Solution Brief



Keeping Your Critical Website Always Online

Operating Percona XtraDB Cluster In On-Premises Environments

This solution brief outlines a way to ensure replication and multi-primary capabilities using a Percona XtraDB Cluster on-premises architecture, built with Percona Server for MySQL and the Percona enhanced Codership Galera Library.

This is a great option for:

- Industries or websites that require high data integrity and have strict consistency requirements
- Companies with in-house or external dedicated database resources
- · Applications with read-heavy workloads



Summary

An on-premises environment running <u>Percona XtraDB Cluster</u> provides high availability and data consistency within one datacenter but involves added complexity compared to deploying and running a standard MySQL® environment.

Percona XtraDB Cluster's automated failover and recovery allows your database to continually service the application transparently, with ProxySQL directing traffic to available nodes. <u>Percona Monitoring and</u> <u>Management (PMM)</u> provides advanced visibility into your database environment. This architecture is a good fit for financial and/or healthcare applications and provides a strong foundation for more advanced deployments capable of surviving disaster scenarios.

This document describes a proven, standard, Percona XtraDB Cluster on-premises, with multi-datacenter architecture built on Percona Server for MySQL, and the Percona enhanced Codership Galera library for replication and multi-primary capabilities.

Use case

Setting up Percona XtraDB Cluster on an on-premises location, either managed by a third party or internally, is a common deployment model for websites that need their application to always be online. This architecture provides some read scaling capabilities and high availability. The tradeoff is limited write scalability.

This environment is ideal for highly visible, high-profile web applications due to the level of data consistency and high availability it provides. Percona XtraDB Cluster's builtin election protocol and multi-primary capability, with auto-recovery of nodes, provides the environment with high uptime and transparent read/write splitting via ProxySQL implementation.

This solution is tailor-made for companies with in-house or external MySQL resources, or with expertise dedicated to the database environment.



Benefits of this approach

- Quicker failover means higher application uptime with little to no application downtime and consistent data across nodes.
- Failover is transparent to applications and doesn't affect application performance.
- Provides detailed data analytics from enhanced Percona software packages.
- Grants you full control over software versions.
- · Allows you to scale read and writes as needed.
- Allows you to distribute application workload across your entire system, minimizing updates and work on applications while maximizing flexibility.
- Allows you to keep your applications up during database maintenance.
- Provides access and control of your operating system, infrastructure variables, and configuration.

Downsides of this approach

- Must manually manage software: Percona XtraDB Cluster, ProxySQL.
- Solution has a higher level of complexity and requires more DBA expertise across multiple software.
- Provides only moderate write performance, but the impact is limited as synchronous replication happens only within the primary datacenter. Disaster recovery to the secondary datacenter is asynchronous, and you can lose a few seconds of data.



ARCHITECTURE DIAGRAM



Architecture

The design is straightforward – your application servers connect to <u>ProxySQL</u>, which directs traffic transparently to the Percona XtraDB Cluster.

To minimize losses in the event of a total failure of the primary datacenter, an asynchronous node is located in another datacenter. This minimizes, rather than eliminates, data loss in the event of a disaster in Datacenter A but comes with no added write latency impact.

A server instance with Percona Monitoring and Management should be used to provide enhanced workload analysis.

Components

- 3 servers (physical/VM) for Percona XtraDB Cluster nodes*
- 1 server running PMM for monitoring/analytics*
- 1 server running Percona Server for MySQL as asynchronous replication
- ProxySQL running on each application node
- Physical backups taken with <u>Percona XtraBackup</u> and real-time binary log stream with <u>mysqlbinlog</u>

* Enabling encryption is recommended for storage.



Failover

Failover is handled automatically by Percona XtraDB Cluster through a quorum vote. ProxySQL automatically removes failed nodes from the active read pool, or shifts the primary. This requires no changes to the application. As consistency is the primary function of Percona XtraDB Cluster, no data loss occurs when a node fails and ProxySQL redirects traffic.

Disaster

In the event of a disaster in the primary datacenter, a manual process can be initiated to restore the service. This requires that the infrastructure be capable of serving the entire application.

Monitoring

For query analytics and time-based database performance information, the open source tool Percona Monitoring and Management (PMM) is highly recommended. This should be installed on a third host. PMM monitors OS and MySQL metrics and provides advanced Query Analytics.

Backups

Percona XtraDB Cluster ships with mysqldump, which can make logical backups of the database environment. The recovery time of a logical backup grows exponentially with the size of the dataset. Therefore, it is strongly recommended you use the open source tool Percona XtraBackup, which takes physical backups of the dataset, which can be restored much faster.

Backups should be taken from one of the Percona XtraDB Cluster nodes at regular intervals, stored on a separate host, and also made available via another datacenter.

To enable you to perform point-in-time recovery, we recommend you back up binary logs using mysqlbinlog.

Percona can help

Managing your organization's database operations, on-premises or in the cloud, requires in-depth knowledge of potential issues, and diligent, dedicated database software experts.

When setting up a high availability database environment, being aware of the issues we have highlighted will help protect your organization's data-based applications. It will also significantly enhance performance and scalability, enabling you to deliver a better end-user experience.

<u>Percona Support</u> services are accessible 24x7x365 online or by phone to provide assistance with tricky issues and help you keep your database running optimally.

We can provide onsite or remote <u>Percona Consulting</u> for current or planned projects, migrations, or emergency situations. Every engagement is unique, and we work alongside you to plan and create the most effective solutions for your business.

Finally, <u>Percona Managed Services</u> can support and help you manage your existing database infrastructure; whether hosted on-premises, or at a co-location facility, or if you purchase services from a cloud provider or database-as-a-service provider.

To learn more about how Percona can help, and for pricing information, please contact us at **+1-888-316-9775** (USA), **+44 203 608 6727** (Europe), or email us at **sales@percona.com**.