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A dbaDIRECT White Paper

From Database Administrator to Data Steward:
*Why Companies Must Upgrade Their
In-House, Operational DBAs*

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Executive Brief

Not too long ago, databases were siloed within enterprise applications only accessed by limited audiences of employees, and the role of operational database administrators was pretty straightforward. DBAs kept the databases running, and when things went wrong, they were paged, and the problems were usually fixed within the same day. There was little impact to the business during this downtime.

Now, data is recognized as perhaps the most important strategic asset within the enterprise, and is expected to be available and accessible 24 hours a day, seven days a week. Companies need operational DBAs that are not merely on call, but also on demand, as any downtime with databases may mean significant losses in revenue.

However, many CIOs and IT managers are hard-pressed to find and staff their data centers with enough DBAs that stay on top of such round-the-clock critical functionality while addressing increasingly expanding volumes of data. Plus, the business needs the skills and know-how of DBAs to perform higher-level tasks, such as consulting with end-users to design new applications and leverage information in new ways. Businesses need DBAs that take on the roles of data “stewards” that function as subject matter experts for the data, rather than managing relatively mundane tasks that could be automated.

That’s why many CIOs and executives are increasingly embracing outsourced or managed service solutions to handle repetitive, onerous and low-level tasks that still consume much of the time of DBAs, such as database monitoring and patching. While there are a variety of such services, from outsourcing to data management, the approach that can deliver the most value is a data infrastructure approach employing intelligent automation that can scale to business needs.



1.0 The Rise of the Operational DBA

There was a time when no business could run without its database administrators. As the first database management systems (DBMS) hit the scene in the 1970s and 1980s, executives and employees quickly recognized that they needed professionals that knew how to build, run, and troubleshoot these environments.

But their roles were shrouded in mystery. Rightly or wrongly, the image of a DBA has been one of a “techie” immersed in some complicated part of the infrastructure that is beyond the understanding of mere mortals. To most managers and employees, the DBA was the individual to call when the system was down. As Craig Mullins, author of *Database Administration: The Complete Guide to Practices and Procedures*, put it:

“DBAs understand the complexities of the DBMS, making them a valuable resource. Indeed, sometimes the only source of database management and development knowledge within the organization is the DBA.”¹

However, because they need to provide assistance to many parts of the enterprise, DBAs are simply stretched too thin to be able to adequately address a wide spectrum of requirements and requests from end-users. Another complication is the fact that many of the DBAs that started their careers during those halcyon days of RDBMS in the 1970s and 1980s are now at or nearing retirement age. As a result, many CIOs and executives are reaching a point where they need to start looking at replacement strategies for their DBAs.

To keep things running smoothly, CIOs and executives rely on DBAs to engage in a wide range of duties, from installing new databases to managing security to building or integrating the applications to run on the databases.

¹ *Database Administration: The Complete Guide to Practices and Procedures*, by Craig Mullins, Addison Wesley Professional, 2002.

Information is now perhaps a company's most important strategic asset, and enterprises increasingly are turning to DBAs to not just deliver maintenance and patching, but to engage with and help end-users leverage data to deliver the most value. DBAs need to get involved in a consulting role with their end-user communities. As end-users increasingly become empowered with new tools and applications such as business intelligence or analytics, DBAs are assuming a key role in providing guidance to end-user communities for identifying and leveraging their organizations' data.

Recognizing this elevation in the roles of DBAs, many companies have split their duties beyond the traditional operational DBA chores. For example, there are architectural DBAs that deal with database planning and design, developer DBAs who focus on either building or tweaking applications for optimal performance within data environments, and data warehouse administrators who are charged with building and managing large archival stores of data coming in from all corners of the enterprise. In smaller and medium-size companies, DBAs may assume all of these roles.

2.0 Why In-House Operational Database Administration No Longer Makes Sense

Database administrators are increasingly being called upon for higher-level business tasks, but many still are mired in operational roles, which continue to consume the bulk of their time and resources. Such operational aspects of the DBA's job include:

- Installing new DBMS versions and applying vendors' maintenance fixes
- Setting and tuning system parameters
- Tuning the operating system, network, and transaction processors
- Ensuring appropriate storage
- Troubleshooting, monitoring and ensuring availability/uptime
- Managing security and authorization
- Ensuring data integrity, data formats
- Overseeing data migrations,

But these responsibilities are now but one part of the DBA's job, a part that is having less and less of an impact on the overall success of the business. DBAs are far more productive and valuable to organizations when they are freed up to assume development or architectural roles. However, much to the dismay of many DBAs and their employers, operational database administration is a growing black hole that consumes more and more of the DBA's time and energy. The following are reasons why operational database administration is growing out of control, beyond the limits of what typical DBA staffs can effectively handle.

2.1 Data Has Come Out of Its Silo, and is an Enterprise Concern.

In the past, many end-users did not give a lot of thought to the databases at the back end of their companies' applications. They were the data stores that sat behind the scenes, usually within their own silos. Nowadays, however, data has become the critical driver to business decisions. End-users are increasingly being empowered to access data from across the enterprise, to be able to slice, dice and leverage information as needed.

Today's database management systems have grown even more complex, and few people understand what really is involved in the intricacies and complexities of running a DBMS. While few CIOs and executives view database administration as a core competency, all require well-managed database environments to process transactions, track and service customers, and reach new markets. Plus, unlike previous times, a database outage these days may mean a significant loss of sales to a company, not to mention the potential of bad publicity. In addition, a failure to adequately address security and unauthorized access incidents may also mean issues with meeting compliance and regulatory standards.

2.2 Data is Exploding Faster Than It Can be Managed.

To put it simply, databases are growing at an almost exponential rate, and managing these growing behemoths is too much for human administrators to keep on top of. Plus, the number of end-users pulling data from these environments is also growing. These databases need to be up and running and available 24 hours a day, and there are simply no opportunities to bring the databases down to perform maintenance.

Consider these latest statistics: A study by IDC and EMC Corporation estimates that in 2006, 161 exabytes of digital information were created and copied.² To put it in visual terms, this is approximately three million times the information in all the books ever written – or the equivalent of 12 stacks of books, each extending more than 93 million miles from the earth to the sun. The study also projects that the amount of information created and copied in 2010 will surge more than six-fold to 988 exabytes, a compound annual growth rate of 57 percent. Separate research from IDC estimates that data storage needs are growing on average at 50% to 100% annually. Some analysts put those growth rates even higher.

Clearly, the falling costs of data storage have driven companies to gather, store and deliver data for various purposes and applications. But there's also a growing demand for data infrastructure support as analytical, reporting and other information applications become increasingly critical to business decisionmakers.

However, the ability of operational DBAs to deliver services and maintain productivity is more of a challenge now. Businesses now rely on their databases for non-stop, 24x7 capabilities. It's no longer enough for DBAs to be "on-call"; they need to be on demand at all times.

² *The Expanding Digital Universe: A Forecast of Worldwide Information Growth Through 2010*, IDC, March 2007.



2.3 Operational DBAs Do Not Deliver Direct Value to the Business.

Many operational DBA tasks have become “commoditized,” meaning the required skills can be cost-effectively obtained from other sources. Many purely administrative functions, in fact, can be either automated or outsourced. While some data-related work will prove strategic and a source of competitive differentiation, other data work will remain merely administrative, operational and infrastructure-related. The challenge for IT decision-makers who must confront data-related hiring decisions is how they can invest their limited budgets to achieve the highest impact on their enterprises.

2.4 Data Environments are too Heterogeneous to be Handled by Traditional DBAs.

Multi-database and multi-platform sites pose another challenge to effective database administration. Few companies these days run their business on a single type of database; most may be running on three, four, or even more database environments. For example, a mission-critical ERP system may be running on Oracle on Sun Solaris servers, but the CRM system that was acquired through a merger runs SQL Server on Windows. Adding to the heterogeneity, data professionals may have built their own peripheral applications on an open source system such as MySQL to avoid the steep licensing fees that come with the more commercial brands.

However, because these environments are complex and require certification and training, DBAs still tend to specialize in one database type. This presents skills and staffing challenges to most organizations that need the expertise to administer multiple brands of databases. A Sybase DBA, for example, may be highly effective in dealing with data and applications run within the Sybase environment, but would require extensive training to also administer the Oracle database environment run within another business unit.

DBA Talents and Skills are Needed to Help the Business Take Advantage of New Opportunities. How much time do DBAs

spend in traditional database administration tasks? Too much. For example, a recent study of almost 1,500 database administrators and professionals, conducted across five user groups, found that 38 percent still spend a majority of their days engaged in “traditional” DBA tasks such as availability, space management, schema changes, network connectivity, performance management, and capacity planning.³ Moreover, more than a third – 34% – say this commitment to traditional database tasks has grown over the past year, while 48% say it has remained at the same level. Only 15% report that the amount of time they spend in traditional database administration has decreased.

The roles of DBAs and other data professionals are clearly shifting to more strategic business priorities – evolving to that of data steward, rather than administrator. “DBAs are spending less time on the ‘knobs,’ and more time on the higher value tasks that exist in organizations,” said Francois Ajenstat, group product manager for SQL Server at Microsoft, in a recent article in *Database Trends & Applications*.⁴ “This might include securing the database for more compliance. Ensuring that systems are secure, or ensuring that the right people are able to access the right data. It might be delivering reports on the database. It might be managing hundreds of servers, rather than just one particular application. The goal is to automate redundant tasks, and make the database more intelligent so it’s self-healing and self-tuning.”

Businesses depend on the intelligent deployment of information resources for growth, and to do so, DBAs need to evolve as subject matter experts around the data

³ *Multiple Roles, Multiple Opportunities: Data Management for 2007 and Beyond*, survey of 1,483 data professionals published by Unisphere Research, for International Oracle Users Group (IOUG), International DB2 Users Group (IDUG), International Informix Users Group (IIUG), International Sybase Users Group (ISUG), Professional Association for SQL Server (PASS). January 2007.

⁴ “‘New’ Data Professionals is Business-Driven,” *Database Trends & Applications*, by Joe McKendrick, November 2006.

they manage – not spending time on mundane tasks that should be automated.

This puts DBAs into more proactive roles, in which they need to act more as data or information “stewards.” A data steward role requires an understanding of the business usage of data. In this role, a data manager needs to be able to develop standards to ensure data quality, as well as certify that the data aligns with business requirements. Data stewards also are champions of data governance initiatives.

3.0 Data Infrastructure Management Services – A New Model for Database Administration

Increasingly, CIOs and executives are finding that it’s far more effective to offload as much traditional operational database tasks as possible. There is now a new emerging class of services that can provide all the monitoring and troubleshooting capabilities that take up so much of the DBA’s time.

Data infrastructure management (data IM) services – handled through an external, managed service – can take on many of the routine tasks handled by operational DBAs.

Leveraging data IM services is not to be confused with IT outsourcing, however. In traditional outsourcing arrangements, companies will bring in IT outsourcers, write them a check and hold them to a service level agreement. This approach abandons the strategic potential of IT, and, instead, treats IT merely as a supporting resource, albeit a more efficient one.

Data IM services offer another proven path, which not only enables enterprises to continue to manage and enhance their own IT operations, but also frees up resources to invest in high-value activities that represent strategic differentiation.

As the experiences of many companies have already demonstrated, specialized vendors can provide a scaleable service that can grow as data demands grow – taking on many of the non-differentiating, data

infrastructure management activities that would otherwise tie up highly priced data professionals. Indeed, existing data professionals could be redeployed to take on more high-value roles and responsibilities.

Data IM services offer the following key benefits:

- **Focus on Strategic Business Initiatives.** Data IM services enable organizations to offload more onerous or routine administrative tasks, thereby freeing up DBAs to expend more time and energy to help business users better leverage data for their applications. Such services enable IT executives to tackle strategic, high-value data projects that grow the business. For example, organizations can free up their resources to work on business intelligence, enterprise application integration, and data warehouse initiatives.
- **Predictable, Controllable Costs.** A data IM service assumes the “commoditized” tasks that consume considerable time and energy among DBAs on staff. Outsourcing these capabilities to an outsourced DBA management service cost far less than having on-site staff to maintain the same levels of database administration. Some analysts maintain that database administration costs can almost be cut in half.⁵
- **24x7 Data Availability.** Data IM services provide ’round the clock, consistent service. In today’s Internet-driven economy, it may be too costly to suffer a long-term database outage. It’s no longer enough to “get by” relying on night and weekend pager response. Often, enterprises are swamped when major technical problems or spikes in activity hit. Enterprises cannot effectively cope with growing

⁵ Gartner, 2003.

data volumes and complex usage and management when their DBA staffs are consumed with addressing mundane technical issues.

3.1 Core Data Infrastructure Management Capabilities

The leading data IM services offer focused expertise capable of delivering 24x365 support for all major database platforms. Such services can proactively spot and fix potential issues before they become problems, ensuring nonstop availability and peak performance. Essentially, these services take over all the service headaches, enabling end-user organizations to minimize their management time requirements.

When moving to a new database administration framework, there are certain capabilities that enterprises should seek out. Such features provided by a DBA service should include the following:

- **Event Translation.** A key aspect of database administration is event translation, in which data coming in from database sites is categorized and assigned priority status based on service level agreements. This monitoring data may include alarms or alerts coming from the customer's data environment. Is it a down server? Is it a space issue? Is it a production or test box? Or is it simply scheduled downtime? The event translation function sorts this information out and, if necessary, generates a trouble ticket.
- **Comprehensive Customer Knowledge Repository.** The customer knowledge repository encompasses all the information obtained about a database instance – essentially what DBAs need to know before they roll up their sleeves and start working on the problem. Information included in the repository includes the type of database where the event is occurring (e.g., SQL Server or Oracle), database version, patches

already applied, location of the home directory, location of the error log, and primary customer contacts.

- **Work Queue Management.** Work queue management is a form of skills-based routing, which incorporates intelligence, employing scheduling to determine available personnel, and introduces load balancing across the functional areas.
- **Service-Level Management.** A database administration service should be able to automatically match incoming messages with customer service level agreements. That way, critical issues will automatically get bumped to the top of the priority list.
- **Standard Operating Procedure Library.** Many companies have special requirements around their data environments and this should be built into the processes of the database administration provider. For example, a company may require that requests to increase database space first go through their systems administration group.
- **Service Visualization Portal.** CIOs and executives should be able to access information on the status of their databases through a Web-based portal made available from the service, which enables them to view the status of open and closed tickets, as well as various performance metrics.

Such capabilities distinguish a truly world-class approach to data infrastructure management from less powerful alternatives. Decision-makers should consider the value of such capabilities as they contemplate investments in such solutions.

4.0 Conclusion: Getting to Strategic Differentiation

Companies can no longer afford to maintain staffs of operational DBAs that are forced to spend their time mired in the under-the-cover technical aspects of database maintenance, troubleshooting, and patching. Now, data is recognized as perhaps the most important strategic asset within the enterprise, and is expected to be available and accessible 24 hours a day, seven days a week.

Today's enterprises need the skills and know-how of DBAs to perform higher-level tasks, such as consulting with end-users to design new applications and leverage information in new ways. Businesses need DBAs that take on the roles of data "stewards" that function as subject matter experts for the data, rather than managing relatively mundane tasks that could be automated.

That's why many CIOs and executives are now turning to outsourced data infrastructure management (data IM) services that can handle many of the repetitive and onerous low-level tasks that still consume much of the time of DBAs, such as database monitoring and patching. Data IM services offer a proven path, which not only enable enterprises to continue to manage and enhance their own IT operations, but also free up resources to invest in highvalue activities that represent strategic differentiation.

APPENDIX A

TYPES OF DBAs

There are four basic categories of database administrators. While many functions may overlap, the variety of these roles reflect the changing nature of DBA jobs. Some organizations – especially larger ones – split DBA responsibilities into separate positions.

Operational DBAs

Operational DBAs focus on technical matters, especially in the realm of system administration. Typical tasks center on the physical installation and performance of the database system, and may include the following:

- Installing new database management system versions and applying maintenance fixes supplied by the vendor
- Setting and tuning system parameters
- Tuning the operating system, network, and transaction processors to work with the database system
- Ensuring appropriate storage for the database system
- Enabling the database to work with storage devices and storage management software
- Interfacing with any other technologies required by database applications
- Installing third-party DBA tools

Architectural DBAs

Architectural DBAs are involved in new design and development work only; they are not involved in maintenance, administration, or tuning of established databases and applications. Typical tasks performed by the database architect include:

- Creating a logical data model
- Translating logical data models into physical database designs
- Implementing efficient databases, including specifying physical characteristics, designing efficient indexes, and mapping database objects to physical storage devices
- Analyzing data access and modification requirements to ensure efficient SQL and optimal database design
- Creating backup and recovery strategies for new databases

Development DBAs

Development DBAs focus on database design and the ongoing support and administration of databases for a specific application or applications. The application DBA is likely to engage in the following pursuits:

- Writing and debugging complex SQL
- Incorporating database requests into application programs
- Performing application-specific database change management
- Overseeing application-specific performance tuning

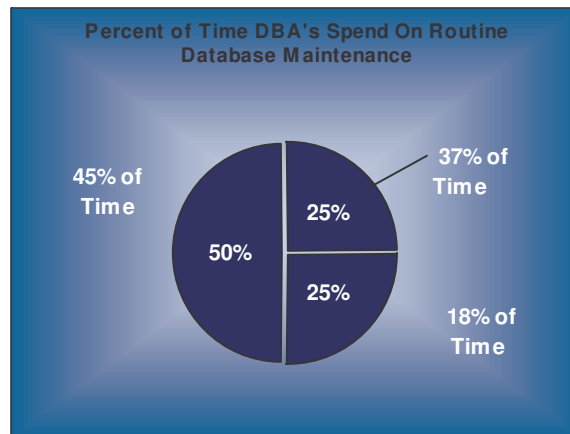
Data Warehouse Administrators

Organizations that implement data warehouses for performing in-depth data analysis often staff DBAs specifically to monitor and support the data warehouse environment. Data warehouse administration requires experience with the following:

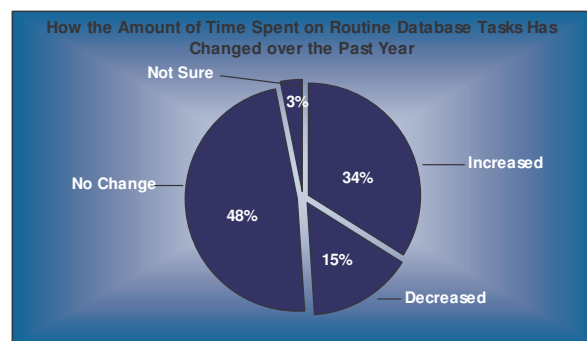
- Business intelligence, query, and reporting tools
- Database design for read-only access
- Data warehousing design issues such as star schema
- Data warehousing technologies such as OLAP (including ROLAP, MOLAP, and HOLAP)
- Data transformation and conversion
- Data quality issues
- Data formats for loading and unloading of data
- Middleware

Source: Craig Mullens, *Database Administration: The Complete Guide to Practices and Procedures*

APPENDIX B



Source: Survey of 1,483 data professionals published by Unisphere Research, for International Oracle Users Group (IOUG), International DB2 Users Group (IDUG), International Informix Users Group (IIUG), International Sybase Users Group (ISUG), Professional Association for SQL Server (PASS). January 2007



Source: Unisphere Research