**CI/CD Pipelines and Software Deployments at Scale**

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**QUESTION:** How do we build an ideal CI/CD pipeline deployment solution for software at scale that maximises repeatability, while minimising disruption and outage time for users.

**PROJECT PURPOSE:**  The goal of this project is to ideate and simulate some of the software deployment techniques and approaches used by commercial software delivered at scale. Student will need to build an appreciation of how to take what they have already learnt and reapply it in the context of commercial software development lifecycle tooling and technologies. The ultimate goal is to model the entire journey of code, from code in an IDE to compiled code deployed onto cloud hosted infrastructure, how these approaches work at scale, with automation, and using deployment approaches that minimise outages and disruption to the end user.

**PROBLEM:**

1. Understand the scaling strategies and patterns identified below, build a super simple prototype code repo (Restful API+SQL Database) that implements these patterns,
2. Design a solution and implement a prototype deployment strategy
3. Understand the effects deployments have on usability, and the damage that use can inflict during deployments.
4. Seek strategies that optimises deployments for:
   1. Robustness and repeatability is maximised.
   2. Minimise opportunities for technical team error by using automation of deployments.
   3. Outage time is minimised for API+data layer upgrades.
   4. Outage time is imperceptible for API only upgrades.
   5. Outage time is imperceptible for Web only upgrades.
   6. Data integrity is not compromised by the upgrade.
   7. Attempted usage during upgrade does not compromise integrity.
5. Explore hosting strategies that enable high scale.

**CONSIDERATIONS:**

You may wish to consider the following for this project:

* Blue/Green deployment and in which contexts it helps.
* The difficulty in upgrading data schemas while in use.
* How replication makes database deployments more difficult.
* How at-scale architectures make deployments more difficult.

**ADDITIONAL INFOMRATION**

We have supplied a partially redacted real world solution architecture document that implements many of the principles being considered.

This document does not describe solutions to this project, rather it provides additional context for a solution architecture where these concepts have been applied.