On the Aging Effects due to Concurrency Bugs: a Case Study on MySQL

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Abstract: This study investigates software aging effects caused by the activation of concurrency bugs in a well-known database management system (DBMS), namely MySQL. Experiments with different workloads are performed in order to reproduce the most likely conditions for concurrency bugs activation. Besides the typical aging effects observed in many operational systems (i.e., a gradual degradation over time), results highlight that both available resources and DBMS performance (e.g. service rate, service time, and connection latency) can decrease with time in a hard-to-predict way. We observed that, due to the activation of concurrency bug, the DBMS enters a degraded state in which: i) the estimation of Time-To-Failure (TTF) by means of memory depletion trend analysis is highly inaccurate, and ii) the failure rate does not depend on the instantaneous and/or mean accumulated work. Results suggest that, in such cases, more fine-grain indicators and/or different techniques need to be taken into account for properly preventing failures.