The topic of maintenance pertains to environment hardware and software infrastructures, code, deployments, and data synchronization. Evolution requirements cover the code and data (zero code maintenance due to the immutable append-only convention). The CI-CD-CT requirements cover deployments and rollbacks, once again including synchronization of the relevant data. The remaining maintenance requirements cover the hardware and software of the various environments (Dev, Test, QA and Prod) of a given DGP system, and in particular how maintenance can be performed while a system remains in continuous use (100% uptime).

Requirements

1. When a requirement for 100% uptime has been specified, a system must allow for all hardware and software to be patched and updated while the system as a whole remains in continuous use.

What: *Patching the hardware, operating systems and application servers must have sufficient redundancy that is also loosely coupled enough to support patching and updating individual parts of a system while the overall system remains in continuous use.*

Why: *100% uptime does not permit the "planned downtime" of maintenance windows for a system.*

Testing: *The API Tester can be used to run load tests in lower environments while patches and updates are applied to verify 100% uptime of the system during the process.*

2. Similar to code releases, the application server farms, clusters, etc. must allow for incremental patching and updates that result in an inconsistent state between the servers in a location, and also between locations.

What: *The process of patching servers in a server farm or cluster while it remains in use requires individual nodes to be taken offline, patched, updated, and then returned to the farm or cluster.*

Why: *To achieve 100% system uptime, the system (and application servers used by the system) must allow for incremental updates of individual servers, resulting in an inconsistent configuration during the maintenance process (some servers updated, others not yet updated, etc.)*

Testing: *Lower environments with sufficient redundancy to have server farms, clusters, etc. can be used to test the maintenance process while running a load test.*