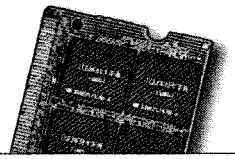

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Big Data Broadens Its Range

New Wave of Software Is Helping Companies Like AutoZone Boost Their Businesses

By Rachael King And Steven Rosenbush

Customers walking into an **AutoZone** store in Waco, Texas, will find a deal on Gabriel shocks which they won't find at most other AutoZone stores. In Minneapolis, they can find a discount on Reese towing equipment. And in Mulberry, Fla., there's a special on a bug deflector.

The targeted deals are part of AutoZone Inc.'s strategy to customize its global supply chain at the store level, reducing the chances that customers will leave without making a purchase.

To do this, the auto parts retailer is using new software that helps it adjust inventory at some of its 5,000 stores based on information gleaned from a variety of databases, such as the types of cars driven by people living around those retail outlets. The new software, from startup NuoDB Inc., is one of a number of new database options that are giving companies a faster and more efficient approach to data.

"We think this is the direction of the future," said Ron Griffin, AutoZone's chief information officer.

The use of advanced databases was pioneered by Web companies such as **Google** Inc., **Amazon.com** Inc. and **Facebook** Inc. Now a broader range of industrial and retail companies are picking up on the idea, and it is beginning to change the way some of them are doing business.

Sears Holding Corp. and **Wal-Mart Stores** Inc. use these "Big Data" databases for marketing efforts. **Chevron** Corp. uses them to process seismic imaging data in the search for new reserves of oil and gas.

The market for such databases brought in revenue of $1.22 billion last year, and is expected to more than double by 2014, according to a February report from David Floyer, co-founder of research firm Wikibon.

AutoZone uses database software from NuoDB to adjust the prices of products at some of its 5,000 stores.

A flood of capital is pouring into the database market, funding startups and potential rivals to big vendors such as **Oracle** Corp., **International Business Machines** Corp. and **Microsoft** Corp. In the past two years, 119 database software companies received $1.17 billion in venture-capital funding, according to Dow Jones VentureSource, which, like The Wall Street Journal, is owned by **News Corp**.

Conventional databases are often written in a language called SQL, for structured query language, using columns and rows to show the relationship among records. But these so-called relational databases can't easily handle the large volume of data being created by the rise of social media, mobile devices and other technologies.

The new wave of databases make use of a variety of computing techniques, such as linking together clusters of low-cost computers or putting storage and processing on a single chip, which reduces the time it takes to fetch data.

"In the past 10 years, people have innovated with websites, in an effort to create the best experience possible," says Jon Oringer, the founder and CEO of photo agency **Shutterstock** Inc. "But it wasn't until recently that you could process that unstructured data from the Web."

His fast-growing company—which stores 24 million images and adds 10,000 more each day—uses a new kind of database known as HDFS, an open-source variant of technology originally developed by Google, to analyze data such as where visitors to the site place their cursors and how long they hover over an image before they make a purchase.

"Today, we are looking at every move a user makes, in order to optimize the Shutterstock experience....All these new technologies can process that," he said.

Many of these databases can be accessed over the cloud, as a service, which means companies don't have to spend as much up front, or on maintenance fees. Others are open source, which means companies only have to pay for consulting services.

NuoDB, which last July raised $10 million in venture-capital funding, uses a cloud model with an annual subscription fee. AutoZone, one of NuoDB's highest profile clients, uses the software to quickly increase the amount of data analyzed without bringing down the system, or changing a line of code.

While AutoZone's massive scale allows it to hold as many as a million pieces of inventory, each store only has room to store around 40,000, making the odds pretty high that a potential customer will walk out of an AutoZone store empty handed, even though the part they were looking for might be at an AutoZone only a few miles away.

AutoZone has also been testing digital signs powered by NuoDB inside stores in Mexico to display these types of offers more dynamically.

While some corporations are willing to try new databases, many large corporations say they are sticking to established technology. Financial services firm **State Street** Corp., with about $2.1 trillion under management, is staying with relational databases and using conventional appliances to speed up transactions, said State Street CIO Christopher Perretta. "It's a lot of bookkeeping that you can't screw up," he said.

Oracle, for its part, has not been standing still. The company, which holds the largest market share of any database vendor with 48.8% of the market in 2011, according to research firm Gartner, developed its own NoSQL Database. Oracle SQL databases can also work across different machines in various locations and accommodate big data, said Andrew Mendelsohn, senior vice president of Oracle Database Server Technologies.

Analysts say, however, that the new wave of database innovation could ultimately turn the market away from Oracle, much like cloud services ultimately shifted the ground from under the feet of Microsoft Corp.

Online real-estate site **Trulia** Inc. started out using **MySQL**, an open-source version of conventional relational database software now owned by Oracle. As it grew and began to track pricing information for 100 million U.S. homes, the company began experimenting with other databases to process some of this information, said Daniele Farnedi, Trulia's vice president of engineering at Trulia.

The company still uses MySQL for some tasks, but has added Cassandra, database software created by the open source Apache Software Foundation, to create faster searches. Mr. Farnedi says Cassandra helped it grow quickly and has enabled it to offer new services, such as listings of home foreclosures and apartment rentals.