PERCONA

What is "*Fully Managed*" in the Cloud?

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Record numbers of businesses are investing in "as-a-Service" (XaaS) infrastructures and moving parts (or all) of their IT infrastructure to public clouds. Many of these same businesses are moving their databases to the cloud as part of this trend. Why? The promise of the cloud is easy setup, simplified management, guaranteed availability, and on-demand scalability — all at a knowable price with no surprises.

In the minds of companies moving their database to the cloud, this translates to a one-and-done decision that comes with a low overhead: database instances, on demand, with little to no oversight or hassle. You probably can even reduce the number of DBAs on staff! But is it true?

In reality, cloud providers provide an excellent resource for creating and maintaining cloud database infrastructure, but do not provide the necessary technical expertise that gets the best business value out of your database. It is a company's responsibility to develop, implement, and optimize the architecture that most serves their business goals.

So, when moving the database to the cloud, should you just let the cloud provider be your database expert? Who in your company is responsible for database performance?

The State of Enterprise Open Source

Once viewed as the "wild-west" stepchild of commercial software, open source software (OSS) is now a mainstay in enterprise businesses. Companies are adopting open source software at an increasing rate, and show every sign of continuing this trend. Enterprises — well-known, well-branded ones — now regularly include open source software as part of their business strategies and IT architectures. In fact, some of the biggest names in internet businesses were built using open source software.

Further evidence of this trend is visible in the number of companies that now offer open source software solutions to these large enterprises. Today there are over 40 public companies that have an open source product as part of their solution (versus 20 in 2016 and five in 2014).

More proof is seen in the number of newsworthy business stories around open source software:

• Red Hat acquired by IBM for $34 billion
• Elastic and Pivotal IPOs
• Mulesoft and GitHub acquisitions
• MongoDB triples its market value
• Cloudera and Hortonworks merge

We can also see changes in the ecosystem itself. "Open source" used to mean fully free and available software, with a license that allowed anyone to use and reuse the code. Now, there are many different types of licenses available: GPL, open-core, source-available, SSPL, etc. Mostly these new "open source" licensing models were developed so that the primary owners of the open source code could monetize what used to be given away.

Open source database software is definitely part of this new trend. MySQL, MongoDB, PostgreSQL, and others are now commonly seen in most major enterprise database environments. In fact, PostgreSQL — a database that has been free and open source for more than 20 years — was named Database of the Year in both 2017 and 2018, and is a proprietary database migration target of choice.

As open source databases become a more viable alternative in enterprise strategy, more companies are attempting to capitalize on their popularity. Companies providing open source databases are moving away from the totally free model that was used to build popularity, to a subscription or "some-features-free" model, causing tension between open source vendors and users.

Why Enterprises Adopt Open Source

So, what is driving enterprises to adopt open source software (and open source databases specifically) as a vital part of enterprise business strategy?

Percona recently conducted a survey of companies asking about their open source database "footprint." In that survey, roughly 69% of companies that responded say open source is an important part of their business operations. There are several reasons why it is a crucial factor:

Cost savings

80% of respondents in the survey say cost savings is a big factor in adopting open source software. This makes sense, as almost all open source software has at least some free or "community" version available. This means there is little to no capital or operating costs associated with the software itself.

No vendor lock-in

62% of the survey respondents say that preventing long term contracts with vendors is an important reason to adopt open source software. This helps businesses remain agile and respond quickly to changing customer needs or development plans.

Community resources

53% of the survey respondents cite the community as a big reason to adopt open source software. The open source community provides insights, fixes, workarounds, and general software knowledge to anybody who participates. allowing companies to crowd-source issues and development ideas.

There are still reasons that enterprises are wary of open source software. including:

Lack of support

54% of enterprises responding to Percona's survey list lack of structured support as a reason that prevents them from adopting OSS. And yet, this same survey reports that 64% of companies rely on self-support when running open source database technology.

Bugs

41% of survey respondents say that possible bugs in OSS software are a concern. However, OSS often goes through the same rigorous testing as commercial software, and arguably even more — the community acts as a real-world QA laboratory for OSS, as well as a bug tracking and resolution repository.

Security and compliance

35% of survey respondents list concerns with security and compliance as reasons to hold off on deploying open source software in their IT infrastructure. 30% of companies have sustained breaches in the past year, and 60% in the past five years. There have already been 1,903 incidents in 2019 (versus 1,200 in 2018). While security concerns are always an issue, even community versions of open source databases have robust security features. Insider mistakes are the leading cause of security incidents.

Still, the advantages of open source are winning over many converts that traditionally used commercial software for database environments. And with the commercialization of open source to an extent, we see the rise of a new model based on open source software: cloud provided services.

Open Source Databases and the Cloud

Everybody is moving everything to the cloud — "as-a-service" models for just about every aspect of business IT architecture are taking off exponentially. Enterprise cloud deployment of what were traditionally on-premises IT architecture is also the new norm. Database as a service (DBaaS) is a rapidly growing sector of the cloud provider model, and cloud and open source databases are frequently mentioned in the same enterprise discussions.

The need for start-ups and small businesses to deploy applications and services quickly, and for enterprises to react quickly to changes, is driving the move to the cloud. The factors driving enterprise databases to the cloud are:

Providing access to data anywhere	Enhancing disaster recovery capabilities	Reducing the support burden on IT staff
Desktop virtualization is popular, with employees traveling further and for longer, and companies becoming more global and connected. Having access anytime, any place is vital for success and the cloud enables companies to meet their growing demands.	Companies depend on their IT infrastructures. Without it, activity grinds to a halt. Business continuity is vital in this fast-paced world and the cloud's scalability enables companies to have confidence in a recovery plan that minimizes the impact of a disaster.	Managed IT services are an extension of a company's IT team, allowing them to focus on other key activities within the business.

DBaaS is winning enterprise converts because it provides convenience, supports agility, and enables operational simplicity — all of which help businesses manage their bottom line and achieve business objectives.

From the Percona Open Source Database survey, we learned the following information:

• 50% of respondents run databases in the public cloud, and 70% of those respondents are using Amazon Web Services (AWS). AWS continues to be the leader in the public cloud market.

• 38% of respondents are not only running their database in a cloud environment but are also using a DBaaS offering (with 74% of those explicitly using AWS). Of those using a DBaaS service, Amazon RDS is twice as popular as other offerings.

• 38% of large enterprises (more than 5,000 employees) are using multi-cloud deployments — in other words, they aren't relying on a single vendor for DBaaS or cloud database hosting. This could also be a combination of public, private, and hybrid options.

Along with most other business IT architecture, open source databases are being deployed in the cloud more often and being provided as a service (DBaaS). The drive behind this is ease and simplicity of deployment and fast scalability. The focus for these enterprises is offloading as many and as much of the routine tasks as possible to a third party service. Anything that can be done out-of-house, or automated, under one contract cost, should be.

Database Management in the Cloud

Even in a managed cloud environment, bad things can happen to a database. Despite all of the promises of simplicity, reduced complexity, and automation, Percona's recent survey showed that 42% of respondents had product performance issues in cloud deployments, and 21% had unplanned downtime.

Automation is a great tool to manage complexity, however, it's just a tool, not the solution to complexity. Automation can also automate poorly executed solutions — making them much worse over time.

Cloud vendors often use confusing language around "Fully Managed" that does not match users' expectations. Configuring, tuning, securing, and optimizing a cloud database is still a "shared responsibility."

"Fully managed" in the cloud does not mean the same thing and doesn't provide the same services as what a common understanding of fully managed in the real world. Easy and automated operations aren't the same thing as painless, secure, and optimized. Don't mistake the benefits offered by DBaaS platforms for the needs of specific applications or organizations.

In the Cloud, Every Solution Looks like a Server

The cloud business model is based on consumption. A company pays for access to infrastructure and the use and maintenance of that infrastructure. The more they use, the more they spend. This can lead to over-provisioning to solve problems like performance and high availability.

The database is not responding fast enough to application requests? **Buy more servers!**

Customers are experiencing long waits for applications to provide service? **Buy more servers!**

Global high availability suffering? **Buy more servers!**

A pattern is clear. The answer to most performance and scalability problems from a cloud provider is almost universally going to be to **BUY MORE SERVERS**!

Once a database is in the cloud, it can be tempting to think all application performance issues will be handled by the provider. After all, the provider guarantees uptime and access, has built-in redundancies to ensure access and typically handles data backup and scalability. If a database is struggling with performance issues, the initial temptation is to solve it by adding more instances or more services. It's much easier for a service provider to "throw more instances" at performance issues instead of looking at ways to create a more efficient database design or other cost-effective remedies. If adding instances becomes a go-to strategy to improve performance, then any cost advantages gained are quickly eaten up and achieving ROI takes much longer (or disappears entirely).

Even though it is easy to buy more cloud resources, this ease of scaling can come with a quickly escalating (and recurring) price tag. Even if cost were not the primary reason for moving to the cloud, it's important to take an active role to ensure the infrastructure is designed and maintained as efficiently as possible so a company isn't wasting money.

DBAs must also still be actively involved in the administrative and performance aspects of a database, even if a company outsources DBA responsibilities. For instance, while a cloud provider may handle data backup, they don't necessarily test the viability of those backups

The Need for Cloud Support

So, what does "support" actually mean — both in and out of the cloud? And how can a company determine if they need more than the support available from a cloud provider?

Generally speaking, databases are managed by database administrators (DBAs). These are the people that make sure databases are running, available, safe, and working well with the applications that need data.

A DBA performs many routine tasks for a database environment: installing software, upgrading and patching software, creating new database instances, planning capacity, setting up and managing permissions, ensuring security, and managing backups (this is only a brief list of tasks, there are many and different ones depending on the database environment).

LOOKOUT CASE STUDY

Lookout

As a mobile security company, Lookout's database environment is crucial to providing customers with security assurance for mobile devices. Their databases store critical data for their mobile security applications. Lookout uses Amazon Web Services (AWS) platform, with Aurora as their main database software.

Lookout needed to ensure that as they grow and increase their customer base, their database environment remained responsive and available – with an eye to increasing efficiency and more effectively using their AWS deployment.

Lookout chose Percona to help them investigate how to best ensure uptime and reduce overhead. They found Percona through its reputation as a leader in database and cloud environment optimization techniques. Lookout engaged Percona Managed Services to check their systems and verify if everything was configured and integrated according to best practices.

The first step was a Percona Database Performance Audit. Percona cloud database experts pinpointed ways to reduce Lookout's cloud footprint. Their initial configuration involved 35 sharded master/slave pairs. They decided to move their architecture from a sharded master/slave topology to a micro-services-based infrastructure.

Percona's recommendations and expertise helped successfully migrate Lookout's AWS configuration from 35 master/slave pairs to only 10 server instances. This not only simplified their environment, but saved them significant OPEX costs – nearly 500K per year.

Percona's Lookout case study provides more details on they maximized AWS performance while minimizing AWS costs.

A DBA is also responsible for monitoring the database for issues and — if they occur — finding solutions. They should also need a system in place to alert them of crashes that stop access to data. They also must understand the database environment changes needed to meet growing data demands. This can include requirements for scalability, hardware upgrades, and high availability architectures.

The task-oriented work of a database environment can be very repetitive and time consuming. It's important, but not terribly complicated for a well-versed DBA. Some of these tasks, such as backups, are automated and done during low traffic times to minimize the impact on system resources.

For many years, the majority of DBA's jobs revolved around these day-to-day tasks. And they are still important. But in today's app-driven, data-intensive landscape, simply keeping the database environment "dusted and well-swept" isn't enough. Maintenance needs to be done, but the larger and more important job of making sure the database environment is optimized to achieve the business goals of the company and meet the needs of applications, services, and customers is a much larger and more important part of the DBA role.

The more time a DBA allocates to the day-to-day managing of the database itself is less time that can be spent planning and optimizing the database and application interaction that improves the IT architecture. This, in turn, allows businesses to improve existing processes, scale to meet larger customer bases, and roll out new applications and features faster.

This is where "cloud management" and "real-world management" diverge.

Cloud Support vs. Cloud "Support"

Most cloud providers offer the support needed for the day-to-day maintenance tasks and easily automate routine things such as software updates and backups. They don't, however, provide expertise on how to architect a database environment to meet the specific needs of specific applications and customers' experiences.

Cloud providers do not replace the strategic technical expertise and business value of the DBA function. It is a company's responsibility to develop, implement, and optimize the architecture that best serves their business goals.

This is a subtle point that often gets missed when companies move their database to the cloud. In the rush to simplify infrastructure and minimize costs, moving to the cloud often seems like a "one-and-done" solution. It is not.

The out-of-the-box setups found as part of cloud providers' offerings are just that: out of the box. They aren't bad, per se, but they also aren't optimized. There are many configuration variables, options, and decisions that should be made in order to best accommodate the needs of any particular business.

Applications and databases — the interactions they share — are living, breathing organisms that require tuning and attention. Applications and databases need to be optimized to work together. Even the best cloud setup will experience unforseen downtime.

To further complicate matters, many enterprises don't use just a single cloud anymore. Multi-cloud environments are becoming a new norm. Gartner's latest data shows that 81% of large enterprises use more than one cloud provider. Percona's own open source database survey supports this conclusion and found that 41% of large enterprises are using more than one cloud.

Amazon itself is pretty explicit about what it does and doesn't cover in a series of blog posts on databases in the cloud and DBaaS services. Cloud providers on the whole view this work and personalization as a company's responsibility, not theirs. This leaves the open question of who in an organization is responsible to guarantee that data doesn't prevent a business from achieving its goals?

The New Role of the DBA

As we've stated, the role of the DBA over the past decade has shifted from ensuring access and availability to better understanding business needs and how to architect, design, and scale the database to meet them. This is a far cry from the classic enterprise DBA's top responsibilities: keep it up, keep it backed up, and react to issues as they present themselves.

When a company migrates its database to the cloud, many of the mundane day-to-day tasks are covered by the cloud provider's support services But this does not eliminate the need for database expertise: it just means that database expertise is now needed at a more conceptual level: how do we make the database function as a driver of the company's business goals? How does the database best support the applications, services, and customer needs?

The new role of the DBA is to design and tune the database to support the application, but also has to understand how to build the modular pieces available in the cloud into a cohesive scalable unit that meets the needs of the application and the company. This means there are much higher impacts and clearer ROIs realized from efficient database expertise.

Percona has strong data to support this shift as well. More than 50% of the support tickets from our customers are now related to application design issues, query performance, or database infrastructure design. This is a marked change from just five years ago, when these represented less than 20% of our overall caseload.

[In fact, we wrote a blog about it!](#)

Respondents in a recent Percona survey claim that the fact that open source software doesn't generally include support options is a limiter to OSS adoption. However, and somewhat contradictorily, respondents generally agree that they prefer to self-support their open source database environment rather than pay for support.

Why the apparent discongruity? It probably has to do with the nature of open source software, and the fear of vendor lock-in.

Open source software is traditionally a "developer" domain. The community is populated with coders who like to solve problems. It thus stands to reason that they are the ones who want to "fix" issues. As more and more open source software was adopted by enterprises, most likely this attitude was adopted as well — both by the technical people implementing solutions and by management who was all-too-happy not to pay for support.

Given that most large enterprises don't use a single database (variants of MySQL, PostgreSQL, MongoDB, and other databases), and that many large enterprises don't rely on a single cloud provider for cloud services, cloud database deployments are growing more and more complex.

The nature of today's cloud database deployments means "we can be our own experts for everything" mindset probably doesn't scale well. While many people can be an expert on a single solution, few are experts on multiple solutions. As the complexity of database environments increases, and includes different databases spanning on-premises and cloud or multi-cloud environments that have to interact with many types of applications and services, finding experts that can handle every scenario is difficult.

And, having just moved away from commercial software in order to avoid vendor lock-in, it seems antithetical to now buy support from a vendor such as a cloud provider. A cloud provider is going to support their cloud, and as discussed, many (if not most) companies are moving to multi-cloud environments.

There is a solution.

How Percona Fully Manages Cloud Database Deployments

Percona is a leading provider of unbiased open source database solutions that allow organizations to easily, securely and affordably maintain business agility, minimize risks, and stay competitive. We fill the gaps in support that cloud providers don't cover.

Percona experts get the most out of cloud database environments, and optimizes, secures, and tunes the databases to a specific application workload. Percona can optimize an Amazon RDS, Amazon Aurora, Amazon EC2, Google Cloud SQL, Microsoft Azure, or some other cloud database environment, for maximum ROI and minimum complexity.

Percona helps scale, build, and manage many of the databases that power today's internet ecosystem. Percona is uniquely capable of helping organizations optimize business performance by ensuring a dependable and secure database uptime. Our best practices for MySQL, MongoDB, MariaDB, PostgreSQL, and other open source database software on-premises or in the cloud help companies of any size meet high availability and business continuity requirements so the user experience is never interrupted or delayed.

Percona is the trusted partner for finding the best cloud database deployment strategy. If a company is currently using a DBaaS, IaaS, PaaS, or needs assistance with migrating an open source database to the cloud, we provide unbiased, in-depth experience with multiple open source databases and cloud platforms. Percona is cloud-agnostic, we partner and support all major cloud providers. We can help get the most out of the systems in a single provider or across multiple clouds.

Percona helps keep our customers' costs low — companies save more with us than without us. Percona has over a decade of experience supporting multi-vendor cloud environments which translates into better performance and availability, improved cost savings, and higher ROI for every customer.

To learn more about how Percona can help you, contact us or email us at sales@percona.com.