HOW TO BECOME A DATABASE ADMINISTRATOR FOR MYSQL

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INTRODUCTION

You are reading this because you think that becoming a database administrator may be the right career path for you. Our goals here are to: (1) Give you some insight into what the job looks like when using MySQL. (2) Show you at a high level the skills you need to get that first job in the field. (3) Give you suggestions for how to acquire those skills and find your first database administrator job working with MySQL.

FOCUS ON MYSQL

It is important to understand that a great majority of database administrators focus on a single product. MySQL is our focus here. However, others focus on Microsoft SQL Server, Oracle Database, IBM Db2, and other database platforms. Focus is necessary because database platforms are complex products that take years to master. It is challenging to reach the expert level with multiple platforms. Focus also matters because most businesses look at each product as a silo. There may be a team of database administrators. Within that team, typically each database administrator specializes on a single product or a subset of a product. From a practical perspective, it makes sense to focus on MySQL when your employer uses the product. If they do not, then learning MySQL is possible but much harder without the opportunity to work with it in a production environment solving real problems.

WHAT IS MYSQL?

MySQL is software that runs on a server to allow users to store and query data in a database using a language called SQL. End users rarely interact directly with MySQL. Instead, end-users access data through reports, web pages, and applications. MySQL is the most popular open-source database. MySQL can deliver high performance, scalable database applications. You can use MySQL to power high-volume websites, business-critical systems, and packaged software. Various forms of MySQL exist, such as Oracle MySQL, MariaDB, Percona Server for MySQL, Galera Cluster for MySQL, and Galera Cluster for MariaDB. Oracle MySQL Community Edition is a freely downloadable version. Commercial customers can choose from three editions to meet specific organizational and technical requirements. It is possible to deploy MySQL as an embedded database.

It is possible to run MySQL in a virtual machine hosted on a cloud hosting service, such as Amazon Elastic Compute Cloud (EC2), Microsoft Azure Virtual Machine (VM), and Google Cloud Compute Engine (CE). You can also access MySQL as a managed cloud database or database-as-a-service, such as Oracle MySQL Cloud Service, Amazon RDS for MySQL, Amazon RDS for MariaDB, Amazon RDS for Amazon Aurora, Microsoft Azure Database for MySQL, and Google Cloud SQL for MySQL. Database administrators can use the integrated environment Oracle MySQL Workbench to develop SQL, and design, model, manage and migrate databases. Also, database administrators can use the web application Oracle MySQL Enterprise Monitor that is included with Oracle MySQL Enterprise Edition to manage the software, databases, and users that are authorized to query the data in the databases.

THE ROLE OF THE DATABASE ADMINISTRATOR

Database administrators are responsible for all facets of managing MySQL. Such responsibilities range from installation and patching to creating databases to managing permissions that allow users to actually use the databases. However, more than anything, they are responsible for protecting the data. Also, they are responsible for ensuring that performance levels are maintained. They often act as internal advisors on how to use MySQL effectively. It is a critical role. The reason is that if a database is offline or data is lost, then the business and its customers immediately feel the impact.

THE PRODUCTION DATABASE ADMINISTRATOR

The production database administrator is the role most people think of when discussing database administration. Database administrators have full access to production databases. Also, they usually have access to the databases in quality assurance and development as well. Much of the work a production database administrator does is in response to a request or an event, often in the form of change requests and help desk tickets. Frequent interruptions are common.

Consequently, a good database administrator must be good at juggling tasks. Also, they must be good at prioritizing which tasks to perform first. It can be a slow-paced job or a fast-paced one. It varies day to day and organization to organization. It is a very different role than that of a developer who may work on a project for weeks or months at a time.

A typical week for a production database administrator may include these types of tasks:

- Apply changes to database objects that were previously tested and approved. Such changes need to be applied usually during a designated change window that is after regular business hours.

- Refresh a database in development using a copy of production data. Also, obfuscate any sensitive or confidential data such as in backup and restore.

- Review any failed jobs and then fixing or referring to the appropriate developer for research.

- Troubleshoot a sudden performance slowdown with a critical application.

- Grant access to read or write data in a database for a new developer.

- Review proposed database changes to make sure they meet organization standards, do not display security issues, and use an appropriate amount of server resources.

BECOMING A DATABASE ADMINISTRATOR

The hard part of becoming a database administrator is getting the first job. No hiring manager wants to give a user with no track record the keys to the most valuable thing the organization owns, which is the data. A single mistake by a database administrator can cause an outage or loss of data that can result in loss of revenue or the worst case the failure of the organization. Of course, any database administrator may and probably will make mistakes. However, the challenge for the hiring manager is that the first-time database administrator often makes mistakes because they did not understand the full impact of their actions. Many organizations only employ a single database administrator. Also, many organizations cannot take the risk of hiring a junior database administrator. The reason is that there is no one on staff with the time and skills to coach them.

Very few database administrators start as database administrators. Many database administrators start as developers. Also, as they work with the database as almost all applications need at least one database, they find that they gravitate to the management side of things. Many database administrators start as network or systems administrators who start working with the database by performing installs and patches, learning the basics and then gradually adding skills. Others begin as report writers or performing extract, transform, and load work. Regardless of their starting point, they show an affinity for data and databases as it comes naturally to them.

Organizations hire most first-time database administrators from existing staff. They learned how the business works, demonstrated their work ethic, earned trust, and shown that affinity for data we mentioned earlier. The combination of those is often sufficient to convince a manager to take a chance on moving an internal candidate into the database administrator role. The candidate needs to convince them that they know that they are interested in becoming their database administrator. Also, the candidate needs to convince them that they did something to be prepared for the opportunity. If you want to become a database administrator, then you need to be ready for that opportunity by building skills above and beyond those you use at work. That is, you need to learn the basic skills of a database administrator.

GETTING READY TO LEARN

Learning the basics requires a place to learn, such as your private lab. For hardware, you need a reasonably modern computer running a recent version of a relevant operating system. It would be best if you also had sufficient space for the install and some databases such as 30GB free to start. Also, it would be best if you had at least 4GB of memory while more is better, but not required. You can always invest additional resources later and start small now. Install the free MySQL on your virtualization platform of choice. Download the software and figure it out as you go. If you make

mistakes, then that is good as you learn from them. Set it up once, then tear it down and do it again. Take your time and pay attention. Think about what you see. Also, think about what you do not know.

Another option is to use virtual machines hosted in the cloud. You can accomplish the same learning. However, cloud environments are not free. Remember that you need to turn off machines when done as just shutting down does not stop the billing. Alternatively, you can use managed cloud databases such as [Oracle MySQL Cloud Service](#), [Amazon RDS for MySQL](#), [Amazon RDS for MariaDB](#), [Amazon RDS for Amazon Aurora](#), [Microsoft Azure Database for MySQL](#), and [Google Cloud SQL for MySQL](#).

SKILLS TO LEARN FIRST

There is so much to learn. How do you decide what to learn first? Do you focus on theory or practice? You should learn the tasks that you will perform most often as a database administrator. For example, learn the kind of tasks that you are likely to encounter in your first week. If you can execute the basics and succeed, then that gives you time to grow and learn about the stuff that you use less often. Here are some skills the beginning database administrator should have:

- Install multiple instances of MySQL and apply the latest service pack. Also, set up jobs and email notifications.

- Create and manage logins, users, database-level roles. Also, be able to explain and fix an orphaned user.

- Fully understand how to use GRANT, REVOKE, and DENY.

- Create and modify tables, views, stored procedures, and functions.

- Write queries using INNER, LEFT, FULL, and CROSS JOINS plus 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 perform 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 and to a different location.

- Understand how indexes and statistics work, how to create them, and how to maintain them.

That is not everything that you need to know. However, if you can perform all of these tasks, then you should able to credibly interview for a junior or intermediate level database administrator position.

HOW DO YOU LEARN BEST?

As you set out to acquire the skills above, you need to figure out what works for you. Some people learn effectively from books. Others do not. Some like videos where they can watch someone performing the task. Others prefer a written step by step article that they can follow at their own pace. Some prefer to go to a class where they can get immediate feedback. Others prefer to puzzle out the answers on their own. Most people end up using a combination of books, articles, videos, classes, and forum discussions to learn. However, use what works for you. To be successful, you should learn things on your own. It is just not practical to pay for all the classes you would need to take to learn all the things you need to know.

Many successful database administrators are entirely self-taught. They buy books, read articles, and watch presentations. Then they go back and try out the techniques until they understand them and can execute them. That approach is the most cost-effective method, with a cost approaching zero when you do not count the time investment when it works for you.

VENDOR RESOURCES

The main vendors provide a wealth of information, and a significant part of that information is educational rather than intended to sell their products. As such, Oracle MySQL's website includes their products, services, documentation, resources, and events. Percona's website includes its services, products, solutions, resources, and community. Galera's website includes its products, resources, references, and community.

A great way to keep up with what you are learning is the online MySQL documentation and specifically the MySQL reference manual, and the MariaDB documentation.

CLASSES

The fastest way to get started is to take a 5-day class that focuses on MySQL administration. You can expect to pay anywhere from about USD 2,000 to USD 4,000 for the class, plus any travel needed. Frequently, employers may consider paying for or subsidizing this type of educational opportunity. While you cannot learn all you need to know in 5 days, a course of this nature gets you started and over the initial steep learning curve. Start with local training providers. Then, expand your search from there. That approach is a way to jumpstart your learning. It does not make you immediately employable as a database administrator.

You may find online versions of classes. They tend to be more cost-effective because no travel is involved. However, it depends on whether it works for you whether the savings are worthwhile. Online learning is different from being in a classroom, no matter how hard they work to create that environment online. Some common vendors of online classes are Edureka, LinkedIn Learning, Oracle MySQL, Oracle University, TutorialsPoint, and Udemy. When you evaluate these options, keep in mind that there are many sources for recorded training available for free or minimal cost. It makes sense to spend the additional money on a true online class when you need the guidance of an instructor.

LOW COST TRAINING

There is a lot of free training available on the internet. Web sites such as MySQLTutorial and TutorialsPoint's MySQL Tutorial provide free MySQL tutorials. Videos are another way to quickly and easily get started with MySQL. An excellent place to find such videos is YouTube by just searching for 'MySQL.' Similarly, on-demand webinars from industry experts can be a great learning experience. You can find such on-demand webinars on Oracle MySQL's list and Percona's list.

Books such as High-performance MySQL, Introduction to MySQL, Learning MySQL and MariaDB, Managing & Using MySQL, MySQL Cookbook, MySQL in a Nutshell, MySQL Pocket Reference are still a great way to learn. Also, the nice thing about MySQL is that if you are working on the basics, then you can buy a used book from a version or two back to save money. Also, some software vendors offer educational courses for free.

THE VALUE OF CERTIFICATIONS

When thinking about learning, it is logical to consider certifications. Beginners often look at certifications as proof of competence that they can show a hiring manager. In practice, few managers view it that way. The reason is that they observed candidates that passed the examination but did not possess real-world skills. It does not mean a certification does not have

value. It is a way to demonstrate interest and effort. That is important, whether it is an internal manager or a recruiter who is not sure that you are ready to interview for a database administrator role.

[Edureka](#), [LinkedIn Learning](#), [Oracle MySQL](#), [Oracle University](#), [TutorialsPoint](#), and [Udemy](#) maintain certification tracks for MySQL, which are updated as new releases come out. Usually, it takes one or two tests to acquire the entry-level certification. Should you take these examinations? You should start by learning the tasks above first because they are the ones you use. Then, once you feel very comfortable with them, you can begin studying for an entry-level examination as a way to validate and extend your skills. Tests are very effective at driving learning when you take the time to learn rather than just doing the minimum needed to pass. Remember to refer back frequently to the examination objectives until you feel you reached competency but not necessarily mastery on each of them.

HOW TO ACQUIRE EXPERIENCE

Until you get the first database administrator job (that is, the one that requires knowledge), you should work at building the experience of solving real problems. One approach is to determine whether you can work with whoever fills the database administrator role now your employer. That is, you can assist them when you have free time or when they are doing something unusual. Potentially you can expand this so that you become the personal backup to the database administrator. That is, you become someone they trust to perform routine tasks when the primary database administrator is not available.

What if you do not have a database administrator? That problem is prevalent with smaller organizations. Typically, someone on the team has database administrator-level access. However, that person is not a database administrator. That can lead to much administrative work not being done and the creation of less than optimal solutions. As you discover pain points, you may be able to work on the problem and come up with a recommended solution. Go slow, ask questions, and pay attention to how the other people involved react when you offer up suggestions. Getting the chance to learn and experiment is far more important than winning every discussion.

Keep an eye out for a chance to volunteer for any project that may drive learning. It may be an official work project or a volunteer opportunity for a local non-profit or a small consulting engagement after hours. If you can work with MySQL and gain experience, then that is a big win for you even when you are working for free.

FIND A ROLE MODEL OR MENTOR

It is hard to learn to be a good database administrator without a role model. However, it is possible. Most of us did it that way because it is widespread to be the only database administrator in an organization. However, it is doing it the hard way. At a minimum, you want to find a role model locally, someone who walks the walk of the database administrator and is willing to give you some time for questions and answers once in a while. Ideally, this person could be an active mentor. It could be someone you respect, who sees potential in you and is willing to invest e ort to help you grow.

User groups and former employers are great places to look for someone to fill this role. Start slow. Let them get to know you and find out whether the chemistry builds. Try to build the relationship to the point where you can meet or talk for an hour every week or every other week. Ask them to tell you about their week. On what did they work? What problem did they solve? Why do they do things a certain way? You can also use that time to ask their opinions on various parts of technology as you learn. However, do not look at them as a tutor. They expect you to figure out most of it. Also, they help you stay focused and moving on the path you selected.

THE COMMUNITY

Once you get started with MySQL, you start to hear about the MySQL community. That is a catch-all name for the many people and web sites that collectively engage on MySQL topics. It is a group of people that are smart, engaging, and approachable. All you need to do is to participate. Ask questions, answer questions, and attend events. Participate in whatever level suits you best. Then, you soon start to feel like you truly joined a community as well as a craft.

There are many neighborhoods within the community to stretch the analogy. You may like the forums on the [MySQL forums](#), [Oracle MySQL's community space](#), and [StackExchange questions tagged with MySQL](#).

Many database administrators blog about lessons learned and how to perform common tasks. Popular blogs are [MySQL Server team's blog](#) and [Percona's blog](#). Alternatively, you may find that [Slack's MySQL community](#) is a better fit. Alternatively, start with [Twitter](#) by following the hashtags [#MySQL](#) and [#MariaDB](#). Make it a habit to connect with people you meet on [LinkedIn](#). Join a local user group as a minimum.

LIVE EVENTS

Attending live events, whether in person or digital, can be a great learning experience and at the same time inspiring. If you or your organization can afford it, you can try to attend international or national conferences. Otherwise, regional or local conferences may be a more feasible option. You can find relevant events on MySQL Community Space's list and on Oracle MySQL's list that can filter by region and on the. You can find Oracle events on Oracle's events webpage but make sure to select 'Product = Database.' You can then search by type, date, location, industry, and language.

FREE TOOLS

There is a selection of free tools that help with the daily management and administration of MySQL. Some of those tools often require only a standard registration to download and enable its use. Such free tools provide basic features that a DBA may find useful occasionally. Some of these tools offer high-level insights. Also, others may go a bit further and provide rudimentary warnings or highlight of an area that could pose a threat. However, none of these free tools dive deep enough to help reveal the actual root of the problem. Moreover, such free tools are unlikely to guide DBAs on how to fix it and or set up proactive measures or alerts if such issues were to present themselves in future events. After all, they are free for a reason. For example, Adminer, HeidiSQL, IDERA MySQL Query Explorer, MyDB Studio, Oracle MySQL Workbench, Ocelot GUI, phpMyAdmin, Sequel Pro, and SQL Buddy.

CONVINCING THE HIRING MANAGER

Most hiring managers want to hire someone that is an expert at everything. However, they usually hire someone that has the skills to cover the core areas and seems like they are a good fit. Your task is to show them what you know and how you learned it, and to know the things you do not know. Play the cards you have, such as relevant experience, any classes or certifications, and books read. Be ready to talk about your contacts in the business and your learning or career plan. Remember that they are trusting you with their most valuable asset. Consequently, it would be best if you showed them you are calm, steady, and thoughtful under pressure, such as in a job interview.

YOUR FIRST DATABASE ADMINISTRATOR JOB

You did it. You are a database administrator! Now what? It takes a few weeks to get up to speed as you learn the servers, people, and processes. Here are five tips you should implement every day:

- Spend the first 30 minutes of every day reviewing your servers with the daily health check.

- Go slow and be methodical.

- Ask questions and take notes.

- Be adaptable, non-judgmental, and customer-focused.

- Never make a change without having a plan for backing it out.

YOUR ACTION PLAN

We told you about the role of the database administrator. Also, we told you about many of the things that are involved in learning the skills. Now let us translate that to an action plan. That action plan is only an outline. We recommend that you schedule time every day or at least every week to study and that you have a roadmap of the skills you want to learn. It would help if you supplemented that with daily or weekly reading on related topics via various newsletters and blogs.

FIRST THINGS FIRST

Let us start with easy, concrete steps:

- Sign up at one or two forums.

Sign up to a local user group (for example, from [Oracle's list of MySQL user groups](#)) that is within driving distance.

- Buy a book and take it with you whenever you expect to have some off time such as commuting, traveling, standing in line, and sitting in a waiting room.

- Set up a virtual lab using the free edition of the latest MySQL.

- Put time on your calendar for your daily random learning via newsletter or blog feed.

- Put time on your calendar for your daily or weekly structured learning.

WHAT DO YOU NEED TO LEARN?

Make a learning list of all the things that you think that you need to know or that you want to learn. Start with the list earlier in the document (refer to the section 'Skills to Learn First'). Cross off any you know. Also, add other skills you need to learn or enhance as you go. You will never complete the list. However, you can work your way through the beginner stuff into more advanced topics and new features. It is a pattern you can use your entire career.

SET GOALS

Goals help to drive progress and help you measure progress. Put these events on the calendar:

- The date by which you expect to complete your first 200 hours of study. It would help if you were thinking about interviewing to get feedback on where you are at this point.

- The date by which you expect to take and pass your first certification examination.

- The date by which you want to be a real, official MySQL database administrator. It is just a guess. However, how fast do you want to drive forward? Setting this date makes you think about that.

TRACK YOUR PROGRESS

Build the habit of logging every learning session. Enter the date, about how much time you spent, the topic, the source such as URL and book, and a sentence or two about what you worked on and where you should pick up next time. Use whatever works for you (such as a word processor,

spreadsheet, and text editor), but write it down. It is there to help you stay on course and resume when you get knocked off course. It may also be something you show to a recruiter and hiring manager to convince them just how hard you are working on achieving your goal.

SQL DIAGNOSTIC MANAGER FOR MYSQL

With [SQL Diagnostic Manager for MySQL](#), monitor MySQL and MariaDB performance in real-time. This powerful tool helps database administrators to pinpoint the cause of MySQL performance problems in physical, virtual, and cloud environments.

Proactively find and fix MySQL performance problems:

- Improve performance by optimizing bad SQL queries.

- Gain visibility into overall health and performance.

- Alert proactively on potential performance problems.

- Take action before MySQL powered systems run out of resources.

- Get high ROI with increased DBA productivity and server performance.

"SQL DM for MySQL is very intuitive and it makes database administration easy."
Olu Efonwoye, Database Administrator, ICF Corporation (Small Business, Telecommunications Services, USA, 10 to 24 MySQL databases)

Unlike its competition, SQL DM for MySQL provides:

- Agentless monitoring with no additional load on servers

- More than 600 monitors and advisors

- Custom dashboards, charts, and monitors

- Real-time monitoring of locked and long-running SQL queries

- Display of top-10 problematic SQL queries across servers

- Tracking and comparison of configuration changes

- File-based log monitoring for Amazon RDS for MySQL

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