

# Dive Deeper into the Black Forest



CRAXEL

# We Need New and Better Math

To tackle the big data problems plaguing businesses in areas including ad-tech, cybersecurity, the metaverse and analytics at scale, we need to think differently. We need new math.

The last 50 years of computer science has failed to provide a data infrastructure that can efficiently organize data for rapid ad-hoc query at scale. Instead, the response to exponentially growing data forces organizations to choose between solutions that trade important properties for somewhat better performance or that apply unsustainable brute force techniques to mask inherently inefficient designs.

The root of this challenge is how to rapidly and efficiently organize data at any scale. If there was an effective way to do this the shortcomings of today's data management solutions could be avoided. Historically, data indexing schemas have been used to keep data organized for efficient search. These schemes were developed in a different era of computing when data volumes and velocities were exponentially lower. Unfortunately, their mechanisms are too slow and costly to be used at scale.

Because of this, many data solutions fail to support the operational needs of modern data-centric businesses: NoSql and other recent database models have sacrificed many properties needed by many real-world workloads; Cloud-only options have unpredictable price and performance beyond TBs of data; Data Lake query engines are too slow and expensive to power large-scale and interactive analytics; and legacy index based approaches are inflexible and can quickly become prohibitively expensive to scale.

The current generation of data management solutions simply do not provide the scalability, performance, compute, and cost efficiency today's data-centric organizations require.

Craxel has solved for these limitations by developing a new way to organize data at any scale. Solving for these fundamental scale, performance, and efficiency problems improves almost everything that happens within a data infrastructure. The capabilities include rapid and complex query for all data types, high availability and resilience, transactional consistency, support for decentralization, and unprecedented security capabilities.

Craxel's breakthrough in computer science is a new hash algorithm that solves the problem of maintaining indexes efficiently at any scale. It can do this because it is a constant time algorithm with a novel solution to the hash collision problem while supporting range, graph,

time series, spatial and multi-dimensional queries. No other hash algorithm that can do this is known to exist.

## Modern Data Management Solution Requirements

As data grows exponentially, our management systems need to support ad-hoc queries to enable rapid operations on essential data. It must empower engineering and product teams to execute the millions of queries needed to extract actionable insight from petabytes of data. It needs to be elastic to scale based on user requirements and support high levels of concurrent use without creating an unacceptable loss in performance.

To accomplish this, modern data management solutions should be:

Compute and Cost Efficient: Prior generation indexing methods like B Trees and R Trees are impractical at scale. Order(N) solutions like the cloud data platforms built on massively parallel processing are not cost and energy efficient enough for exponentially growing data. The only credible path forward must be built on new math that can support the endless scale requirements today's data-centric organizations face. Adopting innovation using precision analytics from ad-hoc query and highly selective data access as opposed to wasteful brute force can reduce compute resource consumption while increasing the speed of queries.

Incredibly Fast and Efficient Ad-Hoc Query Capable: Some of today's most mission-critical applications demand constant time access and ordering to data. We need math that provides constant time access that would make new data available sooner and selective queries run as fast or faster than used to while using dramatically fewer compute resources.

Consolidated and Autonomous: A consolidated approach designed to comprehensively address both production and analytics workloads at scale simplifies the integration stack. Similarly, implementing a truly self-optimizing process eliminates the need to fine tune traditional databases. This also simplifies product and engineering operations and keeps data organized, always.

Natively Deployed: For ease of integration, data management solutions must be compliant with industry standard interfaces and plug seamlessly into existing environments. Migration for new teams must be quick, and easy by integrating with industry standard interfaces at a single click or SQL command, allowing organizations to adopt new-age technology with absolutely no regrets.

Exa-scale Ready: Many companies already have terabytes and petabytes of data. Meanwhile their data requirements are growing at an exponential rate, and there's no sign of it slowing down. To be useful, the infrastructure where data at this scale is organized must be able to support a range of query types and be compute efficient enough for sensible and predictable performance.

Highly Concurrent: As consumption of the data infrastructure increases, it must be able to support growing numbers of concurrent users and concurrent queries without hindering performance. Unlike traditional data management solutions, in a selective access approach far less data needs to be scanned, allowing the infrastructure to support substantially more concurrent use without a significantly impacting performance.

Highly Secure: For mission-critical applications, it's essential to guarantee security through encryption instead of mere software. Trusting strong encryption instead of breakable, buggy, and complex software simplifies everything related to security.

## Summary

The future of data management will be run by new, better math. Craxel's has found it and built the products needed to bring the future of data management to your organization today. We are enabling unprecedented speed, efficiency, and scale with unmatched security and simplicity for mission-critical workloads across industries.

We'd enjoy the opportunity to dive deeper with you on some of these capabilities. Please reach out to [info@craxel.com](mailto:info@craxel.com) to request more in-depth content and to learn about our solution.

## For more information

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Online [www.craxel.com](http://www.craxel.com)

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## About Craxel

Craxel is a trusted provider of highly performant data infrastructure to the AdTech, cyber, financial service, metaverse, and big data analytic sectors. Built to address the big data problems current vendors have failed to solve at scale.

