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USPS DEPLOYS KINETICA TO OPTIMIZE ITS BUSINESS OPERATIONS

THE BUSINESS

With more than 600,000 employees and a fleet of 215,000 vehicles, the United States Postal Service (USPS) is the single largest logistic entity in the country, moving more individual items in four hours than the combination of UPS, FedEx, and DHL move all year.

In an effort to streamline operations, lawmakers sanctioned the Postal Accountability and Enhancement Act of 2006 to address the technological deficiencies of the current system. The Act called for upgrades to the archaic server and storage platforms, and the adoption of Big Data techniques to improve the ability to respond to market dynamics, enhance competitive practices, and accelerate the delivery process.

Faced with increasingly limited resources and progressively tech-savvy customers, the USPS is tasked with efficiently processing, tracking, and delivering mail on a limited budget.

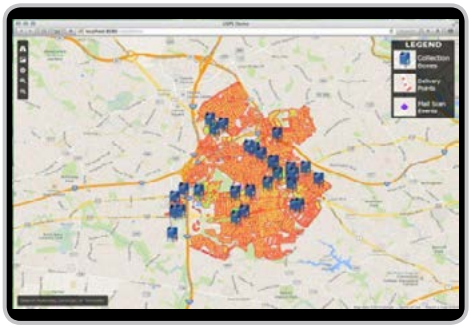

FIGURE 1: A REGION SHOWING A HEAT-MAP OF DELIVERY POINTS WITH COLLECTION BOX ICONS REPRESENTING MAIL-DROP.

THE CHALLENGE

So how does an organization that makes daily deliveries to more than 154 million addresses using several hundred thousand vehicles and employees create efficiencies based on visual near-real-time data? The United States Postal Service (USPS) turned to Kinetica and its GPU-accelerated database as a first step in improving their ability to improve safety, efficiency, and service without overspending.

Postal customers these days expect sophisticated services like just-in-time supplies, tracking and delivery updates, and dynamic shipment routing. The USPS knew they needed to improve their end-to-end business process performance while reducing costs at the same time. They decided to outfit its entire workforce of USPS carriers with a device that emits its exact geographic location every minute. Armed with this location data, the service aims to improve various aspects of its massive operation, including improving carriers' route efficiency.

To fully optimize data usage, the USPS is rapidly replacing its traditional legacy systems with revolutionary high-performance computing (HPC) solutions. An in-memory relational database was its first choice. But when that technology proved too costly and complex, the USPS looked to KInetica and the use of graphical processing units (GPUs). Kinetica is helping the USPS turn their data into knowledge, enabling them to improve efficiency while saving time and money.

For the first time in history, USPS is able to see their entire mobile workforce in real time.

KINETICA SOLUTION

The USPS runs Kinetica on a large cluster composed of 150 to 200 nodes. Each node consists of a single X86 blade server from Hewlett-Packard Enterprise, half a terabyte to a terabyte of RAM, and up to two NVIIDIA Tesla K80 GPUs. The system went live in 2014, and was bolstered with a high availability redundancy in November of that year.

With those 200,000+ USPS devices emitting location once every minute, that amounts to more than a quarter billion events captured and analyzed daily, with several times that amount available in a trailing window.

USPS' parallel cluster is able to serve up to 15,000 simultaneous sessions, providing the service's managers and analysts with the capability to instantly analyze their areas of responsibility via dashboards and to query it as if it were a relational database.

And Kinetica has been running since with 5 9's uptime.

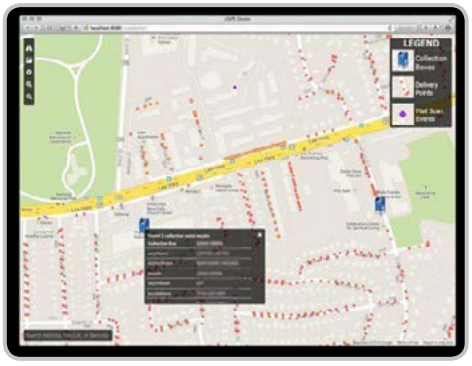

FIGURE 2: ZOOMED IN AREA SHOWING COLLECTION BOX METADATA WHEN SELECTED.

FIGURE 3: TERRITORY REASSIGNMENT TOOL SHOWS TWO ROUTE BOUNDARIES AND THE ACTUAL TERRITORY SECTIONS WITHIN THEM THAT CAN BE MOVED BETWEEN THE TWO ROUTES.

RESULTS

Analyzing Breadcrumb Data to Improve Services

The first step in the process was to analyze USPS breadcrumb data. Kinetica was used to collect, process and analyze over 200,000 messages per minute. That data was used to determine actual delivery and collection point locations and enable delivery notifications to mailers and customers. By analyzing this breadcrumb data, the USPS was able to 1) understand where spending would achieve the best results, 2) make faster and more efficient strategic decisions, 3) provide customers with a reliable service, and 4) reduce costs by streamlining deliveries.

Processing Geospatial Data for Real-Time Decision-making

Kinetica was also used to enable visualization of geospatial data (routes, delivery points, and collection point data) so that dispatchers could efficiently plan and graphically view employee territory assignments and take proper action if needed. Kinetica helped the USPS make the best use of routes and to find inefficiencies such as overlapping coverage of assigned areas, uncovered areas, and distribution bottlenecks. They were also able to improve contingency planning if a carrier was unable to deliver to assigned routes and use their work force more efficiency by aggregating point-to-point carrier performance data.

Optimizing Routes

Kinetica springs to life the moment mail carriers depart a USPS Origin Facility. By tracking carrier movements in real time, Kinetica provides the USPS with immediate visibility into the status of deliveries anywhere in the country, along with information on how each route is progressing, how many drivers are on the road, how many deliveries each driver is making, where their last stop was, and more. Course corrections are then made so a carrier is within the optimal geographical boundaries at all times, helping reduce unnecessary transport costs. Optimizing routes results in on-time delivery, fewer trucks handling a greater number of deliveries, and delivery windows narrowed.

IDC INNOVATION EXCELLENCE AWARD RECIPIENT

Due to the success of the project, USPS was named a 2016 recipient of International Data Corporation (IDC)'s HPC Innovation Excellence Award for its use of Kinetica to track the location of employees and individual pieces of mail in real time. "The HPC Innovation Excellence Awards recognize organizations that have excelled in applying advanced supercomputing technologies to accelerate innovation and generate ROI while benefiting science, engineering, and society at large," said Kevin Monroe, senior research analyst at IDC. "USPS' application of Kinetica enhances the quality of service that US citizens receive by giving them a better, more predictable experience sending and receiving mail."

"We're honored to have had the opportunity to partner with the US Postal Service and are humbled by the profound impact our technology is having on their everyday business operations," said Amit Vij, co-founder and CEO, Kinetica. "This IDC Award demonstrates the tremendous value that real-time analytics and visualizations can have when applied to solve supply chains, logistics, and a range of other business challenges."

SUMMARY

The complexities and dynamics of USPS' logistics have reached all-time highs, while consumers have greater demands and more alternative options than ever before. Improving end-to-end business process performance while reducing costs at the same time requires the ability to make fast business decisions based on live data. By implementing Kinetica's GPU-accelerated database, the USPS is expected to save millions of dollars in the years to come, and help them deliver more sophisticated services, achieve more accurate tracking capabilities, ensure safer, on-time deliveries, and increase operational efficiencies.

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For more information on Kinetica and GPU-accelerated databases, visit kinetica.com