Technology Brief

DataCore MaxParallel Software for SQL Server: Making Latency-Sensitive OLTP and Analytics More Responsive and Productive

Sponsored by: DataCore Software

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September 2017

IDC OPINION

Customer experiences can make or break brands. That's why improving customer experience is at the heart of digital transformation (DX) initiatives worldwide. IDC's 2017 DX survey found that nearly half of organizations (48%) cited improving customer experience as the top priority over other initiatives such as creating new revenue streams, improving operations, or developing new partnerships.

But often there are poor customer experiences when applications are not able to keep up with the large volume of requests, forcing customers to go elsewhere. The inability to respond quickly to changing threats, new customer buying patterns, or other external forces hurts the business. Many organizations find it difficult to analyze data fast enough to influence important tactical and strategic decisions.

For them, the performance of business-critical applications including ERP and high transactional workloads as well as 3rd Platform applications such as real-time analytics directly depends on the responsiveness of the underlying SQL Server databases, especially to the degree that the database can ingest, process, and output data in parallel. These challenges drive line-of-business owners and data scientists to make major investments in massive cloud clusters, complex refactoring of their data structures, and expensive timesharing of supercomputers to speed up their transactional velocity and get closer to real-time analysis.

IDC believes it is critical to shift away from these costly and risky maneuvers and first apply next-generation parallel processing technologies such as DataCore's MaxParallel software to overcome resource contention issues responsible for the sluggish behavior of the underlying databases. The software makes the database server respond quicker to multiple requests in parallel. This in turn reduces time to process transactions, generate reports, and analyze trends – all contributing to improve the customer experience.

Microsoft SQL Server functions as the pervasive stalwart back-end data service of many front-end applications, and IDC believes that investment in technologies to improve parallel data access can bring significant competitive advantage to the business.

IN THIS TECHNOLOGY BRIEF

In this Technology Brief, IDC discusses the importance of boosting SQL Server database performance to make key business applications more responsive, productive, and affordable. It assesses how a

new breed of solutions such as DataCore MaxParallel software for SQL Server are addressing application performance challenges with a root-cause approach.

The paper considers the characteristics and features in MaxParallel software, its benefits, and its role in making latency-sensitive, high-velocity, and demanding applications run faster and improve customer experiences.

SITUATION OVERVIEW

Performance bottlenecks are often encountered in applications that are latency-sensitive and/or I/O intensive. These business-critical workloads include OLTP, ecommerce, ERP, high-frequency trading, inventory optimization, and fault/threat detection, as well as newer workloads for digital initiatives such as IoT and Big Data. By nature, they process numerous, simultaneous updates in real time, issuing concurrent yet independent requests to SQL Server databases.

Unacceptably long delays arise when the systems are overwhelmed by large volumes of high-speed inputs and updates. Delayed inputs can result in delayed outputs subsequently slowing down transactions, reporting, and data analysis.

It's clear that the responsiveness of the SQL Server database behind these applications directly influences the organization's effectiveness and customer service. Frequently, enterprises find that their latency-sensitive applications don't run as fast as they want even when sufficient infrastructure resources are allocated for the task. For example, they may bump into performance problems with concurrent database updates because system software shortcomings cause resource contention. Although they refresh their servers with modern multicore machines, they are unknowingly at the mercy of resource scheduling techniques dating back to times when machines were only equipped with a single processor. The resulting choke points are most pronounced in I/O scheduling, yielding poor performance and poor processor utilization, leaving valuable cores to waste.

IDC notes that organizations try numerous methods to get around application performance problems yet they yield only marginal improvements. Some options they employ include:

- Distributing workloads across multiple SQL Server instances: this can be complex, expensive, and time consuming.
- SQL profiling and recoding: typically a laborious effort that only costly experts can pull off.
- Timesharing on supercomputers: an expensive undertaking.
- Rearchitecting the application to spread the transaction processing/data analysis among many nodes in a cluster or redesigning them for in-memory databases. Such application reengineering is a complex and risky process.

Besides, all these initiatives do not address the root problem.

Identifying and Fixing the Root of the Problem

Often the slow performance of the applications is a result of how SQL Server I/O requests are processed by the operating system. Despite being concurrent and independent, these requests are scheduled one at a time on a single queue – be it on a virtualized or bare metal machine.

IDC's *2017 Datacenter End-User Survey* of 600 enterprises found that organizations are planning to increase investment in endpoint technologies such as AFAs to host applications such as real-time analytics (42%), enterprise applications such as CRM and ERP (41%), and even IoT (40%). The key

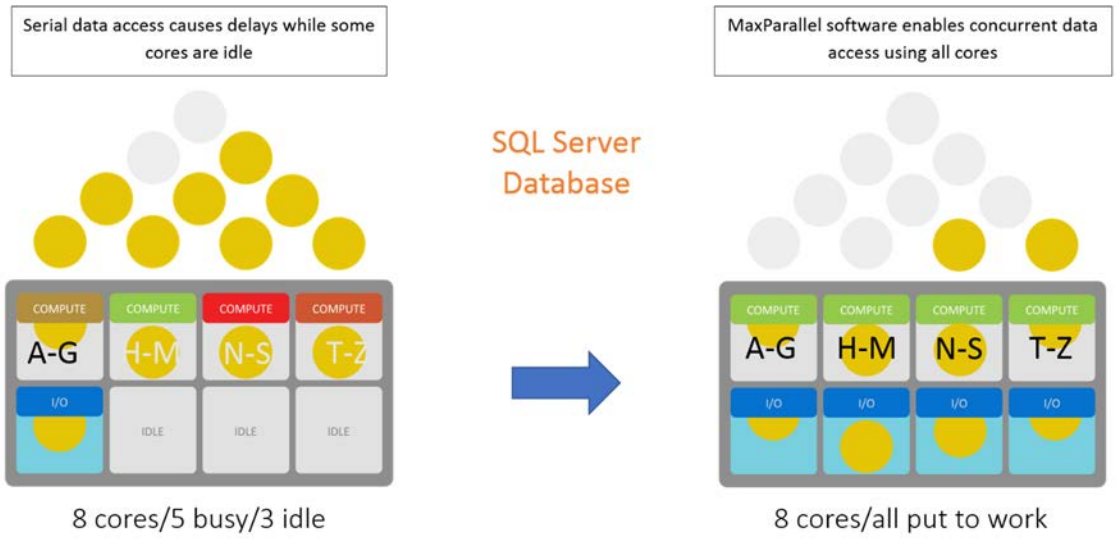
drivers for investing in AFAs are performance (28%) and availability (40%), indicating that these may be the key problems enterprises are facing.

IDC believes that without addressing the root cause of the problem, enterprises will not be able to see meaningful improvement in application performance in a cost-effective and timely manner. It is time to replace existing uniprocessor I/O scheduling and serial queueing with a new generation of parallel processing technologies before investing in additional external infrastructure resources. What is needed is a dedicated software solution that can integrate seamlessly into the existing SQL Server host and boost responsiveness and productivity by leveraging the full power of multicore servers.

MaxParallel for SQL Server

MaxParallel for SQL Server from DataCore Software helps overcome serialization issues by enabling multiple cores to access data simultaneously. Essentially, independent requests to ingest, update, and store data no longer queue up waiting on each other. That translates into quicker access to more data for more concurrent users and processes.

It is a simple, cost-effective plug-and-play software product specifically crafted for business-critical, high-velocity OLTP, real-time analytics, and other latency-sensitive workloads.



Source: DataCore Software

As seen in the figure above, choke points cause major slowdown as only one thread can read and write data at a time and other threads have to wait their turn, causing slowdowns. DataCore removes the bottleneck by enabling multiple cores to access data in parallel. This helps quicken the response time and eliminate inefficiencies as all the cores are put to work (the image on the right in the figure).

IDC believes it is important to resolve the root-cause issue of serial queuing inside servers rather than attempting to sidestep the constraints with elaborate measures. We also believe MaxParallel software is strategic and can be an alternative to risky application reengineering.

With DataCore's technology, businesses can see their Microsoft SQL Server process high-velocity transactions and analyze enormous amounts of data faster, bringing multiple benefits:

- Less risk and complexity
- Lower cost
- No hardware changes or reprogramming

Furthermore, organizations can employ familiar SQL Server database designs, skills, tools, and programming practices.

Over time, business-critical applications will only grow larger and more complex. Simple, lightweight plug-and-play technologies become all the more attractive for enterprises so the developers can focus on application design.

In our opinion, parallel data access can make latency reduction more effective and strategic as it addresses the root problem of uniprocessor I/O scheduling and serial queueing.

> *"Real-time stock level updates, inventory transfers, and price-sheet updates take a fraction of the time with DataCore MaxParallel for SQL Server, enabling us to offer the most competitive products to our customers. The plug-and-play software makes our database run insanely fast. It has the potential to change our business overnight."*
>
> *Manuel Hanke, IT Manager, Tyreworld Burkhard Fuhrmann GmbH*

DataCore has designed MaxParallel software to be elastic and self-tuning, eliminating the need for manual intervention. It is compatible with SQL Server 2016, 2014, 2012, and 2008 on Microsoft Windows Server. These features, along with its use on familiar x86 hardware, can help businesses justify the investment and quickly realize ROI.

The software is available both on the Microsoft Azure Marketplace bundled with SQL Server on Windows Server virtual machine instances as well as in perpetual licenses for instances of SQL Server running on-premise, in co-location facilities, and in the cloud.

Why DataCore?

DataCore's software expertise with parallel processing and demanding data access challenges dates back to the 1990s. DataCore has a track record of delivering solutions for contemporary and next-generation apps.

At a time when the technology landscape is rapidly changing, we see that enterprises don't just invest in point solutions but seek technology partnerships with vendors that can innovate so together they can enhance customer experiences without massive disruption at speed and at scale. In that regard, DataCore is no startup. It is well established as a software-defined storage (SDS) provider. IDC's Tracker has consistently ranked it among the top 5 vendors of SDS storage controller software in 2014, 2015, and 2016. As an established SDS vendor with several high-profile customers, including Volkswagen, MAN, Coventry Building Society, SPIEGEL-Verlag Rudolf Augstein GmbH, Maimonides Medical Center, and Lufthansa Systems, DataCore understands the changing application landscape and increasing expectations organizations have for their tier 1 workloads.

Over the years, DataCore has demonstrated that it has an appetite to diversify and invest in innovation, with its venture into the hyperconverged market as well as its Parallel I/O and RAM caching technologies to improve application performance.

CHALLENGES/OPPORTUNITIES

MaxParallel Software for SQL Server is a strategic offering making high-velocity OLTP and real-time analytics more responsive, productive, and affordable. DataCore will need to overcome some challenges to increase its uptake. First, it can do this by showcasing the simplicity of deploying and using MaxParallel software, as well as the comparable revenue benefits and cost savings. It needs to highlight that the technology integrates with SQL Server without additional hardware or programming, making it appealing to businesses looking for an enduring solution without disruption. It will also need to take increasing advantage of emerging technologies such as NVMe over fabric that are aimed at providing superior performance beyond flash arrays.

It needs to educate companies upfront that single-threaded workloads or environments with limited cores may not benefit from MaxParallel technology. Although some portion of enterprise workloads may still be single-threaded, IDC believes this has been changing for some time, lending more workloads suitable to MaxParallel and increasing DataCore's total addressable market (TAM). IDC also believes that lack of awareness among the partner community and end users about the benefits of parallel processing is another challenge DataCore needs to overcome. The vendor should use PoCs, business outcome messages, use cases, and scenarios to educate the market. It also needs to use custom messaging to business users, data scientists, and DBAs.

Some may consider Microsoft SQL Server 2016, with hybrid in-memory processing support, as a way to bypass I/O bottlenecks. So the benefits of parallel data access in those scenarios must be better characterized.

Also, DataCore is perceived as a storage vendor by many enterprises. It needs to showcase its engineering innovations and its broader vision of maximizing productivity and competitiveness through digital transformation to attract more investment.

IDC believes DataCore MaxParallel has big opportunities ahead of it. The SQL Server market is huge. According to IDC Tracker data, Microsoft held 22.7% of the relational database management systems software market in 2016, representing 11% YoY growth. IDC sees the SQL database as one of the fastest-growing databases, especially with Microsoft's decision to open it up to open source platforms (Linux). DataCore should align MaxParallel's vision with Microsoft's SQL vision around hybrid cloud and analytics workloads. It should also consider expanding the software to other ecosystems such as Oracle, Amazon, and SAP to further increase its total addressable market. DataCore could also consider offering MaxParallel as a service to add further flexibility.

END-USER RECOMMENDATION

IDC recommends that enterprises with ambitious digital transformation initiatives need to:

- Make application performance improvement a top priority to enhance customer experiences
- Break away from band-aid approaches to latency issues
- Assess specialized technologies in the market for cost, simplicity, features, and vendor credibility

CONCLUSION

IDC believes application performance bottlenecks are a bane for businesses. Given that the SQL Server database is the backbone for key enterprise applications that directly touch customers, it is imperative that organizations improve the responsiveness of SQL Server by addressing the root causes. DataCore MaxParallel software removes serial queuing delays through parallel data access across multiple CPU cores to substantially accelerate transactions, scale the number of users, and speed up reporting. IDC believes the technology has the potential to make high-velocity OLTP, real-time analytics apps, ecommerce, IoT, threat detection, and inventory management, among others, more responsive and productive, while affordably improving the customer experience.

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