How to update the DBMS as cloud provider? Problems:

1. A sense of urgency as security leaks might be exploited.
2. For self-service products offered to the customer: When are downtimes acceptable to the customer?
3. Rolling updates or hot standby is very expensive.

Solution: Dynamic Software Updating (DSU), a.k.a. live patching, allows to patch a running process without restart.

Global Quiescence

- Each thread needs to reach its barrier before a patch can be applied. Can cause unbounded wait times:
  1. Thread waits for user input that may never be provided.
  2. Thread performs a long running task.
  3. Deadlock can occur with inter-thread dependencies.

Experiments:

- Benchmarks: NoOp (No Operation), YCSB, TPC-C
- Database: MariaDB (10.5.1)
- Patch: MDEV-21665
  - 1 dry-run (without applying a patch)
  - 9 runs while applying a patch after “round number × 3 seconds”

System Setup:

- Server: DELL R640 (2x Intel Gold 6248R; 384 GB RAM)
- Debian Linux with WF-PATCH kernel (v5.1.0)
- MariaDB MDEV-20753
  - 1 dry-run (without applying a patch)
  - 9 runs while applying a patch after

References


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