

# PCA Certification Guide: Section 4

Analyzing and Optimizing  
Technical and Business  
Processes (~15% of the Exam)



# Mastering Section 4 Requires Translating Abstract Theory into Concrete Infrastructure

## Theory



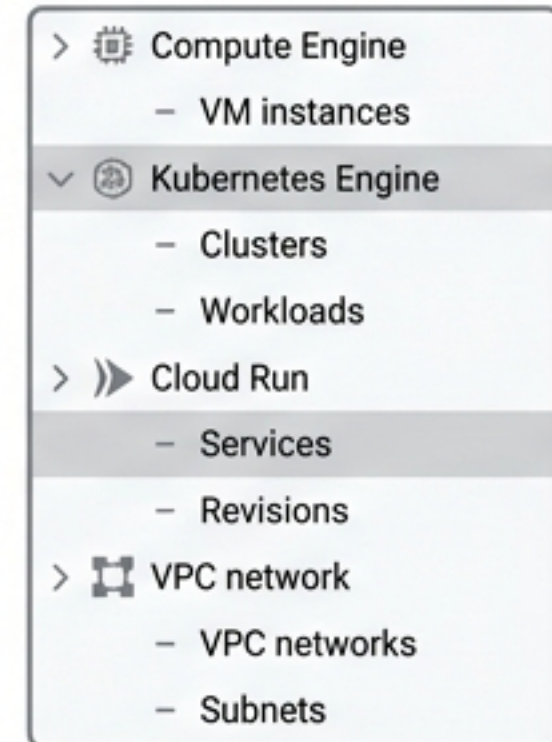
Understand the core architectural principles of shared infrastructure, App CloudRun, and App GKE modules.

## Action

```
infrastructure.tf
resource "google_cloud_run_service" "app" {
  name     = var.service_name
  location = var.region
  template {
    spec {
      containers {
        image = var.image_path
      }
    }
  }
}
```

Configure infrastructure as code using specific variables in the RAD UI portal.

## Observation



Verify the physical resulting architecture directly inside the Google Cloud Console.

# The Technical Engine: Automating SDLC and Deployment Velocity

rad\_variables.tf

```
github_repository_url (Source code)

enable_cicd_trigger (Group 7 CI)
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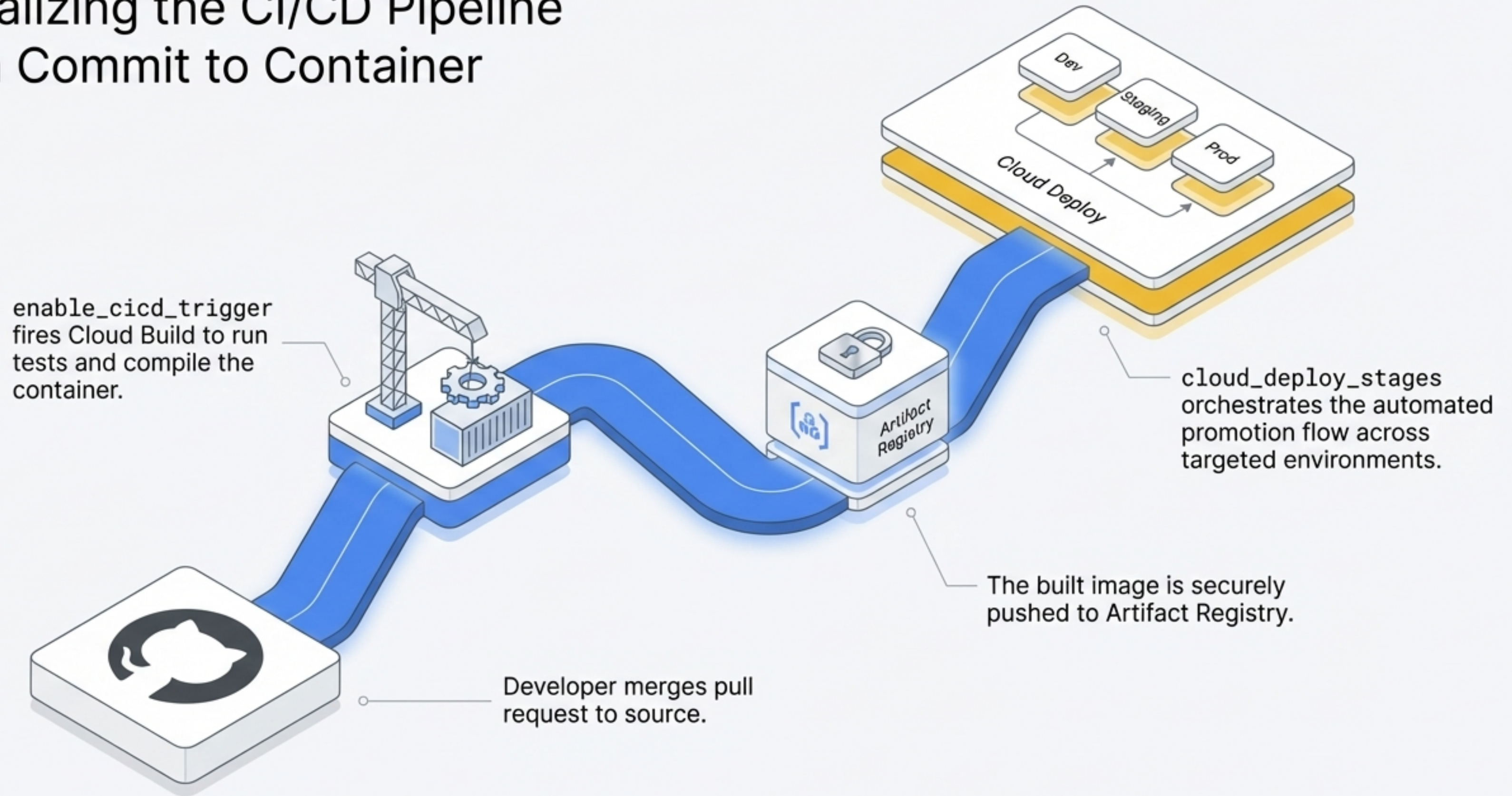
cloud_deploy_stages (Group 7 & 18 CD)
cloud_deploy_stages (Group 7 & 18 CD)
```

Target 1: Cloud Build >  
Triggers

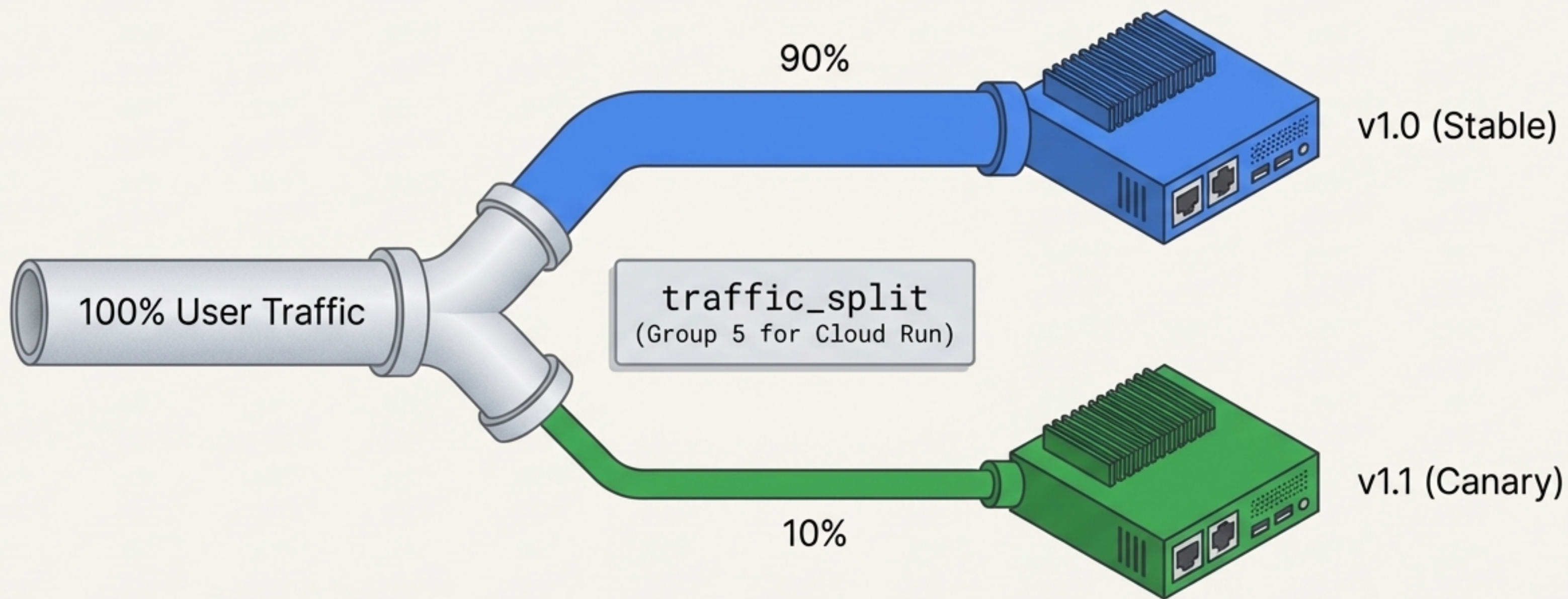
Target 2: Cloud Deploy >  
Delivery Pipelines

Automating testing, integration, and deployment to maximize deployment velocity and reliability.

# Visualizing the CI/CD Pipeline from Commit to Container

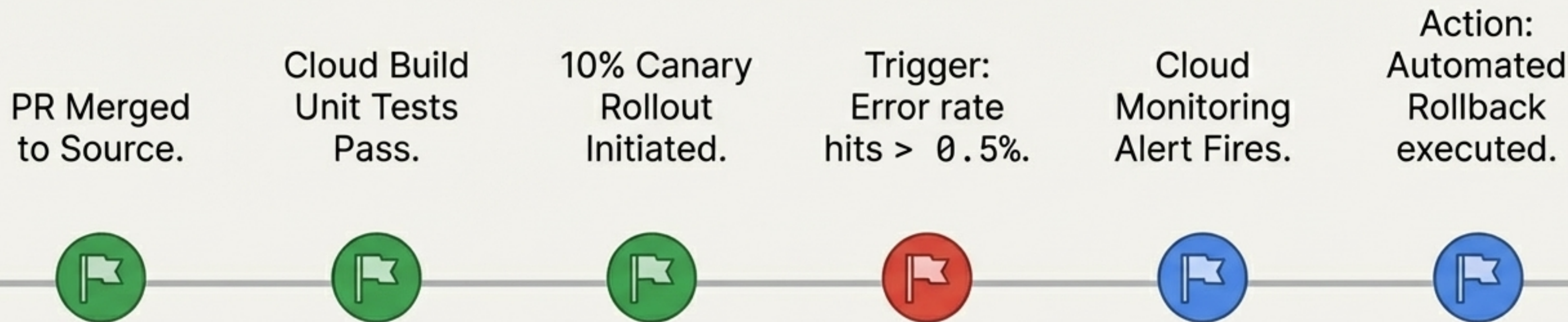


# Validating Safely at the Infrastructure Layer via Traffic Splitting



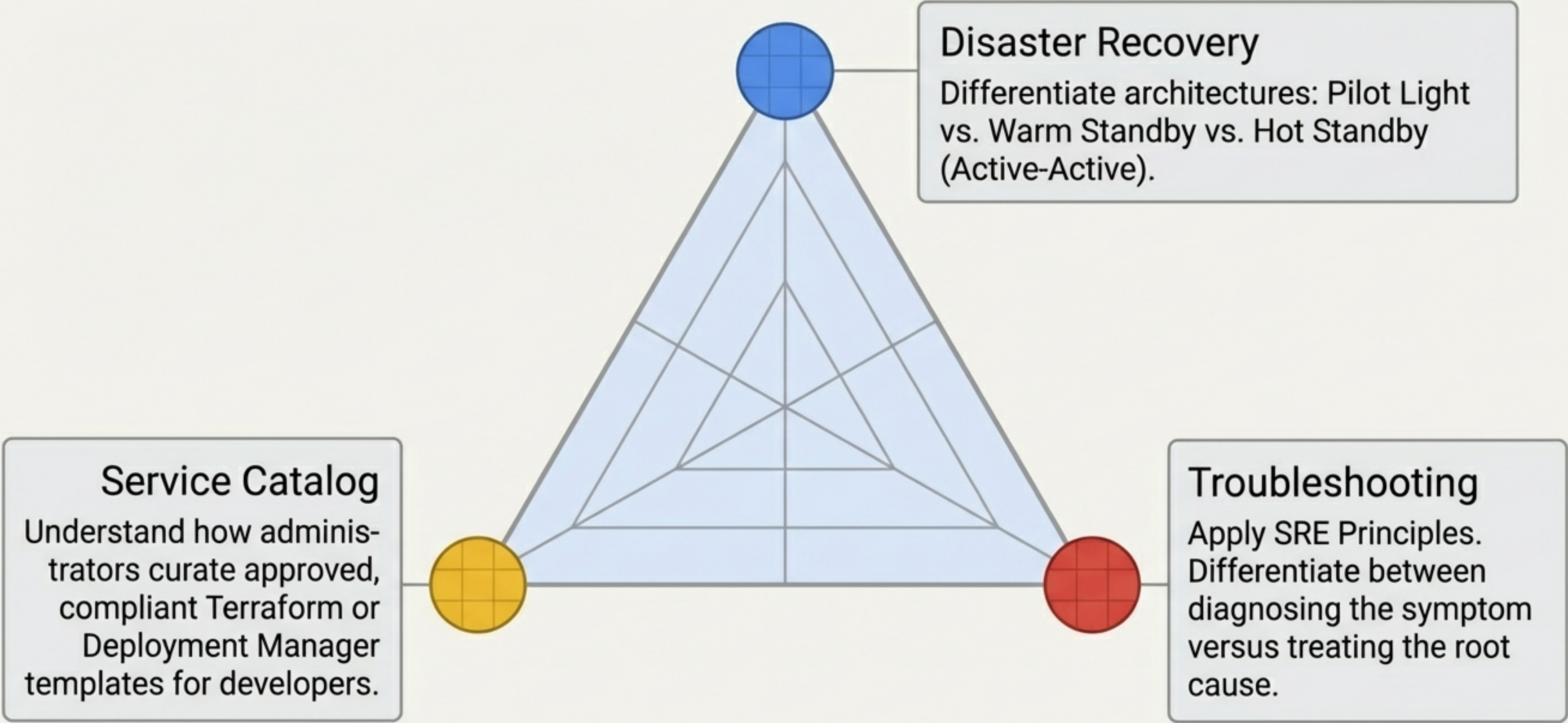
Check the Revisions tab in Cloud Run to verify infrastructure-layer A/B testing and canary rollouts. This configuration allows teams to safely validate software with live traffic while minimizing blast radius.

# Incident Response Timeline: The Payments API Canary



**Diagnosing symptoms vs. treating root cause:**  
Automated rollback treats the symptom; Cloud Profiler finds the memory leak (**root cause**).

# Self-Study Radar: Advanced Technical Objectives



# The Business Governance Layer: Change Management and Cost Optimization

rad\_variables.tf

min\_instance\_count (Group 3 Serverless scaling bounds)

Implicit Configuration (Cloud Deploy manual gates)

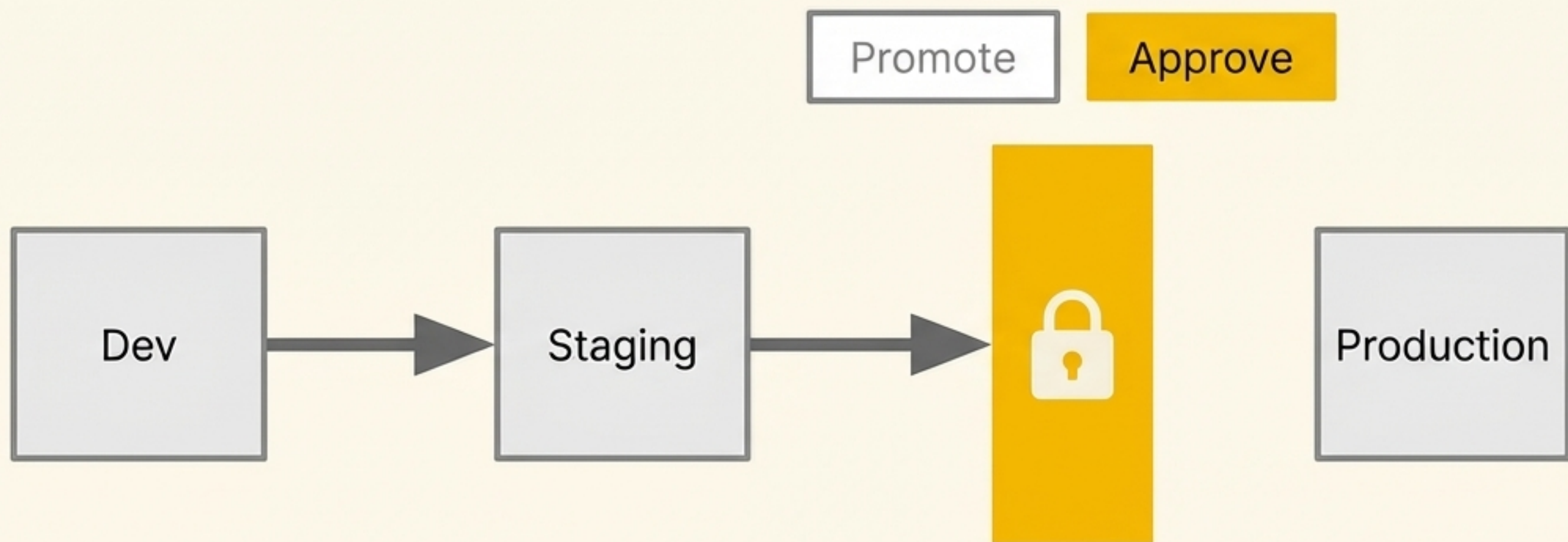
Business Reality

OpEx Optimization:  
Replacing static VM CapEx  
with serverless bounds.

Compliance: Enforcing  
auditable release processes.

**Ensuring organizational checks, balances, and financial optimizations are enforced during operations.**

# Implementing Compliance-in-Code via Manual Approval Gates

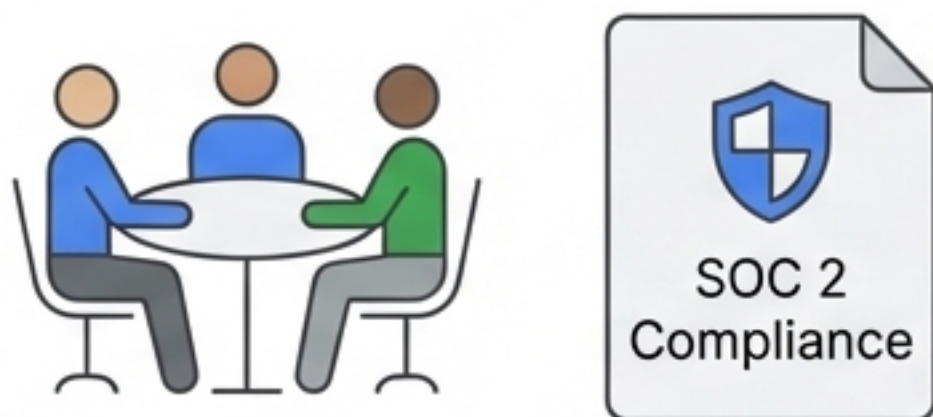


Navigate to Cloud Deploy > Delivery pipelines, click on a release, and observe the 'Promote' and 'Approve' workflow buttons. These gates ensure business continuity and compliance.

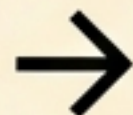
**Automated where possible, gated where necessary.**

# Executing Business Constraints: The Insurance CAB Workflow

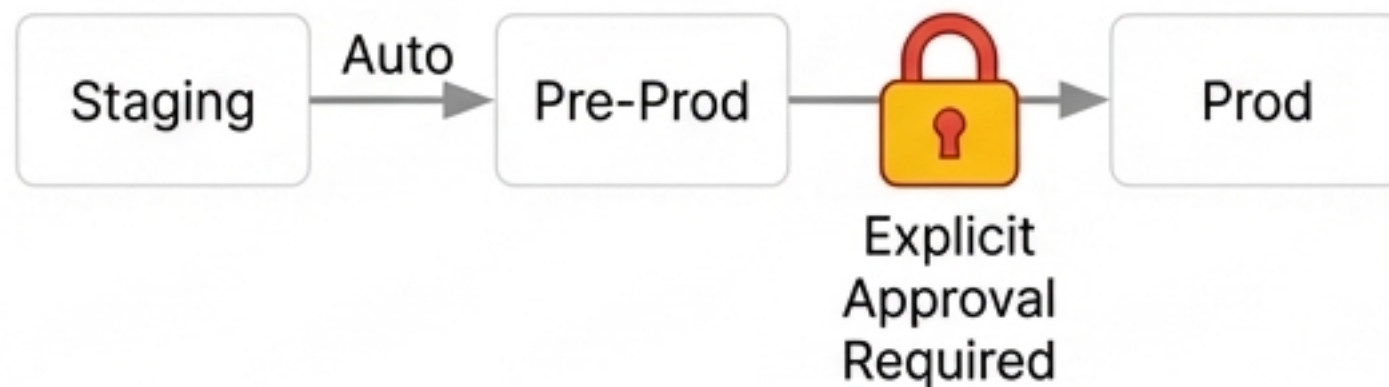
## The Business Requirement



A regulated insurance company requires a Change Advisory Board (CAB) sign-off before any production deployment to satisfy SOC 2 controls.



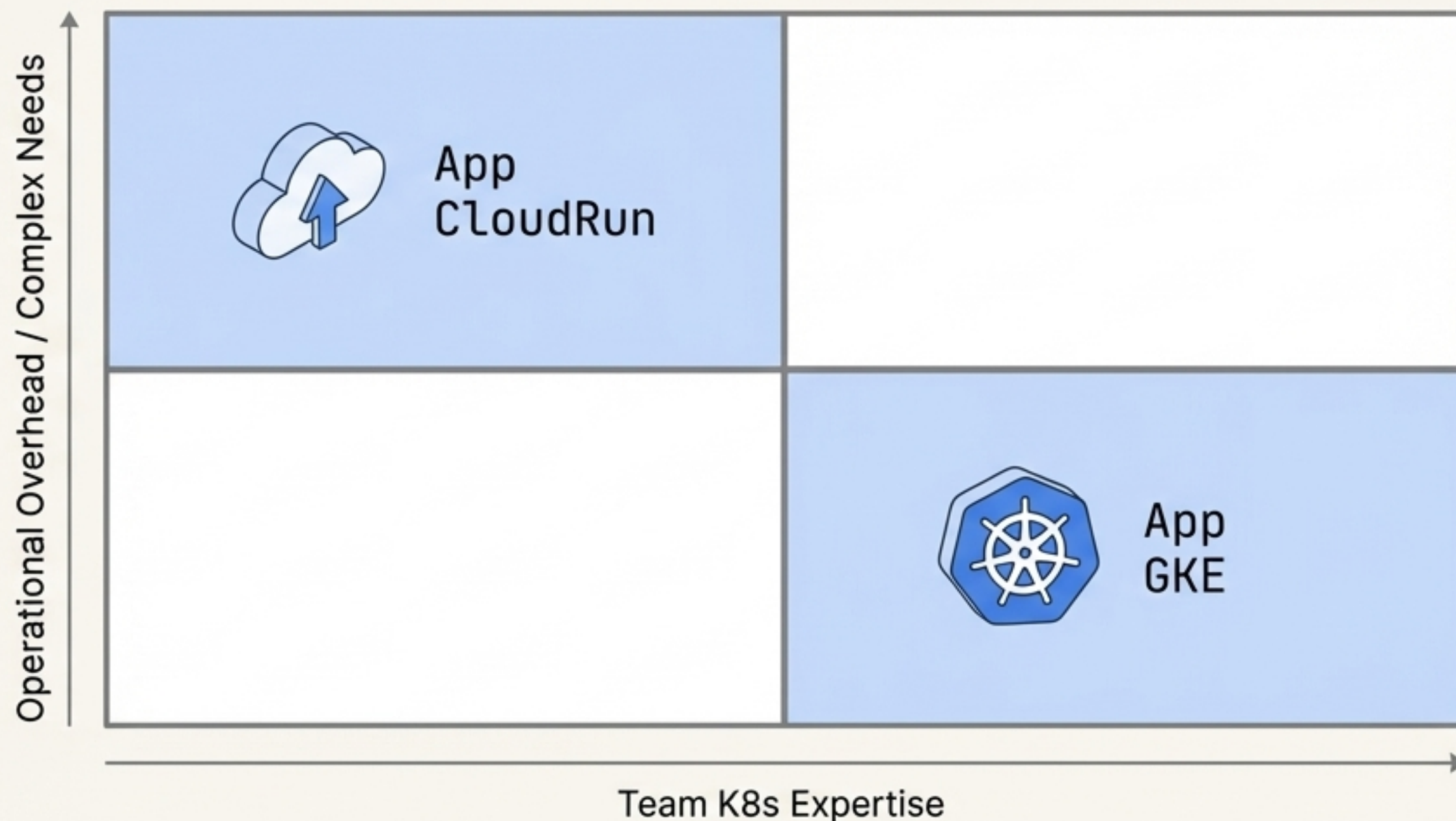
## The Technical Execution



Cloud Deploy's manual approval gate enforces this process. The designated release manager must explicitly approve the promotion to production, creating an auditable, tamper-proof record of the change.

# Platform Selection is Constrained by Operational Skill Readiness

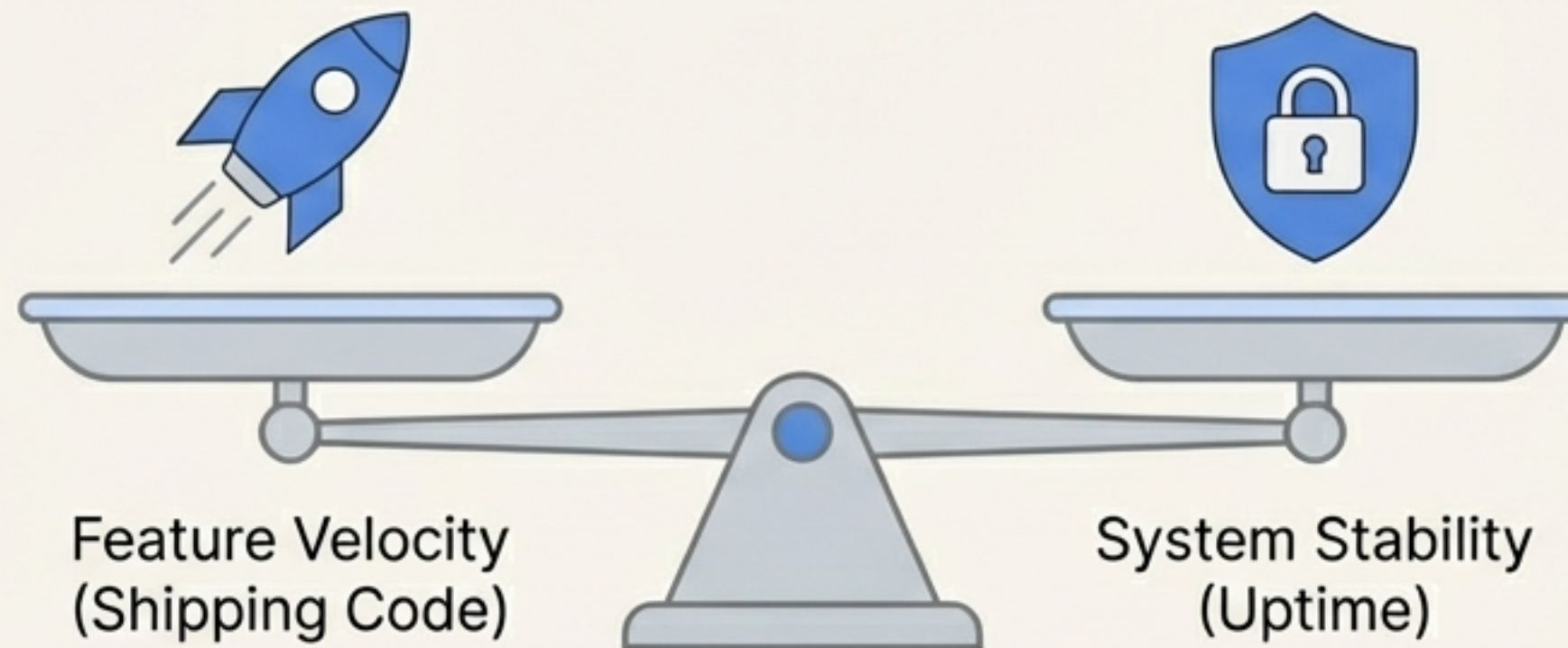
Recognize when a team lacks the skills to manage Kubernetes (GKE) and pivot the architectural design to a lower-overhead platform like Cloud Run.



**Architecture isn't just about technical limits; it's constrained by the operating team's skill readiness.**

# The SRE Equation: Balancing Velocity with Stability

$$100\% - \text{Service Level Objective (SLO)} = \text{Error Budget}$$



Error Budgets mathematically determine a team's decision-making process. They answer the critical business question: 'Should we build new features today, or freeze deployments to fix technical debt?'

# The Architect's Translation Dictionary

<b>DevOps Metrics</b>	<b>Executive Metrics</b>
Reduced P99 Latency by 200ms.	Increased conversion rates by 2%.
Shifted to serverless min_instance scaling.	Replaced fixed CapEx with optimized OpEx.
Automated Cloud Deploy rollback on canary.	Protected customer trust and minimized SLA penalties.

**The Professional Cloud Architect acts as the vital bridge between Google Cloud infrastructure and business outcomes.**