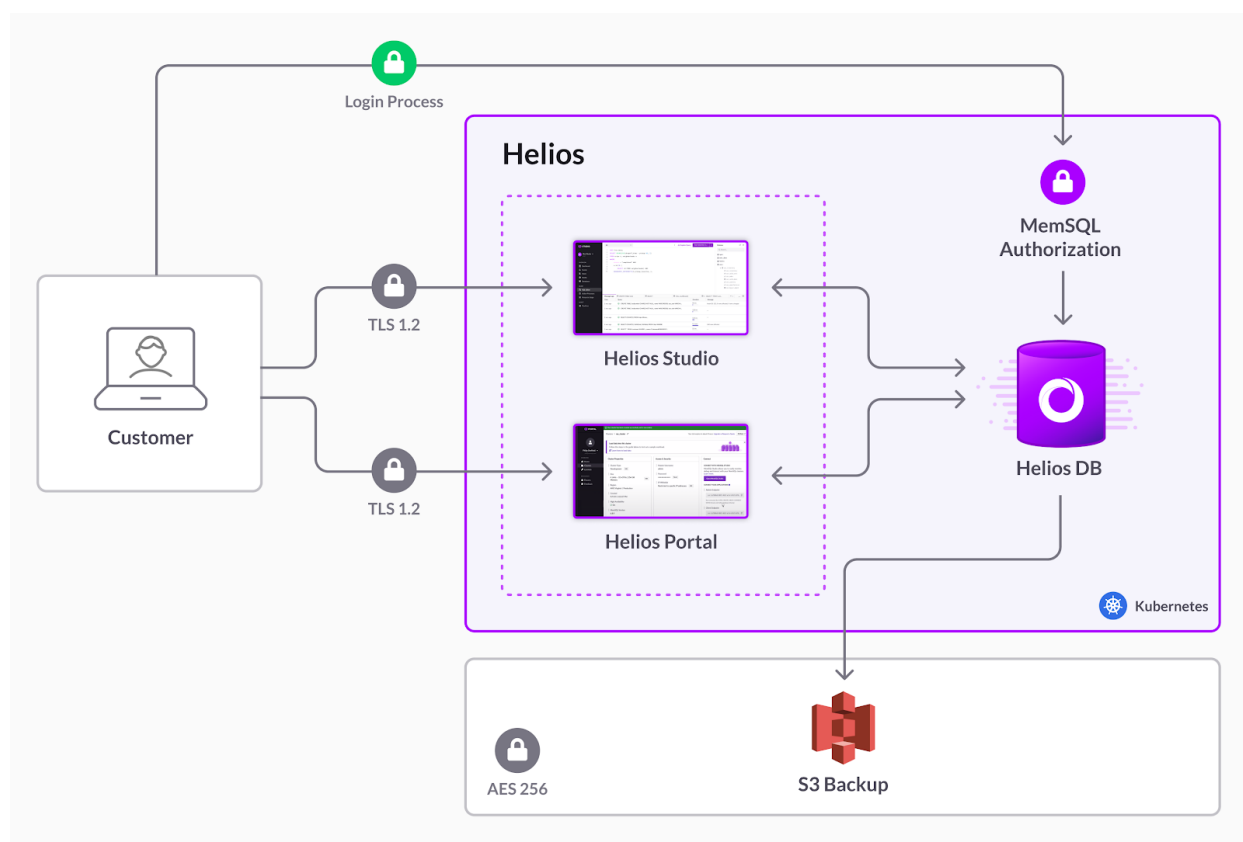


Fig 1. MemSQL Helios Architecture Overview

¹ [MemSQL Processing Shatters Trillion Rows Per Second Barrier](#)

MemSQL provides a customer admin with the power to provision and control access within their organization and to take responsibility for who can see what and when. When a user tries to connect to the cluster, the Helios Portal authenticates with your MemSQL account using secure JWT authentication. MemSQL Helios uses a layered approach (as shown in fig 1) to security, starting with IP whitelisting to ensure only devices you trust, and have given access to, can access your cluster or your data. MemSQL Helios platform ensures that the data passing between your trusted devices and Helios is encrypted with TLS 1.2 to protect it from being intercepted during transit. Unless you explicitly grant access to your data then others cannot gain access to it. The data is automatically backed up on a daily basis to S3.

MemSQL Helios can deliver 10x performance at one-third the cost of traditional databases. It can handle converged workloads executing over 10,000 complex queries per second, or supporting aggregations of billions of rows per second. Just as importantly, MemSQL is offered at a price point dramatically lower than traditional database vendors, while our ultra-efficient query engine means that operational costs for MemSQL also tend to be lower than the proprietary offerings from the cloud service providers.

2. Deploy in Public and Private Clouds

In addition to a fully-managed SaaS deployment, MemSQL Helios additional deployment modes which bring the flexibility needed to fit diverse enterprise IT environments. The hybrid deployment mode supports private cloud and public clouds (such as Amazon Web Services (AWS), Google Cloud Platform (GCP) or Microsoft Azure). With the hybrid deployment, you run your Helios database cluster in your own VPC (Virtual Private Cloud) and in your chosen region with the Helios administration hosted by MemSQL Cloud Operations. There is multi-tenant sharing at the level of the cloud providers' VMs with isolation for each tenant above that level. The roadmap for Helios includes PrivateLink for customers on Amazon Web Services (AWS), which will further increase the ease of forming connections and increase scalability.

Helios provides a resilient database with cloud-agnostic deployment support on Kubernetes enabled private clouds. You may also avoid cloud lock-in as MemSQL Helios is available across public cloud providers and private cloud environments.

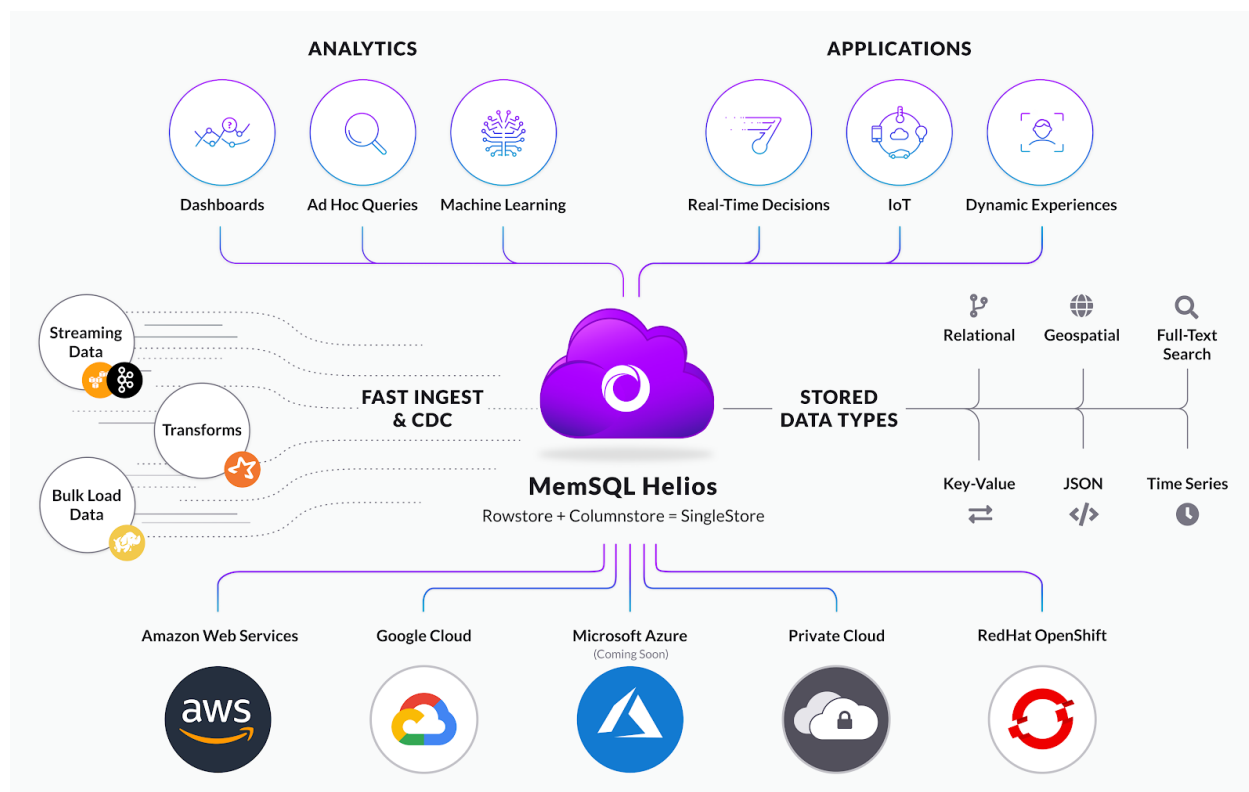


Figure 2. MemSQL Helios Feature Overview

3. Highlights

Security

MemSQL ensures the security for: (i) data in transit and (ii) data at rest.

(i) Data in transit - For all connections to the database MemSQL supports TLS 1.2.

Transport Layer Security (TLS) uses a combination of symmetric and asymmetric encryption focusing on the uses of key pairs, a public key and a private key. The roadmap for Helios includes PrivateLink for customers on Amazon Web Services (AWS), which will further increase the ease of forming connections and increase scalability.

(ii) Data at rest - MemSQL utilises the best practice solution provided by the cloud hosting partner, this is AES-256 for AWS, Google Cloud and Azure. This is an encryption algorithm using a 256 bit key length and is currently the strongest encryption algorithm available.

Scaling, Auto-healing & Resizing

MemSQL Helios is also an elastic database, because you'll be able to grow your cluster or shrink on the fly, and also on demand. All of this is done online, so there's no downtime

when you scale out or scale down. Since Helios is facilitated by, and built on, Kubernetes, users can also leverage other unique features like auto-healing, handling node failures, and rolling online upgrades. The scale-out mechanism of MemSQL Helios is obviously really unique, the way that you can always expand your aggregator or leaf nodes.

Workload Isolation

Enterprises prefer isolating their data and workloads from other businesses. Helios is powered by Kubernetes, ensuring clusters are isolated from each other and guaranteeing both confidentiality and integrity of your data. Some customers host data or adhere to specific regulations that require additional isolation controls. Customers requiring full isolation can obtain a dedicated environment at additional cost.

Administration

MemSQL studio is a powerful management tool that accelerates the administration tasks in MemSQL Helios. It also provides a visual monitoring interface to quickly diagnose and assist query performance tuning. You may quickly see and diagnose query performance bottlenecks and compute resources to ensure optimal performance and availability. The in-built SQL editor enables you to perform all the admin operations including schema design (DDL/DML) and implementation. The status of pipeline jobs can be also monitored through this tool.

Regions where Helios can be deployed.

Currently MemSQL Helios is available on AWS and GCP; we have multiple global regions in both of those platforms, and we have Azure support coming very soon.

Regions for AWS. US East (Northern Virginia), US West (Oregon), and Europe (Ireland)

Regions for GCP. US East (Northern Virginia) and Asia-South (Mumbai, India)

Regions for Azure. Coming Soon

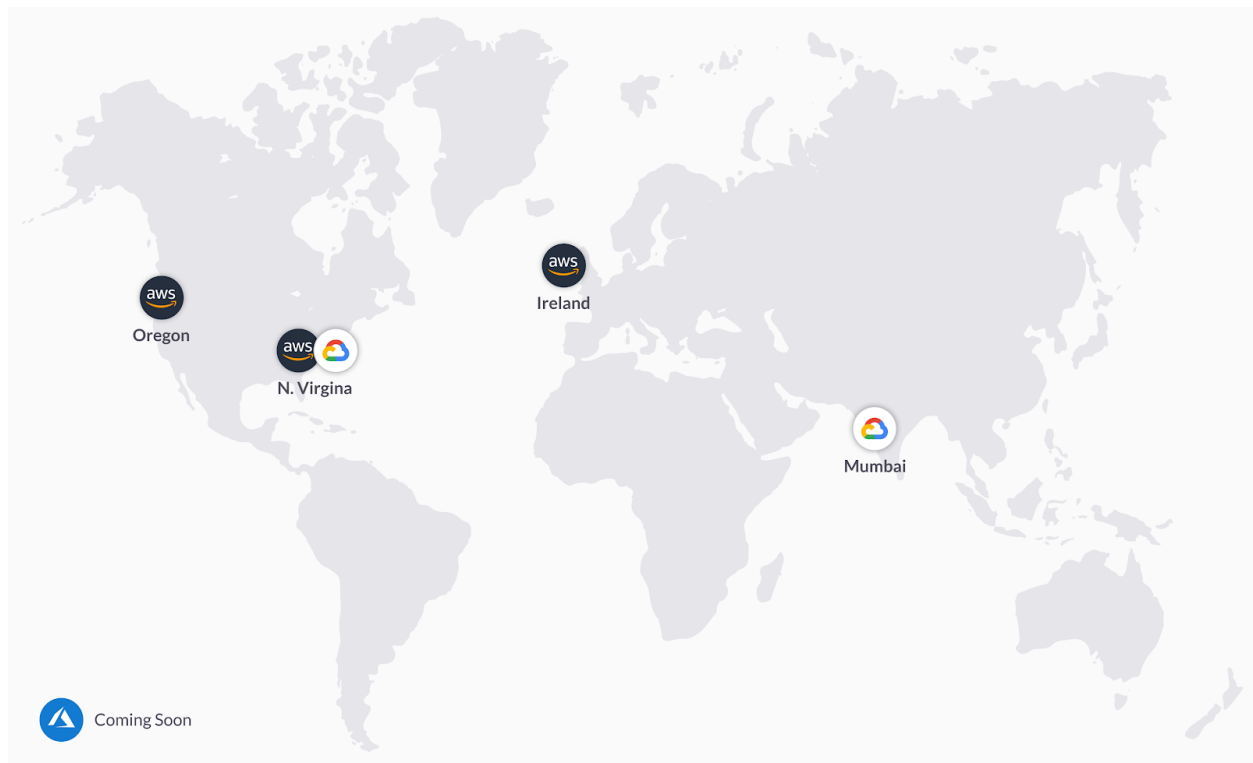


Figure 3. Helios deployment regions

Backup & Recovery

MemSQL Helios automatically backs up your data daily, with a retention period of seven days. It runs in high availability mode, so you always have a live copy of your data, and MemSQL provides data restore services as needed. The data is stored in AWS S3 to provide assurances in case of any disaster incidents. So you can always request a restore from a particular day in the last week or so. In addition, you also have the ability to kick off your own backups whenever you desire. So you can always back up into your AWS S3 bucket, or your Azure Blob storage, and then you can restore from those technologies as well.

4. Customer Benefits

To meet regulatory compliance requirements, Helios supports client connections that are encrypted using transport layer security (TLS) and encryption for data at rest. Depending on the needs of their application, customers have two options for reserving resources with MemSQL Helios. They can either opt to use dedicated, reserved resources, which

cost less and provide stronger isolation guarantees, or they can choose to go with an on-demand model (running side-by-side with other tenants), where cluster usage is calculated hourly and billed monthly.

Key benefits of MemSQL Helios include:



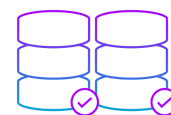
Latency-Free Analytics

MemSQL lets you achieve ultra-fast query response with high concurrency across both live and historical data using familiar ANSI SQL.



Ultra-Fast Event-to-Insight Performance

MemSQL can deliver against the toughest service level agreements using parallel, distributed lock-free ingestion and real-time query processing, which speed performance.



Scale Limitlessly

MemSQL's elastic scale-out architecture, with distributed, massively parallel data processing, delivers consistent, predictable response under high ingest and user concurrency.



Effortless Deployment & Management

As we have all come to expect from cloud services, deployment and upgrades are built in. With MemSQL Helios, you get the full benefits and capabilities of the MemSQL data platform, without having to worry about deployment, management, or maintenance. There's no need to rack servers, script deployments, or manage VMs.



Avoid Cloud Lock-in Through Multi-cloud & Hybrid-cloud Flexibility

MemSQL Helios eliminates the risks involved in cloud vendor lock-in by offering hybrid and multi-cloud deployment through supporting private cloud and public clouds (such as Amazon Web Services (AWS), Google Cloud Platform (GCP) or Microsoft Azure).



Superior TCO

Compared to either legacy databases, or proprietary databases from cloud service providers, MemSQL Helios offers superior total cost of ownership (TCO). MemSQL's unique architecture and high-performance query engine mean that many operational analytics workloads run with far less resource consumption, offering significant cost savings.

5. Customer Success Stories

5.1 [John L. Scott](#)



*One of the largest real estate brokerage companies
in the Pacific NorthWest.*

Use Case

John L. Scott leverages MemSQL to re-architect their existing real estate reporting and listing website to provide additional capabilities and improved performance for their brokers and customers (interactive searches, complex integrations, geo-spatial analytics).

Before MemSQL

- Performance issues with legacy platforms
- Inability to achieve interactive searches and complex analytics using geospatial function and datatypes to provide search functionalities similar to their competitors
- Self-managing multiple database platforms (MySQL and other data warehouse solutions) adds up the maintenance tasks and overall complexity
- Federated analytic information was difficult to extract across the multiple database technologies

Benefits after MemSQL Helios Implementation

- Collapsed three different database technologies into one, which is MemSQL Helios
- Faster query performance than prior solution
- Overall 3x to 10x performance improvement
- Helios offered about a 60% savings as compared to the old database environment
- Managed service aspect of Helios offered about .5 FTE in savings for MemSQL alone.
- Migrating and consolidating into a single database improved the ability to provide accurate, relevant analytics, which was not previously available across 3 platforms.

Positive Business Outcomes

- Helios cloud offering aligned very well with John L. Scott's IT strategy

- Improved SLA's to business users/brokers/customers
- Valuable analytics not available across multiple database technologies
- Reductions in both operational and personnel costs associated with on-premise IT
- Increased availability and scalability delivered by technology experts
- \$312,648 savings over three year period

You may watch [this video](#) to learn more about how John L. Scott meets expanding data needs with MemSQL Helios.

5.2 [Medaxion](#)

medaxion:

*Provides advanced information tools for use in the operating room.
Their accessible, easy-to-use solutions improve financial performance,
enhance quality and optimize clinical teams.*

Use Case

Medaxion has to deliver in-the-moment analytics to their customers in the health care sector. MemSQL Helios platform enables real-time decision-making capability for their MedTech application.

Before MemSQL

- MySQL was used as underlying database to perform analytics using Looker
- Unable to meet the increased demand of queries coming into Looker
- Combination of Looker and MySQL couldn't handle the data volume and analytical SLA requirements
- Analytical reporting was incredibly slow

Benefits after MemSQL Helios Implementation

- Fast, scalable SQL delivers dramatic performance gains with no learning curve
- Compatibility with MySQL wire protocol means skills and tools move smoothly from MySQL to MemSQL
- MemSQL Helios elastic cloud service eliminates operational headaches, frees up skilled people

- Near-real-time results delivery to the field leads to faster business growth
- Operationalized analytics able to drive revenue optimization and customer experience

Below diagram shows the reference architecture before and after MemSQL Helios implementation:

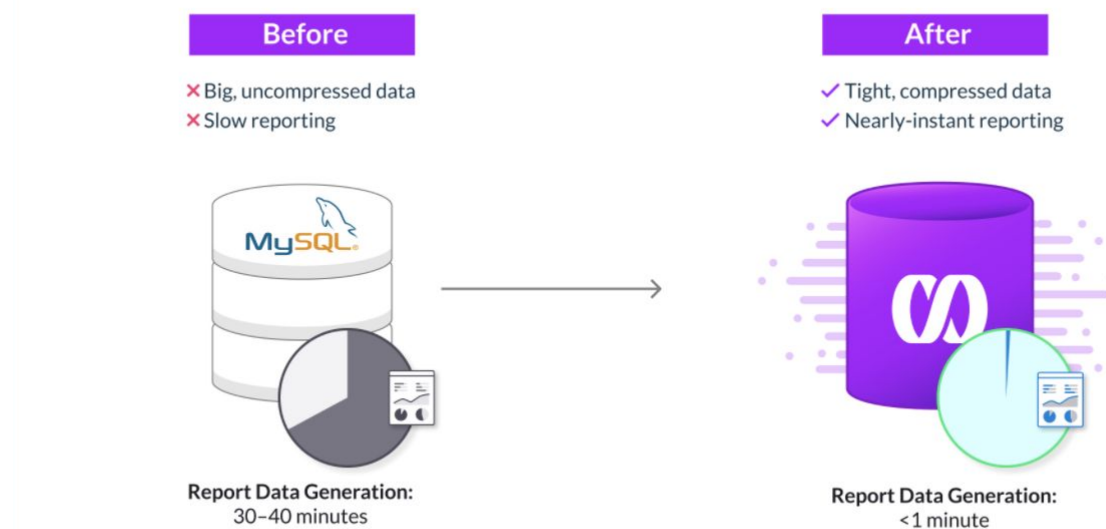


Fig 4. Architecture before and after MemSQL Helios

Positive Business Outcomes

- Data analysis that takes 30-40 minutes in the past, now finishes within a minute
- Most of the queries return under a second
- Frees from a lot of operational overhead, while empowering their customers (anesthesiologist users).
- Scale on-demand without any impact on database performance
- Reduced the elapsed time to less than 30 seconds between a data event and a reportable fact.
- Significant operational savings and simplicity for the team

Please refer to this [case study](#) for more information.

6. Conclusion

As the amount of data across modern data-driven organizations grows, the challenges involved in managing data become more complicated. You need a highly-performing, self-managed database in the cloud, that is robust and scalable enough to meet the demanding requirements of your operational and analytical workloads.

MemSQL Helios, a fully-managed service offering of MemSQL software, stands apart, with its unique excellence in distributed cloud-native architecture, by delivering ultra-fast performance and scalability for cloud workloads. Being able to ingest millions of events per second from S3, Kafka, Hadoop, Spark, Azure blob and more, with query response time in milliseconds, MemSQL Helios is an ideal solution for use cases such as real-time and near-real-time reporting, historical analysis, and operational analytics. Many enterprises are leveraging MemSQL Helios for building smarter applications to solve some of the complex big data problems in our data-driven world.

With MemSQL Helios now publicly available, we hope that you can experience it by following [Self-PoC on MemSQL Helios guide](#), and share your success story.

Contact Sales

Test drive MemSQL Helios at memsql.com/helios.

Please fill out the [form](#) to be contacted by a MemSQL sales representative. For immediate sales help, email us at team@memsql.com.