Zero-Downtime Dreams

Bringing Live Migration to Kubernetes

September 6, 2025
New Relic Office, bangalore

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HELLO

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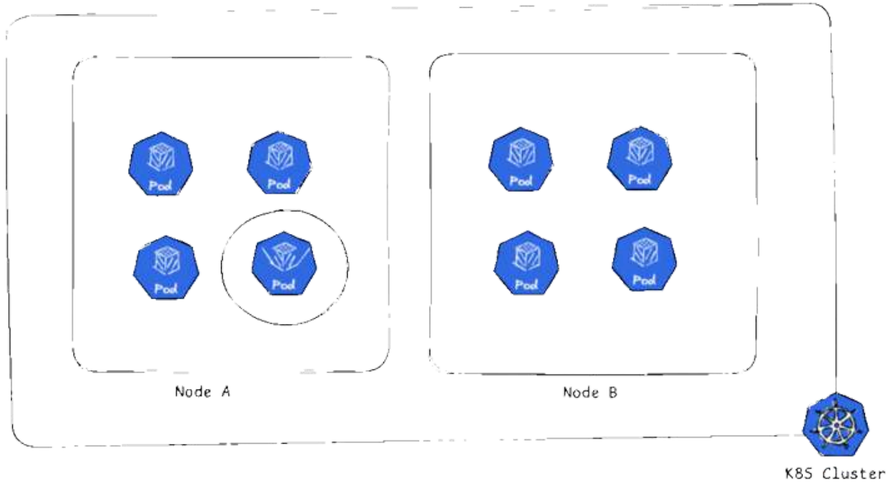
Live Migration



Container live migration is the process of moving a running container from one host server to another with minimal or zero downtime, allowing for continuous operation, uninterrupted service, and efficient resource management

Why does live migration matter?

Downtime costs

Users drop

SLAs break.

Databases

Long-running connections

ML / AI Workloads

Challenges of Live Migration

- Stateful vs Stateless: Stateless is easy (reschedule pods), but stateful is hard.
- Network Identity: Preserving IPs so TCP connections don’t break.
- In-Memory State: Migrating memory pages with minimal freeze.
- Kubernetes Defaults: No native mechanism for true zero-downtime migration.

DEMO TIME

Let’s see Live Migration in Action

Minecraft Capture the Flag Rules:
Teams: Red vs Blue – each team has a base with their colored flag

Objective: Capture the enemy team's flag and bring it back to your own base to score
Basic Rules:

- You can only capture the enemy flag if your own flag is at your base (not stolen)
- If you're holding the enemy flag and get killed, the flag drops and can be returned by the enemy team
- Flags automatically return to base after a certain time if dropped
- Check the bottom of your screen for command prompts/coordinates

CAST AI's Approach

Core Techniques

DaemonSet

Controller

CRIU

Network Magic

TCP connections persist.

Pods retain their IP addresses during migration.

Benefits & Use Cases

- Zero downtime upgrades / node replacements.
- Preemptible & spot instance automation.
- Maintenance windows without service disruption.
- Cost savings by moving workloads seamlessly.

Q&A

FAQ:

Available on :

Coming Soon :

THANK YOU FOR YOUR TIME

PING ME ANYTIME TO KNOW MORE