HOW TO BECOME A SUCCESSFUL DATABASE ADMINISTRATOR

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INTRODUCTION

In many organizations, data not only defines what the business is, it is the lifeblood of how business operates. Yet data is a largely intangible and invisible thing, residing in locations that most of its users never see, appearing on the network when summoned over unwired connections, delivering the information necessary for applications to run, and returning to be managed and protected while remaining available for future use. How natural it all has become. And how critical it is that everything goes off without a hitch.

Who makes it happen, this tangible use of intangible data? What, exactly, do they do? And how do they get to the point where an organization will entrust them with the care and feeding of its valuable data assets?

This whitepaper is written by IDERA, a global leader in database management software, to provide insight into the position of database administrator (DBA) for readers who are new to the DBA position or who want to expand their capabilities as one of the essential professionals working behind the scenes to keep nearly everyone's business and all our personal worlds spinning.

BE THE PROFESSIONAL WHO GETS THE JOB DONE

While a database administrator may rarely work directly with customers, it's hard to name someone whose effect comes closer to the front line of business. That's because data management has never been more critical than it is in an era—present and future—when unprecedented numbers of people work and shop from home or other remote locations.
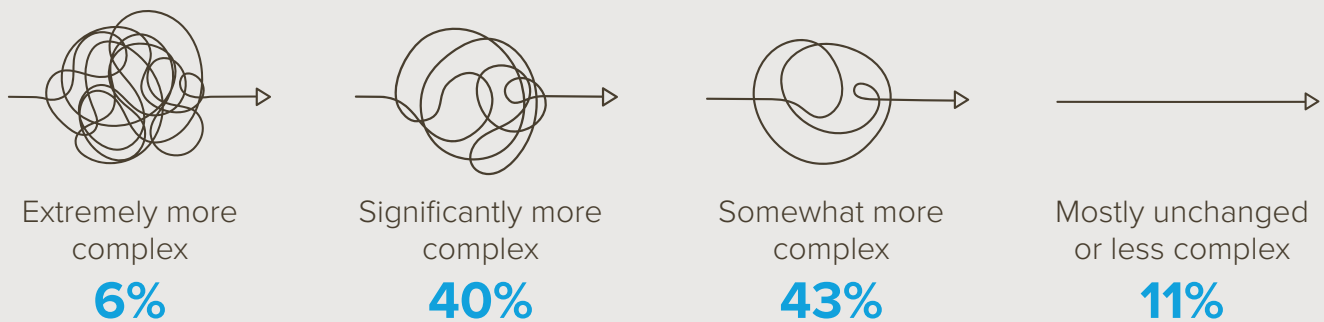
Personnel may come to the office rarely, if ever. Customers may increasingly make their purchases online. And both may access data and information via laptops or handheld devices rather than dedicated, onsite workstations. But staff, customers, and the organization itself all need the data and the back-end systems that deliver data to be fast, reliable, and always ready to get the job done.

That's the work of the database administrator—to secure and protect data and to smooth any upheavals in data and IT systems due to outside events, internal errors, or the use of the data itself. That's the mission of IDERA, to help organizations design, develop, and deploy enterprise data with complete confidence regardless of the platform they're using—Microsoft SQL Server, Oracle, IBM Db2, SAP Sybase, IBM Informix, or other.

Each provides capabilities for managing data—from creating to manipulating, retrieving, or securing it—in your database. Each is also designed to improve the efficiency of your data, and therefore the efficiency of your business. But database management is a field where technologies and architectures are evolving rapidly. The DBA must keep on top of these constant innovations.

How are databases changing?
DBAs and managers say today's databases are:

Extremely more complex	Significantly more complex	Somewhat more complex	Mostly unchanged or less complex
6%	**40%**	**43%**	**11%**

SOURCE: Joe McKendrick, Unisphere Research, 2016 Survey on DLM Strategies, IDERA Database Management Whitepaper, 2016

For years now, the Internet of Things, artificial intelligence, and other technologies have brought an explosion in data volume, variety, and velocity. Business operations seeking competitive advantage have demanded increased use of data analytics. And regulatory agencies have required an increasing focus on data governance and compliance. To deal with these forces, database administrators wield powerful tools to gain reliable, real-time information on the status and health of the entire data environment—and then to quickly predict, pinpoint, and resolve performance issues, while ensuring that data is stored securely.

GET A FIRM GRASP ON THE ROLE

Data growth in recent years has been so rapid and the need for data management has become so critical that the U.S. Bureau of Labor Statistics has projected an employment growth for the field of nine percent through 2028, which it characterizes as "faster than the average for all occupations." At the same time, *US News and World Report* magazine ranks database administrator #4 on its Best Technology Jobs list.

But to be successful as a DBA, you'll need more than job openings. You'll need a firm grasp of the functions an administrator performs, the requirements employers place on hiring a DBA, what you have to do to meet them, and the steps you'll need to take to ensure success after you achieve the position.

First, the duties and responsibilities of the DBA.

A database administrator is responsible for all facets of managing the data environment. That's a broad statement, but it's important to remember. Because while specialties do exist in the profession, there's a certain "buck stops here" quality to the job that makes DBAs indispensable—within the organization and in the technology sector generally.

Consider, for example, these sample responsibilities showing both the breadth and depth of the DBA role:
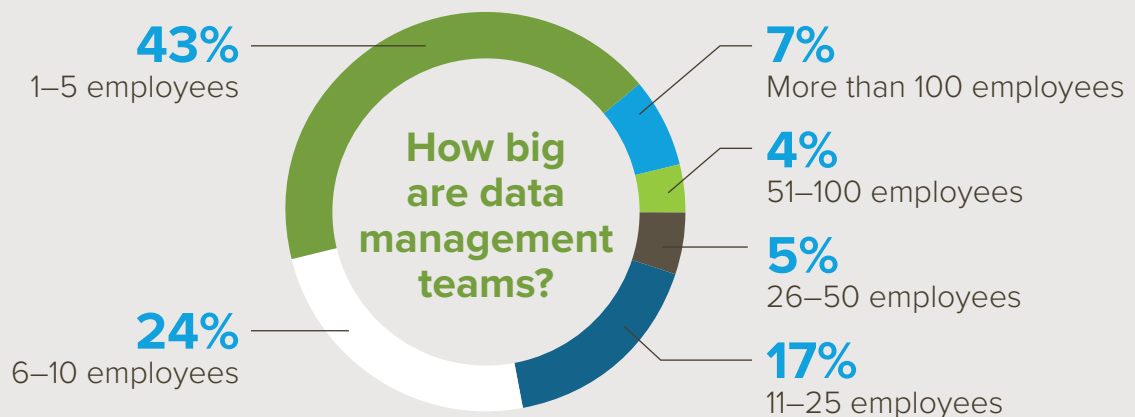
- ⊗ **Install database servers; track and maintain their performance**
- ⊗ **Tune database systems and fix any performance issues that occur**
- ⊗ **Develop processes for optimizing database security**
- ⊗ **Set and maintain database standards**
- ⊗ **Manage database access**
- ⊗ **Install, upgrade, and manage database applications**
- ⊗ **Own the database backup and restore process**
- ⊗ **Automate recurring database maintenance processes**
- ⊗ **Collaborate with other teams on data analysis needs**
- ⊗ **Provide database and system administration and data processing expertise to the development team**

In other words, a DBA's work is hands-on. It's also fundamental to business operations—dealing with how technology actually works and making it possible for an organization to get the most out of its data and systems.

For technical teams that manage complex data environments, IDERA offers productivity tools that help minimize risk and maximize profitability. Only IDERA delivers tools that span on-premises, cloud, and hybrid platforms and put DBAs in full control of the data management lifecycle—letting DBAs tame big data challenges and turn cost centers into growth assets.

FIND YOUR PLACE IN THE FIELD

Given the critical functions a DBA performs, it's hard for an organization to do without a person in this position. The database functions are so critical that in many organizations other employees who have an interest and aptitude for technology are called on to carry out some DBA tasks.

43%
1–5 employees

How big are data management teams?

7%
More than 100 employees

4%
51–100 employees

5%
26–50 employees

24%
6–10 employees

17%
11–25 employees

SOURCE: Joe McKendrick, Unisphere Research, 2016 Survey on DLM Strategies, IDERA Database Management Whitepaper, 2016

Whether there is only a single DBA or an entire DBA team, the common image of the DBA's job is of technology personnel responding to database-related events or help-desk requests. This requires them to have full access to the organization's production databases as well as its storage and servers. They likely also have access to development and quality assurance databases.

In large organizations, the reality is often different. While "Production DBAs" still perform nitty-gritty functions such as server capacity planning, query deadlock detection, and server performance tuning, other specialties have emerged. "Development DBAs" help developers write more efficient code for database access. "Operations DBAs" handle basic housekeeping tasks such as data backup and patch maintenance.

The skills required by a database administrator, as a result, can be both broad and specific:

- Strong command of SQL and SQL tools based on experience working with relational databases
- Advanced knowledge of database security, backup and recovery, and performance monitoring standards
- Understanding of relational and dimensional data modeling
- PowerShell and Unix shell scripting skills
- Familiarity with analysis, integration, and reporting services
- Ability to communicate technical information to both technical and non-technical individuals
- Ability to assess priorities, work well under pressure, manage time efficiently, and analyze and solve problems independently and, if necessary, collaboratively
- Professional written, verbal, and interpersonal communication skills with staff members, trustees, lenders, donors, and volunteers

Now, where do you learn all this stuff?

FIND YOUR ENTRY POINT: DEGREE OR EXPERIENCE

A direct path to a position as a DBA is an undergraduate degree in Computer Science, Computer Engineering, Management Information Systems, or a related field. But it's not the only path.

Some individuals—often called "accidental" DBAs—begin their careers as developers or general production staff, then are elevated to a DBA position related to their original specialty.

Still others are neither university-trained nor "accidentally" in the role—they train themselves and take on the DBA role out of choice.

All are valid and common ways to assume the broader role, with the "accidental" and self-trained transition being most common in small to mid-sized organizations.

Regardless, if in their time with the organization or in previous jobs they have gained experience with different operating systems, with various database technologies, and with a range of cloud services, they will be able to do the job successfully.

Where do DBAs spend their time?
On a typical day...

60%
spend the most time contending with performance tasks

15%
do more than 20 tasks

60%
do six or more tasks that are not in their job description

24%
spend two or more hours researching how to do difficult or new tasks

Source: IDERA, Inc., IDERA Predicts Database Administrators Will Be Biggest Beneficiaries of Empowerment Movement in 2015, IDERA Press Release, Dec. 16, 2014

The flexibility that individuals with other experience bring to the DBA role can also be an advantage. With challenges that include the need to house and manage huge volumes of constantly changing data, improve data access for advanced analytics, and establish and enforce governance policies, the DBA must be able to become a proactive champion of the business who can collaborate closely with other IT teams.

Whether university-trained or "accidental," the DBA must be able to see opportunities in challenges such as the handling of the intense volume of query traffic necessary for analytics or maintaining the integrity and security of all data assets.

PREPARE WITH HELP FROM EXPERTS—AND YOURSELF

Whether or not you earn a degree specific to database administration, you'll need to spend time building experience to become a successful admin. You might be a developer, where part of your job will be to work with the database. You might also work as a network/systems administrator, doing installs and patches. Or perhaps you'll work as a report writer.

When you're in the right place at the right time, you may be plucked from the ranks and made an "accidental" DBA, filling an immediate need. But while you're waiting for such an opportunity—or, better yet, trying to make such an opportunity happen—there are steps you can take to prepare. These steps will also empower you to keep the DBA position once you have it.

If there is no DBA in your organization—which may well be the case in a small firm—try to identify database-related technology and business pain points as well as a mentor in the organization who can help you address them. This could mean supporting business-critical applications, verifying that databases are secure and backed up, and preventing downtime. Yet those goals often are not met because the IT staff is strapped for time and personnel. The technology team probably spends too much time meeting daily challenges, leaving them unable to find and fix systemic problems or put into place proactive measures. If critical work is not getting done, perhaps you can help with the load.
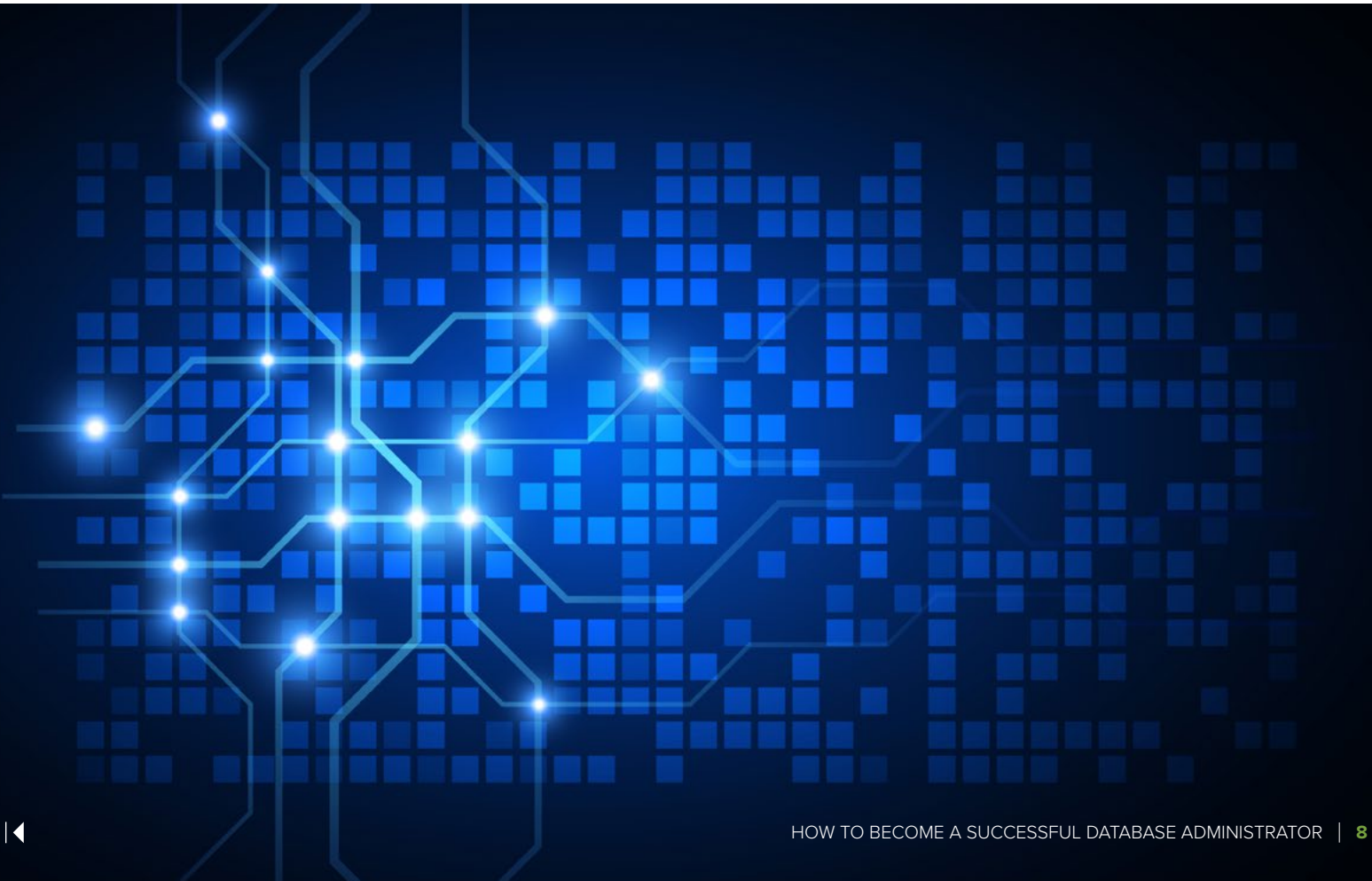
START WORK WITH BASELINE KNOWLEDGE...

Meanwhile, how do you know when you're ready to take on that DBA position? It'll happen when you have the right mix of expertise and experience—you'll know when you can confidently handle the challenges an organization faces.

That can be pretty much anything, of course, so before pushing ahead, here's a checklist of the basic skills the DBA should have.

You should be able to:

- ✓ Install multiple instances of database software and apply the latest service pack, set up jobs, and enable email notifications
- ✓ Create and manage logins, user- and database-level roles, and be able to explain and fix orphaned user accounts
- ✓ Fully understand how to use GRANT, REVOKE, and DENY
- ✓ Create and modify tables, views, stored procedures, and functions (via SQL and graphical user interfaces)
- ✓ Write queries using INNER, LEFT, FULL, and CROSS JOINS plus understand the use of CROSS/OUTER APPLY

- ✓ Use GROUP BY, COUNT, WHERE, HAVING, UNION, and UNION ALL in SQL queries
- ✓ Understand recovery models and how to change them
- ✓ Know how to do ad hoc and scheduled FULL, DIFFERENTIAL, and LOG backups
- ✓ Know how to restore a backup, including how to restore the database with a different name or to a different location
- ✓ Understand how indexes and statistics work, how to create them, and how to maintain them

You'll also need a working knowledge of a range of database platforms, including:

Microsoft SQL Server: Featuring an intelligent processing query for increasing speed and processing power to enhance business.

Oracle: Designed for the cloud, delivering automated patching, upgrades and tuning, automatic security updates with no downtime, and self-recovering capabilities.
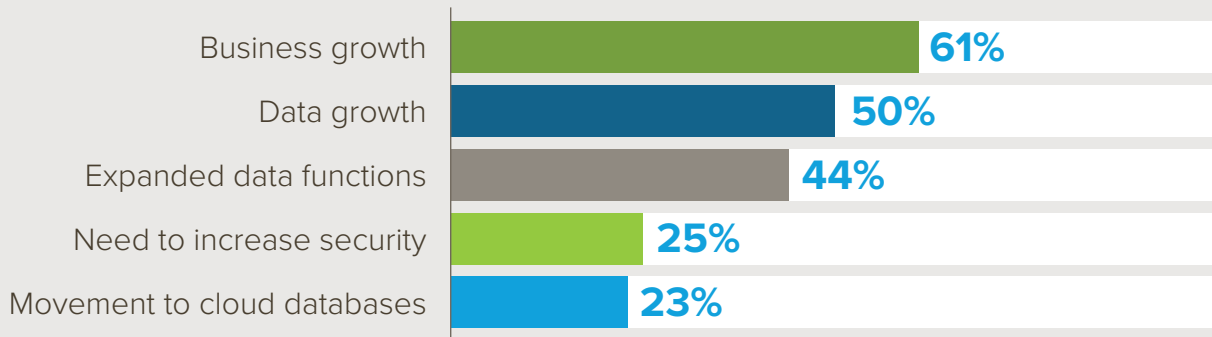
IBM Db2: Offering a suite of AI-empowered capabilities for managing structured and unstructured data on-premises, as well as in private and public cloud environments.

SAP Sybase: Delivering data warehouse solutions that support integration of all data types in cloud, on-premises, and in hybrid environments.

IBM Informix: Creating a fast and flexible database with the ability to seamlessly integrate SQL, NoSQL/JSON, and time series and spatial data.

What drives growth of DBA teams?
Multiple influences are at work:

Business growth	**61%**
Data growth	**50%**
Expanded data functions	**44%**
Need to increase security	**25%**
Movement to cloud databases	**23%**

...THEN ADD MORE SKILLS

Whether you're coming from an academic background or working your way into a DBA position from another role in the organization, remember this: Technology is an ever-changing and ever-growing field. And your knowledge and skills must do the same. Here are some ways you can grow and change, too.

Establish your own computer lab. Since working as a DBA involves hands-on tasks, learning DBA skills require hands-on practice. And you can get that practice on your own. You'll need a PC or laptop with enough hard drive space and memory to install and run database software. You don't have to spend much—for example many widely used database systems are both free (at least for non-commercial use) and open source. Then figure out the work as you go.

Strengthen your competencies in SQL technology. Chances are, once you begin working as a DBA, you'll be managing databases based on structured query language (SQL). So, you can't get too much SQL practice. You'll want to become especially familiar with the monitoring, diagnostic, and management tools you'll use as a DBA to react to performance problems and increase and ensure availability. These tools can be your best friend for gathering reliable, real-time information on the status and health of your database environment, so get to know them now.

Instruction is readily available in the full range of database technologies, with technology- and industry-specific topics such as:

- Managing SQL Server operations
- Provisioning databases in Azure and SQL Server
- Recovering data in Azure and SQL Server
- DevOps for databases
- Introduction to Apache Spark

- Introduction to NoSQL data solutions
- Amazon DynamoDB: building NoSQL database-driven applications
- Supply chain technology and systems
- Essentials of genomics and biomedical informatics

Expand your knowledge with low-cost or free training. If your employer doesn't pay for training, you'll have to do it on your own dime. But don't worry. Free training aimed at beginning DBAs, tailored to more advanced professionals, and for use in specific instances is widely available online. A broad range of information is available at various websites, and some software vendors such as IDERA offer educational resources either on their products or on general topics at no charge. While doing your own online product research, keep a sharp lookout for these programs. You may end up using these vendors' products, so their training can be well worth your time.

Enroll in a specialized class to learn the most the fastest. Comprehensive classes in topics such as database administration aren't cheap, but in many cases, they're the most effective and efficient way to gather the knowledge and skills information you need—all from one source. Some are in-person training, which probably will involve additional expense for travel, food, and lodging. These offer an intense learning experience that only takes a relatively short time, perhaps a week. Others are online, which means you can complete them at home, avoiding additional expense and proceeding through the program at your own pace.

Work toward professional certifications. Certifications beyond academic degrees are not required to work as a DBA, but they can help you land a job—because they boost a potential employer's confidence that you have the knowledge and skills necessary to succeed in the position. Gathering certifications can also be a career-long process that can help you advance within your organization (employers often view them as proof of interest and effort in addition to proof of skill). And they can help you land a new position later if you decide to change employers. Just check the certification programs offered by the vendors you most commonly use. Usually the entry-level certification can be acquired with one or two tests.

Here's a list of topics covered in one typical online course:

- Start and shut down a database
- Back up and recover data
- Create database objects and tables
- Monitor the database
- Export and import metadata and data
- View database version and globalization
- Identify database software release number
- Manage database users
- Manage security of the database

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Play an active role in the larger DBA community. In the same way that a mentor can help you get started in your career, and classes and certifications can keep your technology and product knowledge and skills up-to-date, DBA communities can provide ongoing support and information. Users gather in chapters/user groups. And professional organizations offer both in-person and online events, ranging from live-streamed technical presentations to single-day training to multi-day conferences.

NOW MANAGE THE DATA ENVIRONMENT SOMEONE ELSE BUILT

Unless you're working with a startup, where you may actually have the opportunity to build a data environment the way you want it, you're almost certain to be inheriting someone else's handiwork. Of course, database applications and other technologies impose a certain level of standardization—so the environment won't be a complete mystery. But a certain amount of detective work will still be necessary. What systems do you have to work with? What kind of data? How many users, and who needs access? And, critically, how well does it all work now? Is the system strained or obviously flawed?

Now is the time when your "soft skills" are as important as your technical expertise. You'll need to apply logical analysis, critical thinking, and decision-making on top of your skills in database management, metadata management, and archival software programs. And you'll need to talk with current users to find their pain points. If you're making database or system changes, you'll need to design for efficiency with an intelligible data organization.

Critically, you'll also need to think like a non-DBA. You'll have to understand and sympathize with your end-users, whether they are business personnel within the organization or customers and auditors outside, all of whom will need to use the systems you administer to access data and applications. You'll need to keep top of mind any legal aspects of data administration, such as the far-reaching regulations imposed worldwide by the European Union's General Data Protection Regulation (GDPR) and the growing numbers of regulations put into place by state and local governments.

PREPARE TO MOVE AHEAD WITH A SOLID ACTION PLAN

Working as a DBA, even starting out as one, means thinking about the future, whether with regard to server capacity, protection from cyber theft, disaster recovery, legal implications, business use of data, encryption, remote operations, or upgrades. And you have to do it all with a clear view of where your organization needs to be. You'll naturally begin in the present, though, by looking at ways the organization's data is stored, used, searched for, and protected—and then do it again next year, five years down the road, and further ahead, too.

It's best to begin slowly. Don't rush to "fix" anything except backups and problems that prevent people from working. Then you can proceed through increasingly hands-on steps—from basic ones like establishing your own access to data and systems and finding documentation for the database environment, to fundamental but critical tasks such as checking backups and backup strategy, checking on free space and file growth, learning change management process and maintenance windows, and inventorying service packs.

Make a list of the things you need to know, and methodically work your way through each topic. Track your progress, just as you would document changes to your database systems. Remember that learning is a career-long process, so don't hit the "pause" button. This is no time to rest on your laurels.

GET HELP FROM A TRUSTED PARTNER

Your work as a DBA is important because data is important. Today's world won't run without it. But you don't need to shoulder the entire burden yourself. By working with a trusted partner, you can tie together and efficiently tackle a wide range of DBA functions, from technology issues such as business logic and data protection to human factors such as ease of use.

With solutions from IDERA, you can take control of your enterprise data with practical tools for complex environments. You can design, develop, and deploy enterprise data with confidence for accelerated rollouts, improved performance, lower operating costs, and higher ROI. With IDERA, you can take control of your enterprise data with practical tools for complex environments.

Trusted by more than 50,000 customers worldwide, IDERA tools are user-focused, designed with the end-user's needs and budget in mind. They are flexible, with solutions for specific challenges that are easy to buy and fast to deliver value. And they're comprehensive, delivering breadth that spans the entire data management lifecycle and depth that supports all the use cases for each role and stage.

Compared to competing products, IDERA solutions are mature and complete, without a lot of modular features that require add-on pricing. They do not surprise customers with licensing audits, providing greater peace of mind. And IDERA is a one-stop shop for all database needs, with bundles such as SQL Suites and DB PowerStudio that especially appeal to large organizations.

LEARN MORE ABOUT DATABASE ADMINISTRATION

There is a wealth of information out there on database administration and the administrator's role. Here is a selection of resources we think you will find useful:

Whitepapers

How to Become a SQL Server Database Administrator

How to Become a Database Administrator for MySQL

How to Deal with an Inherited SQL Server

The Adaptive SQL Server DBA

Faster SQL Profiling for Better Database Performance

Key Considerations for Selecting a Database Tool

Webcasts

Master Administration of Multiple Database Platforms with Ease

Differences and Similarities of Working with and Supporting Multiple Database Platforms

IDERA Live | Working with Complex Data Environments

Datasheet

DB PowerStudio

Videos

Using DBArtisan in Multi-Platform Environments

Troubleshooting Database Problems with DBArtisan

Infographics

Key Considerations for Selecting a Database Tool

Integrated Development Environments

CONCLUSION

Take a deeper dive into our services and solutions on our website at www.idera.com. Once there, you'll find a broad overview of all IDERA software products and IDERA's solutions for the cloud.

LEARN MORE

IDERA understands that IT doesn't run on the network—it runs on the data and databases that power your business. That's why we design our products with the database as the nucleus of your IT universe.

Our database lifecycle management solutions allow database and IT professionals to design, monitor, and manage data systems with complete confidence, whether in the cloud or on-premises.

We offer a diverse portfolio of free tools and educational resources to help you do more with less while giving you the knowledge to deliver even more than you did yesterday.

Whatever your need, IDERA has a solution.

IDERA®