



SPECIAL REPORT

POWER REAL-TIME TELCO NETWORK OPERATIONS WITH EXTREME ANALYTICS

How OmniSci's accelerated analytics, intuitive data visualization, and extreme usability help telecommunications companies improve customer service and satisfaction.

Imagine that someone is pouring a giant bucket of water over your head. How much liquid could you actually drink, and how much would rush past your mouth, wasted, onto the floor?

For today's telecommunications companies, data flows like that bucket of water. Thanks to billions of social and Internet interactions, mobile usage logs, sensor streams, and transactions, data is being created faster than ever. What's more, capturing relevant insights from a torrent of data is as difficult as gulping from those gushing streams of water.

Although organizations have made a huge investment in collecting and storing data, they typically lack the ability to gain value from their data. Mainstream CPU-based hardware and analytics solutions are too slow and difficult to scale. Most analytics tools are not powerful enough to analyze today's big data in a timely way.

To cope with huge data volumes, many telcos sample the data, leading to incorrect assumptions or causing decision-makers to miss vital new insights. Even when firms are able to produce data-driven insights, results are often outdated, incomplete, and lacking in detail.

This is bad news for operations analysts, data scientists, and business leaders who want to access large datasets and interrogate data interactively, drilling through data and receiving immediate answers to questions. Running reports overnight and making business decisions based on yesterday's data is no longer enough for companies to differentiate themselves competitively.

Instead, organizations need up-to-the-minute information and instant insights. Telcos want to be able to quickly identify network anomalies and resolve them before customers are affected, improving service availability and network reliability. Users need to drill down through network assets – to individual cell towers or users – to identify equipment malfunctions or mobile devices that are causing abnormal loads on the network. Analysts need to query and explore call detail records, enriching them with geographical insights. They also want to respond immediately to alerts of cyber breaches, to patch vulnerabilities before data is compromised.

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ADVANCES IN ANALYTICS TECHNOLOGIES

Fortunately, technology is changing to help telcos better meet their data analysis needs. On the hardware side, graphics processing units (GPUs) are accelerating analytics and visualization. GPU-based solutions offer massive parallel computing power that is designed for extreme scale and speed. These solutions are suitable for large data volumes and high-velocity processing of structured data.

GPUs have a long history of applications involving massive parallel processing, complex image rendering and data-based visualization, such as high-end computer gaming and supercomputing. They also are the primary hardware technology behind machine learning and deep learning initiatives.

Yet it's not necessary for every telco to make a huge investment in this powerful hardware. Thanks to the growth of cloud-based, software-as-a-service (SaaS) offerings, companies can benefit from the power of GPUs in managed cloud services. These offerings can scale to billions of records while still offering sub-second query performance.

OMNISCI: RAPID ANALYSIS OF DATA AT EXTREME SCALE

To overcome the challenges of speed, scale, and real-time interaction, many leading telcos are choosing GPU-based analytics technology from OmniSci. The OmniSci Extreme Analytics™ Platform offers unique business value through five key advances.

1. GPU-Accelerated Analytics

OmniSci technology harnesses the massive parallel processing and visual rendering power of NVIDIA graphics processing units. Based on technology developed during foundational research at MIT, OmniSci supports data throughput of near 6TB per second on a single server. Adding more servers in a distributed configuration scales throughput linearly.

The ability to query and explore allows users to ask more questions and dig deeper into the data as quickly as their curiosity allows. By being able to visualize many billions of rows and receive answers to questions in milliseconds, OmniSci delivers a “speed of thought” experience for users.

With the speed and power to support a more interactive, immersive, and engaging user experience, the OmniSci analytics platform can change the way that telcos conduct operational analytics, geospatial analytics, data science, and big data exploration.

2. Geospatial Functionality for Enhanced Location Intelligence

OmniSci offers native support for geospatial data tightly integrated with a GPU-based rendering engine. This technology helps analysts perform large-scale, interactive geospatial analytics. It also enables unparalleled visual interactivity for location intelligence use cases.

By processing spatiotemporal data at granular levels, OmniSci provides telecommunications analysts with the power to query and visualize data in real time. Geospatial features natively support geometry and geographic data types, such as points, lines, polygons, and multi-polygons as well as key spatial operators.

Users can query and visualize up to millions of polygons and billions of points with unprecedented speed. They can also calculate the distances between millions of objects in milliseconds or identify geospatial locations inside other geographies and calculate relevant statistics. Interactive visualization features make it easy to instantly cross-filter data by individual polygons or groups.

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3. Intuitive Data Visualization

Easy pattern visualization makes data analysis far more valuable. OmniSci offers features that allow users to create interactive dashboards, display dozens of distinct attributes, and instantly correlate and cross-filter those attributes.

Analysts can create standard visualizations, such as line, bar, and pie charts. They can also display complex data visualizations rendered in geo-point maps, geo heat maps, choropleths, and scatter plots. Dozens of distinct datasets can be displayed in the same dashboard, helping users uncover surprising multi-factor relationships. And all visualizations can be dynamically filtered together for multi-dimensional insight into large datasets.

Users can click on any dimension in a chart, map or graph and OmniSci redraws all related visualizations to reflect the new context. Through this connectivity, the solution helps users quickly find correlations and outliers in the data. The flexibility of the visualization tool also allows analysts to see what matters most to them, in the location(s) that are most important.

OmniSci offers the world's fastest open source SQL engine and visual analytics platform. SQL queries on tables with billions of rows return results in milliseconds, and those results are displayed visually with similar millisecond latency. This means that OmniSci users can ask and answer 100 questions in the time needed to complete one query on a legacy, CPU-only analytics platform. As a result, analysts and data scientists can monitor and respond to changes in real time. And open source technology prevents vendor lock-in.

4. Exceptional Usability

Some analytics solutions are powerful, but using them to gain insight is incredibly difficult. Complex, highly technical interfaces demand advanced user training, while certain tools require extensive knowledge of advanced query languages. These products are suitable for the relatively few advanced analysts and statisticians, not for the millions of business analysts or decision-makers who need answers every hour.

The OmniSci solution is engineered for exceptional usability. The intuitive user interface ensures that analysts can iteratively slice and dice data, exploring questions at the speed of thought without the need for up-front training and certification. Users easily engage with OmniSci, dive deeply into their data, and uncover valuable business insights on an ongoing basis.

Analysts can also graphically represent data in just a few clicks. They can easily share their dashboards and insights across the business, improving cross-functional collaboration and decision-making. OmniSci helps anyone answer questions as if they were a data analyst.

5. Cloud-Based SaaS Offerings

For telcos that prefer analytics as a service, OmniSci offers a managed cloud service that can scale to billions of records while providing sub-second query performance. The service is offered with pricing flexibility that scales dynamically to structured datasets of many billions of rows.

The OmniSci SaaS offering provides frictionless access to and use of the solution. OmniSci handles tasks including automated provisioning, compute optimization, support, monthly upgrades, and simplified scaling. Because OmniSci manages the GPU clusters, telcos can minimize end-user costs and reduce IT maintenance tasks. This benefit is especially valuable for lean IT teams and those with little GPU experience.



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USE CASE: NETWORK PERFORMANCE OPTIMIZATION



The largest wireless telecom provider in the United States, Verizon Wireless, offers products and services to nearly 150 million subscribers. The company's network team works to maintain and improve network reliability for voice, data, and voice over IP (VoIP) calls. However, analysts found it difficult to quickly analyze the terabytes of data streaming across the network each week from multiple platforms.

Challenges included slow-performing analytics tools and difficulty visualizing issues within huge volumes of network data. These problems made it difficult to address network issues in a timely fashion, contributing to customer dissatisfaction.

Verizon Wireless quickly deployed OmniSci, with a goal of increasing the performance of its operational analytics. In fact, report generation quickly accelerated from 20 minutes to just seconds. But that was just the start.

As the team became more familiar with OmniSci, analysts learned they could process billions of rows of data in real time, helping them better monitor network performance and maintain network reliability. Using the intuitive GUI, analysts can spot long-term trends quickly – in just moments instead of the 45 to 60 minutes previously required to review network logs.

The OmniSci Immerse front-end visualization system makes it easy for analysts to dig into the data. The powerful features for cross-filtering and visualization are intuitive, providing analysts with a short learning curve. In fact, many users create their own dashboards in just minutes, allowing even untrained employees to rapidly discover important data-driven insights.

OmniSci helped Verizon Wireless realize several valuable benefits, including:

- Faster identification of issues and trends, speeding problem resolution and enhancing customer service
- Accelerated decision-making thanks to improved user visibility, including dashboards that allow even non-data scientists to create new views of data
- Enhanced ability to see patterns across the enterprise, including other types of data beyond network events and logs
- Expanded use of analytics by new users, resulting in fresh insights
- Support for new services, such as WiFi services in sports stadiums
- Savings of time and money

Looking ahead, Verizon Wireless plans to extend the OmniSci solution to more interfaces and use cases, which will help more users leverage the data. By helping analysts discover new insights and opportunities to prevent or rapidly address problems, the tool will further enhance customer service.



USE CASE: PRECISION LOCATION-ENABLED SERVICES AND GEOSPATIAL INSIGHTS

SKYHOOK°

Mobile positioning and location provider Skyhook Wireless enhances the accuracy of global positioning systems to help refine user and device locations. To deliver precise location and geospatial insights to its Fortune 100 customers, Skyhook processes up to 10 billion transactions per day.

Skyhook has used many database and geospatial technologies, but data processing was painfully slow for very large data sets. Those mainstream analytic solutions were unable to display huge amounts of geospatial data. Unreliable point mapping forced the company to down-sample data and display inordinately small slices of data.

To allow both internal and customer analysts to process and visualize data at high speed, Skyhook deployed OmniSci. By providing the power and performance to map billions of data points on real-time interactive geospatial charts, OmniSci helped Skyhook use analytical and visualization tools that deliver rapid insight – without sampling or pre-processing the data.

The advanced GPU-based in-memory management system delivers highly reliable performance. Data ingestion is simple, allowing analysts to efficiently use the solution for both large and small datasets. Intuitive OmniSci Immerse dashboards allow users to dig deeper into the data and gain more valuable insights. Non-technical users can view and analyze the data and see the impact on results when they change parameters. The data presentation is also customizable.

OmniSci helped Skyhook gain important benefits:

- Dependable performance, allowing users to intuitively visualize and interact with huge volumes of data
- Improved accuracy of point mapping, helping customers develop a competitive edge through geospatial insights
- Deeper analytical depth, data interactivity, and customizable dashboard displays that allow analysts to discover new insights and present them visually to customers
- Cost savings, by enhancing analyst productivity and using a cloud solution to increase the efficiency of the IT infrastructure
- Support for new solutions and service offerings

Going forward, Skyhook plans to seek new ways to expand its use of OmniSci and explore options for integrating the OmniSci solution into its own technology stack.

USE CASE: GEOSPATIAL ANALYTICS FOR COMPETITIVE ANALYSIS

A North American technology company provides crowd-sourced data on mobile network performance to telecommunications companies, who use the information to analyze coverage, user experiences, and investment opportunities. The firm ingests huge data volumes from 250 million mobile devices globally. Due to rapid business growth, the company's existing data and business analysis solutions could no longer effectively manage data at scale. Data scientists needed to pre-aggregate data and run queries overnight, increasing the time to insight. Slow load times and dashboard navigation during demonstrations caused customers to lose interest in new product offerings.

The firm deployed OmniSci Core—the scalable, open source analytics database—to power its own product as an OEM. Now the company collects more than 10 billion measurements daily, which can be queried in real time. Pre-aggregation and down-sampling of data are unnecessary, and there is no loss of granular detail.

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OmniSci's power and ease with geospatial analytics allow the company to drill into any geographic area to analyze network performance, signal strength, download speeds, signal-to-noise ratio, and quality. Users can instantaneously deep dive into billions of rows of data, helping engineers quickly view information and diagnose issues with the company's data and partner networks. Analysts can even review the performance of individual cell towers or connection technologies in seconds.

Using OmniSci, the company realized several critical benefits:

- Faster generation of customer reports, from one day to just minutes
- Increased interactivity of the user experience, improving analyst engagement
- New granularity of analysis that allows customers to discover valuable business insights
- Enhanced revenue generation by building new analytics-as-a-service solutions for customers
- Greater value for customers using the insights delivered by OmniSci-enabled analytics
- Quick time to value with the cloud-based OmniSci solution, which was deployed in a day

In the future, the company plans to collaborate with OmniSci to develop new features that will meet the needs of its telco customers.

LEARN MORE

These three use cases effectively demonstrate how telecommunications companies are using the Extreme Analytics Platform from OmniSci to create critical business insights that improve operations, identify new geospatial-enabled business opportunities, and efficiently explore big data. By enabling data-driven insights that support better decision-making, OmniSci is helping these organizations better serve customers – increasing satisfaction and reducing churn.

For more information about how OmniSci helps telco companies differentiate themselves and compete more effectively, visit <https://www.omnisci.com/industry/telecommunications/>.



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OmniSci is the Extreme Analytics™ Platform. Organizations use OmniSci to rapidly find insights beyond the limits of mainstream analytics tools. Because OmniSci delivers zero-latency querying and visual exploration of big data, analysts and data scientists can dramatically accelerate operational analytics, data science and geospatial analytics. Originating from research at MIT, OmniSci represents a technology breakthrough by harnessing the massive parallel computing of GPUs. OmniSci Technologies Inc. is headquartered in San Francisco, and the platform is available globally via open source, cloud and enterprise license options.