Formative Activity: Migrating MySQL to OpenStack with Percona XtraBackup — Windows Constraints, Workarounds, and Minimal Downtime

Objective

Migrate a production MySQL database from a local Windows workstation to an OpenStack VM with data consistency and minimal downtime, using open-source tools. The preferred tool, Percona XtraBackup (PXB), does not run natively on Windows, so I compare two practical paths: (A) use WSL2 to run Linux-native PXB on Windows; (B) use MySQL replication for near-zero downtime without PXB.

Target Platform

OpenStack VM (Ubuntu), Cinder block volume for persistent data; volumes attached with 'openstack server add volume'.

Path A (PXB on Windows via WSL2): Hot backup + cutover

WSL2 enables a Linux userspace where PXB is supported.

1. Install WSL2 + Ubuntu; install MySQL + percona-xtrabackup-80.
2. On the Windows/WSL2 source, run hot full backup with PXB; --prepare to make it consistent.
3. Transfer the backup to the OpenStack VM; copy-back into /var/lib/mysql; fix ownership; start MySQL.
4. Take a quick incremental just before cutover to reduce downtime.
5. Validate with schema diffs, row counts, or pt-table-checksum (Percona Toolkit).

Path B (Windows-native): Logical dump + replication for near-zero downtime

If WSL2/containers cannot be used, a logical initial load plus asynchronous replication achieves near-zero downtime.

1. On Windows MySQL: mysqldump --single-transaction for initial load.
2. Import on OpenStack VM; configure replication (user, binlog file/pos, START REPLICA).
3. When replication is caught up (Seconds_Behind_Source = 0), stop app traffic, promote the cloud DB, and switch DNS.

Data Consistency & Verification

Structural: Compare mysqldump --no-data outputs (schema diffs).
Row-level: Row counts from information_schema.
Replica integrity: pt-table-checksum for online consistency checks.

Reflection

WSL2 + PXB preserves the physical backup workflow and delivers short cutover times, aligning with PXB on Linux constraints. Replication is simpler on Windows and achieves near-zero downtime with MySQL Community. OpenStack Cinder volumes provide predictable performance and standard attach/restore operations.

References

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