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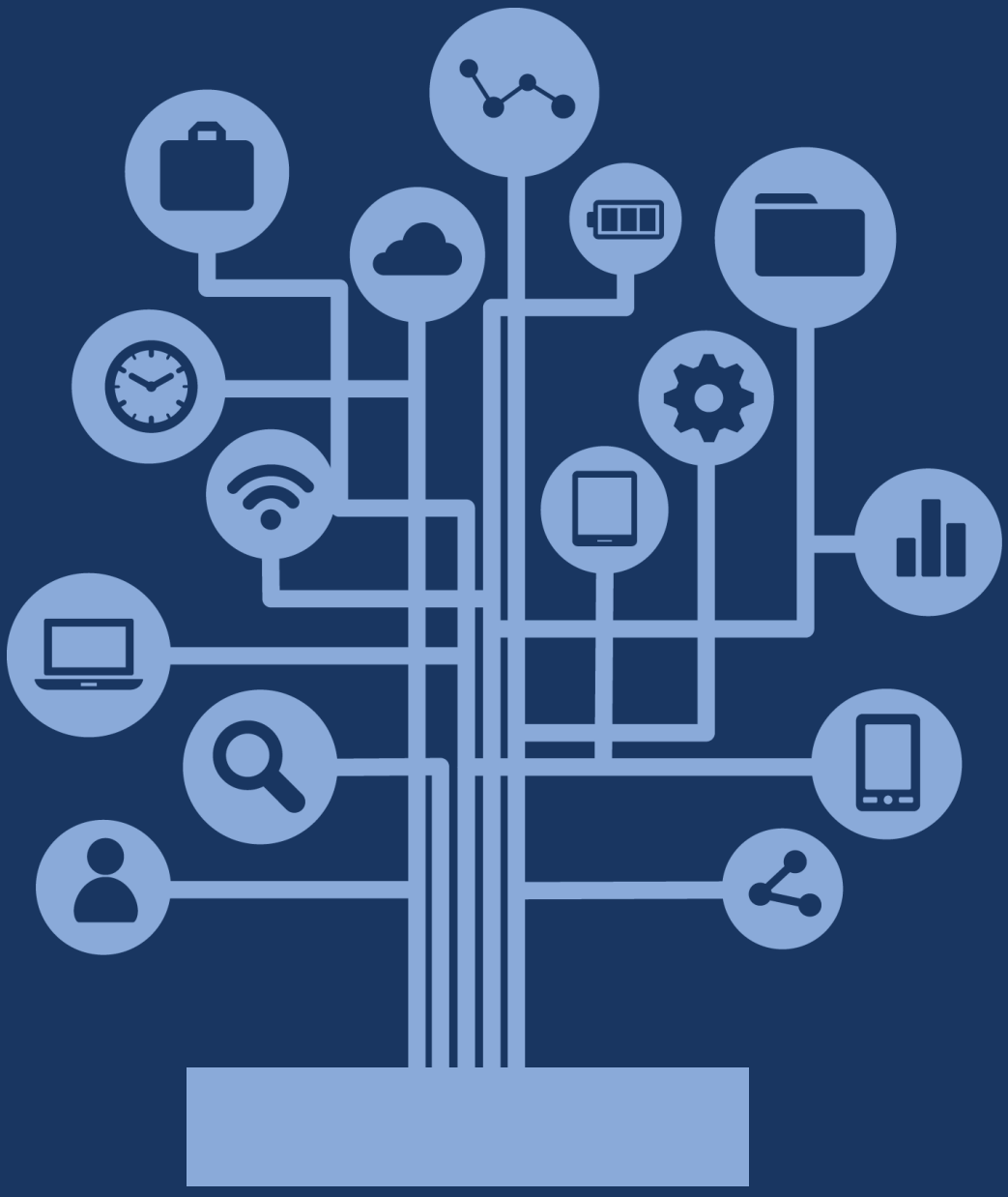
Propelling Business Growth Through Optimized Database Performance In The Digital Economy



Abstract

In today's fast-paced digital business environment, IT has become the backbone while data has assumed the role of being the heart for most businesses. As organizations struggle to continue being relevant in such a digital ecosystem, an optimized IT and data environment is a necessity for most companies. Business growth not complemented with an equally paced technology refresh most frequently leads to drastic data performance degradation. Business gets directly impacted due to low availability whereas SLA failures happen due to unidentified bottlenecks in the data flow.

A holistic assessment of all upstream and downstream application and components is an ideal solution in such a scenario; however a focus on database assessment and the subsequent optimization is the lowest hanging fruit.

Database Performance Assessment, Tuning and Optimization (DB PA/TO) framework provides a comprehensive analysis, tuning and optimization helping customers manage RDBMS environments efficiently thereby enabling businesses achieve significant improvement in their Database performance.

Microland carries out the Performance Assessment in two phases, where we, initially perform a detailed infrastructure assessment to understand an existing database environment & identify bottlenecks. In the second phase, the database environment is fine-tuned for better performance & optimal usage of capabilities.

"40% improvement in data retrieval leading to significant business value for a leading IT Services organization."*

* Source: Microland

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When database performs, business grows

In the current hyper-competitive, digital business environment, data or information has assumed prime importance in organizations as they strive to become more customer-centric and agile in their operations. Information has become the key contributor to success for businesses at every stage of their lifecycle. How that information is arranged, how easily it can be retrieved, how well it is analyzed - in short, the quality of data is increasingly driving business performance. For data to be an asset, organizations need to be able to get good insights from it so that they can take the right decisions.

Over the years, however, data quality within an organization gets degraded as multiple layers are added without being integrated, or duplicated following a merger, or simply irrelevant as some technologies become outdated. In a situation of inorganic growth, the challenges are enormous. Tasks such as standardization of assets, processes and optimization parameters followed by consolidation and planned retirement of applications, assets to be shed because they are in duplicate, harmonizing of operations – are just some of the IT challenges to be tackled.

Growth comes along with changes

While this is happening, so is business growth. Key elements that need to be in-line with business growth are data growth, SLAs, changes in skills and knowledge levels, process and systems complexity. Improper attention to these elements degrades the performance of an organization, and remedial measures will result in incurring more costs.

Mid-life database assessments become essential for most businesses, especially ones with OLTP-heavy applications and/or firms with disparate data sources, as low-performing database environments most often lead to increased business and financial risks.

Like a juggler trying to balance objects in the air, organizations need to keep things moving simultaneously and at a steady pace. For instance, a robust IT planning exercise should dovetail into the business planning process itself so that enhancement in technical assets happens apace. How tightly aligned are the growth assets to already-in-use hardware and software? If there is a mismatch in old and new machines versus goals, plans must be put in place to maintain harmony.

The first exercise in order to remedy degraded performance is to embark upon a holistic assessment of all upstream and downstream applications, associated middleware platforms, databases and obviously the infrastructure sitting underneath.

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Banks, exchanges, point of sales-heavy retail firms or businesses that rely on accurate on-time retrieval of federated data from multiple sources (such as contact centers, credit card agencies, etc. with huge amount of selects, inserts, updates and deletions), need a gold-standard database. Having the most advanced databases and associated hardware is of no value without optimal and harmonious configuration settings.

Need of the hour- A Holistic Database Performance Assessment

Rapidly growing businesses often complain about the inability of the IT infrastructure to scale up in accordance to business growth. As IT complexities increase and data volumes swell, enterprises face problems such as application slowdowns, system outages and the frequent need for hardware upgrades. Database assessment and optimization is one of the most low cost, high impact areas in IT performance evaluation exercises – within a plethora of options available to an IT manager.

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While databases form only a small area in the entire IT infrastructure and application ecosystem, they can cause bottlenecks that affect overall business performance. These issues could be: I/O and CPU hold-ups, database deadlocks, memory blockages and so on. The reason for blockages can range from improper configuration settings to poorly-tuned SQL statements, inadequately-sized infrastructure to non-optimized indexing.

Because there is such a variety in the symptoms and causes of degraded database performance, resorting to standard database performance improvement techniques proves ineffective in the long run, and results in recurrence of issues. Also, these techniques most often do not focus on analyzing the root causes of such symptoms, leading to increased IT costs and failure to improve business performance and customer experience.

On the other hand, a holistic database performance assessment not only eliminates these issues but also fine-tunes enterprise databases for a more agile and stable future-state of operations. This approach proactively identifies and minimizes problems early, and swiftly mitigates performance issues when they do arise.

Tuning it right with the Lifecycle model for Database Performance

Embracing a Database Performance Management Lifecycle model is the best approach to proactively optimize what you have, with what you need.

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As the types of database issues and symptoms are diverse, relying on standard database performance improvement techniques is most often ineffective.

A holistic performance lifecycle assessment hence becomes essential to eliminate current database problems as well as prepare for a more agile and optimized future IT-state.

A Database Performance Tuning's lifecycle approach includes architecture optimization, systems monitoring & assessment, performance tuning and optimization, and ongoing proactive monitoring and tuning, enabling the best impact at any point of a company's process.

While one can assume that optimization occurs at a recognized degradation point, for simplicity, we typically start at a logical point – the architecture and planning stage.

A thorough infrastructure audit, as per defined and tested processes, is required to understand the existing RDBMS environment. This understanding is essential for broad-based infrastructure discovery. A follow-up assessment is conducted to pinpoint sub-optimal database components. A granular management and operational report is then designed to provide a dashboard-like view of the database environment. This enables the planning of a time-bound program for optimization.

Deep dive through a step-by-step performance assessment

A typical assessment exercise should start off by understanding the concurrent business problems followed by capturing information on the database environment design including information on server architecture, network architecture, roles and services and configuration settings.

Next, information on the performance oriented software and hardware aspects of the databases installed need to be captured. Typically this would include data on hardware performances, file sizes and spaces, database schemas, and the actual and virtual table sizes. In case there are recurrent deadlock issues an assessment of these deadlocks and also other events should be carried out.

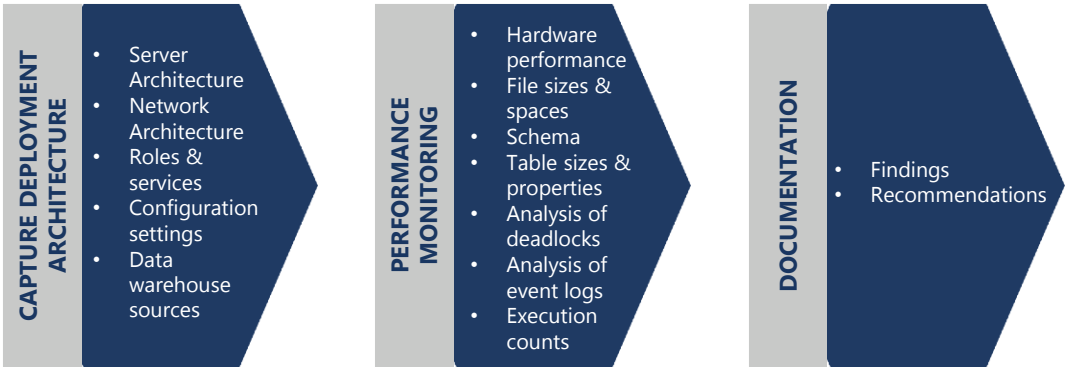

Fig 1: Key activities within the Performance Assessment life cycle

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Tuning and Optimization

After the initial assessment is done, the areas that require deep dive study will be identified for bottlenecks and performance degradation/ chokes. A clear, actionable plan needs to be drawn up to perform a tuning and optimization program.

The deep dive assessment can use tools such as Performance Monitor, Server Profiler, and Tuning Advisor for any Microsoft specific environment. High availability evaluation can also be done to measure and optimize databases geared for HA situations. An analysis of the data points should point towards "actionables". These can be in the form of change implementation, based on standard and proprietary best practices. Microsoft provides a set of best practices which can be utilized as a baseline for the change implementation, again for a Microsoft specific environment. However, it is advisable to construct a proprietary best practices framework (on top of the industry best practices) as per business needs.

Finally, the analysis and reporting for such exercises should contain a detailed overview of the current state as well as the ideal state, especially with respect to critical components such as memory configuration, service pack/hot fixes update information, back-up configuration etc. Furthermore, based on the gap identification / recommendation report, technical enhancements can be made to the underlying database infrastructure itself, in order to reach the level of optimal response and service.

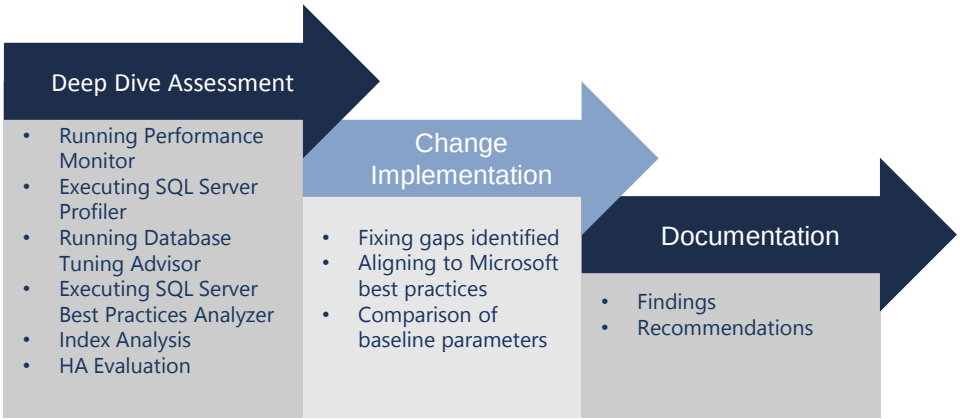

Fig 2: Key activities within the Deep Dive Assessment and Change Implementation life cycle (for a SQL Server environment)

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Microland's Approach for Database Performance Tuning

Microland is well equipped to carry out the performance assessment, optimization, calibration and transformation. For decades now, we have helped clients to revalidate the architecture of the database /data warehouse environments and redesign them into a scalable, highly available and robust set-up capable of handling growing business needs.

Microland's capabilities include deep understanding of RDBMS internals as a focused subject

Also our proprietary analytics platform helps in deriving key improvement conclusions from RDBMS signals.

The approach involves gathering database performance counters, system availability information, and job performance data over defined periods. Performance data during peak business hours, off-business hours and intermediate are collected and collated through various customer interactions.

Microland's suite of "smart" analytics products has extensive analytical capabilities in performance assessment and management of the entire IT portfolio including infrastructure, databases and applications. The platform provides key insights to customers on real-time and future database states through predictive and descriptive modeling techniques. Key database bottleneck areas can be easily identified, such as excessive resource consumption, slow transaction times, system downtimes and other signals and their impact on businesses. This helps in designing an accurate database fine-tuning plan aligned and customized for specific business needs.

Microland also provides advice on modifying/tweaking existing HA-DR solutions to achieve the best possible results and becoming disaster-proof.

The Microland Advantage

Singular Focus: Microland comes with more than two decades of experience in delivering projects that involves managing end-to-end IT Infrastructure, build and design of complex database applications and infrastructure.

Strong Project Management Capabilities: Microland's technical skills, project management expertise and best practices framework built from our experience in handling global projects over the years have enabled us in flawless project execution. We have a track record of having successfully managed several large international projects.

Right Resources: We, at Microland, are committed to bringing in the best talent and the brightest minds to this engagement, drawing from our vast experience in managing similar programs globally.

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Conclusion

Rapid growth can often infuse chaos into streamlined operations. The best bet in such a scenario is to partner with an organization that brings along people and tools which can firstly assess the whitespaces which has emerged due to this sparsely planned growth. These gaps should be analyzed for business requirements/needs and closed if necessary. A post-assessment comparative parameters report should typically validate the improvement in performance in terms or efficiency and/or throughput.

Microland enabled a leading IT Services company to realize significant business gains by improving its data retrievals by 40%. This was done through a thorough analysis and removal of compute load bottlenecks complemented with optimal resource distribution for different data-warehousing activities.

Following a comprehensive assessment exercise, a definite and observable improvement in database performances is usually observed. This adds significantly to business value, particularly for a transaction-heavy business. Remember that storing extra and unnecessary information costs money, and that delays in retrieving the correct information could result in revenue losses.

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About the author

Amarnath Shivashankar

Sr. Lead Architect and Database Principal, Application Management Services, Microland

Amarnath Shivashankar has over 11 years of experience in Infrastructure Management space and has played various lead roles in Database Technology Consulting, Transitions and Service Delivery.

As a Senior Lead Architect for the Database CoE, he is responsible for conceptualizing and building various Database Technology service offerings for the organization. As part of his role, Amarnath works closely with various customer-facing teams as an advisor for engagements which involve database services, including consulting & assessments, implementation, transformation and operations.

In his previous roles at Microland, he led the entire database service-line for a FTSE 200 customer, enabling the client to transform and efficiently manage its data environment. He has also helped multiple global clients realize business gains through effective end-to-end database lifecycle management services during his stint at Microland.

He is a Microsoft Certified Technology Specialist, ITIL®V3 Foundation Certified and Certified Prince2 Practitioner.

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For further information

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About Microland

Microland is a leading Hybrid IT Infrastructure Service Provider and a trusted partner to enterprises in their IT-as-a-Service journey. Incorporated in 1989 and headquartered in Bangalore, India, Microland has more than 3,400 professionals across its offices in Europe, Middle East, North America and India. Microland enables global enterprises to become more agile and innovative through a comprehensive portfolio of services that addresses hybrid IT transformation, workspace transformation, service transformation and end-to-end IT infrastructure management.

Lear more about us at:

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