



DATA ANALYTICS

# The Qlik Analytics<sup>®</sup> Engine

The speed and power  
to bring your data to life.

## THE LIMITS OF QUERY-BASED TOOLS

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When a business user looks at data they usually end up with more questions than answers. In order to make an informed decision, people have to ask and answer follow-up questions — going through a process of questioning, evaluating, and then questioning again — until the right insight is fully uncovered and understood. This chain of thought reasoning is the key to true understanding, and it happens over and over in varying, unpredictable ways for hundreds of decisions each day. It's critical you support this at high speed and scale, using all your data, and in a cost-effective way.

Almost all of the analytics and AI tools on the market today are built on top of some form of query-based architecture. That's a major flaw. SQL and relational databases were never intended to support interactive analytics, and when used for exploring data, their rigid architecture results in limited insight, poor performance, and high cost — especially at scale.



### SQL and RDBMS

**x Limited insight**

**x Poor performance**

**x High cost**

With query-based BI tools, data sources are brought together using SQL joins, which can result in data loss and inaccuracy. Assumptions must be made in advance about what types of questions people will have, and there is little ability to pivot analysis to an adjacent question or dataset. Worse, there is no retention of context from question to question, so it's hard to follow a chain of thought. Users are limited to simple filtering on top of partial views of data, and excluded values are simply filtered out, losing critical insight. As the system scales, performance will slow and costs will skyrocket, especially when trying to handle large volumes of users and questions.

# The Qlik Analytics Engine: Built for Interactive Analytics

Qlik offers an entirely different analytics technology. Designed specifically for interactive, free-form exploration and analysis, this powerful engine lets you ask questions literally anywhere and see the impacts of your selections in all surrounding analytics. You can see the relationships in your data, including what's related and unrelated to your selections. You can search across all your data to refine context. You can access all your data at all times, across all your data sources, from the highest-level summarization down to the full transaction-level detail. And with industry-leading performance, calculations are fast and efficient, no matter what context is set, how complex the data is, or how many questions there are. Only Qlik can deliver this combination of speed, flexibility, and quality of insight.



## What makes Qlik's engine technology so powerful?

### Three major capabilities:

#### All Data Unified

Bring together all your data, from all your different sources, without leaving any data behind, getting anything wrong, or having to perfectly model it in advance.

#### Context-Aware Analytics

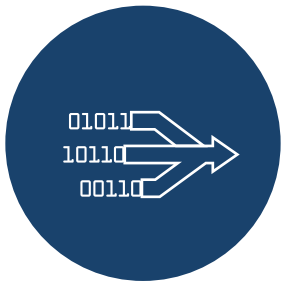
Deliver incremental insight to support chain-of-thought reasoning, retaining context from question to question and revealing both "what is" and "what is not."

#### Fast Calculations

Deliver high-speed, cost-efficient analytical calculations for users and AI, even when scaled to massive query volumes.

## The Qlik Analytics Engine

- ✓ All Data Unified
- ✓ Context-Aware Analytics
- ✓ Fast Calculations

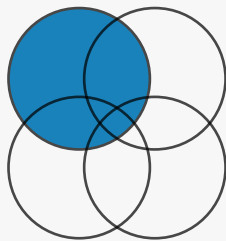


## All Data Unified

Query-based tools struggle when combining large numbers of data sources. Because of the way SQL joins work, they require primary and secondary data sources to be defined. This results in an intersection of data, and data can be left behind or miscounted.

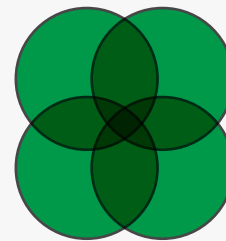
Qlik is different. Our analytics engine fully combines all your data — even imperfect data — from large numbers of disparate sources without suffering data loss or inaccuracies. It achieves the equivalent of what’s technically known as a “many-to-many full outer join,” and generates new views dynamically as users explore. Simply put, this allows users access all their data, from all their sources, at all times.

### Query-Based Tools



- You don’t know what’s been left behind.
- You don’t know what has been counted or how often.

### The Qlik Analytics Engine



- No data is left behind.
- No data is miscounted.

The Qlik Analytics Engine allows imperfect data to be loaded without having to be fully cleansed and modeled in advance. This helps expose areas of your data and your business where issues may exist and value can be created. Users can even create new views and hierarchies on the fly, without having to pre-aggregate data in advance, in response to new questions.



## Context-Aware Analytics

With the Qlik Analytics Engine, both people and AI can explore and analyze freely, following unique chains of thought without restrictions or boundaries. **Here's how:**



- Users can make selections within all visualizations, tables, charts, and other objects



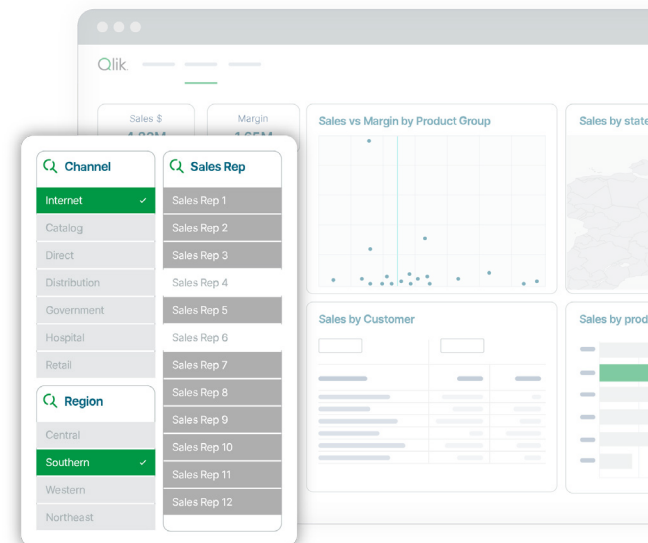
- Or they can use global search to refine context and select combinations of data



- After each refinement, the engine instantly responds by:
  - Delivering fast, incremental calculations for all analytics based on the new context (selection state)
  - Highlighting associations in the data values using green (selected), white (related), and gray (unrelated)

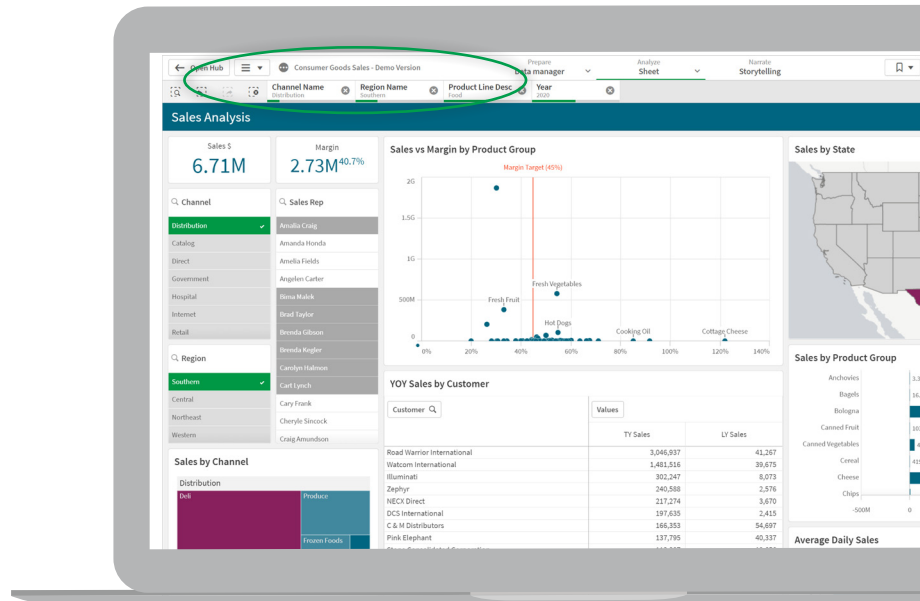
Because the engine dynamically calculates instead of pre-defining queries, users can pivot their thinking to new ideas or views of data. This means any user can ask any question, at any level of detail, without being limited by what developers thought of in advance.

Users also have the ability to see both related and unrelated values in their analysis, relative to their selections. Unrelated data often conveys the most impactful insights — products that didn't sell, for example, or customers who didn't buy — helping users uncover hidden areas of opportunity or risk. With query-based tools, these values are simply filtered out, leaving people with only a partial dataset and an incomplete perspective.



With Qlik, whenever a user makes a selection or performs a search, all visualizations, analytics, and associations are instantly updated to the new context. That's because the Qlik Analytics Engine is context aware, maintaining the selection state for all analytics from question to question, across an entire application.

This global context gives people the ability to understand the impact of their questions on surrounding analytics, at different levels of detail, at the speed of thought. Users can immediately spot potential areas of interest, think of new questions, and continue to explore further. With query-based tools, you have to re-run queries over and over to simulate this experience, but it quickly breaks down. There is no central, context aware engine.



A leading global bank and investment firm discovered nearly \$20 million in mortgage pipeline that wasn't associated with any particular loan processor. These mortgages showed up "in the gray." The firm immediately pursued the lost pipeline, generating tremendous value from a single discovery that wouldn't have been possible with query-based tools.

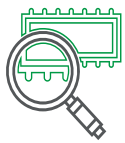


## Fast Calculations

The Qlik Analytics Engine is built for speed. It dynamically calculates analytics and reveals associations as quickly as users can think of questions. With instant responses to selections, people can get the answers they need without having to wait, allowing them to continue their thought process and explore further. And it scales effortlessly – providing industry leading calculation speed and cost efficiency even at massive query volumes. This means hundreds of more-informed decisions each day.

In 2025, BARC, a leading independent analyst firm, conducted a comprehensive performance benchmark study comparing Qlik and Power BI using real-world scenarios. Their findings show Qlik consistently delivered 3x faster response times and 2x the scalability. According to BARC: “Despite Power BI’s tremendous market popularity, the benchmark results show clear limitations

in consistency and efficiency when compared directly to Qlik under identical conditions. Qlik demonstrated very consistent performance and interaction efficiency, leading to higher measured end-user productivity and scalability that proved more predictable under increasing load.” For more information, see the [BARC website](#).



## Under the Hood

The Qlik Analytics Engine achieves an unmatched combination of speed and flexibility that simply isn’t possible with query-based tools. How? By combining several unique technology innovations — including compressed binary indexing, logical inference, and high-performance dynamic calculation.

### Compressed Binary Indexing

Compressed binary indexing is the process that our engine uses to load and store data, creating a compressed, multi-table in-memory data store, with an associative index optimized to support analytics calculation. This reduced, optimized data footprint is created by using binary pointers, storing each unique value only once and symbol pointers everywhere else. The engine maps all the relationships between the values in the data, resulting in a highly optimized data store supporting unmatched performance and scalability for analytics calculation.

This approach also provides a number of advantages for developers and organizations. First, due to binary compression, data loads extremely fast and has a smaller footprint in-memory. Second,

due to the engine's ability to auto-join tables, content creators don't have to worry about joining tables in SQL statements when building analytics. Views are created automatically, and therefore correctly, as users explore.



### **Logical Inference**

Logical inference is the process in which the engine determines related and unrelated data values, relative to user selections, after each click. It leverages the mapping in the compressed binary index to determine what's related and what's not. It then flows the included dataset into all analytics for dynamic calculation, and exposes related and unrelated values to the user in a green/white/gray color scheme.

This incredibly important process happens in the background without any additional effort required for developers. The benefits are all about context, as analytics are updated together from question to question with no need to try and keep multiple queries in sync. Additionally, the user gets unmatched exploratory power and insight, with the ability to make selections anywhere and see the impacts everywhere in surrounding analytics and data relationships.




### **High-Performance Dynamic Calculation**

High-performance dynamic calculation is the process of analytics calculation in our engine, based on a set of record-level data determined by logical inference. Our engine calculates at the lowest level of granularity with no pre-aggregation for maximum flexibility, storing results in hypercubes. It leverages advanced caching techniques to maximize speed across the overall process.

Through highly optimized compressed binary storage, and reduced (included) datasets determined by logical inference, calculation speed in Qlik Sense® is fast, efficient, and greatly outperforms SQL-based systems. And our engine maintains this level of performance when scaled to large, concurrent query volumes and complex datasets.

This analytics engine technology is our core advantage — and can be yours, too. And if you think it's important for users now, just wait until AI agents are demanding thousands of analytical insights a minute. How will you support this at high speed and scale, without breaking the bank?

**The Qlik Analytics Engine is your answer. It's built for this.**



A leading jewelry and accessories retailer reduced their cloud data warehouse costs by a remarkable 75% after deploying Qlik to handle analytical questions rather than using push-down SQL queries. This shift improved performance, predictability, and flexibility of insight while streamlining FinOps spend.



## About Qlik

Qlik transforms complex data landscapes into actionable insights, driving strategic business outcomes. Serving over 40,000 global customers, our portfolio leverages advanced, enterprise-grade AI/ML and pervasive data quality. We excel in data integration and governance, offering comprehensive solutions that work with diverse data sources. Intuitive and real-time analytics from Qlik uncover hidden patterns, empowering teams to address complex challenges and seize new opportunities. Our AI/ML tools, both practical and scalable, lead to better decisions, faster. As strategic partners, our platform-agnostic technology and expertise make our customers more competitive.

[qlik.com](https://qlik.com)