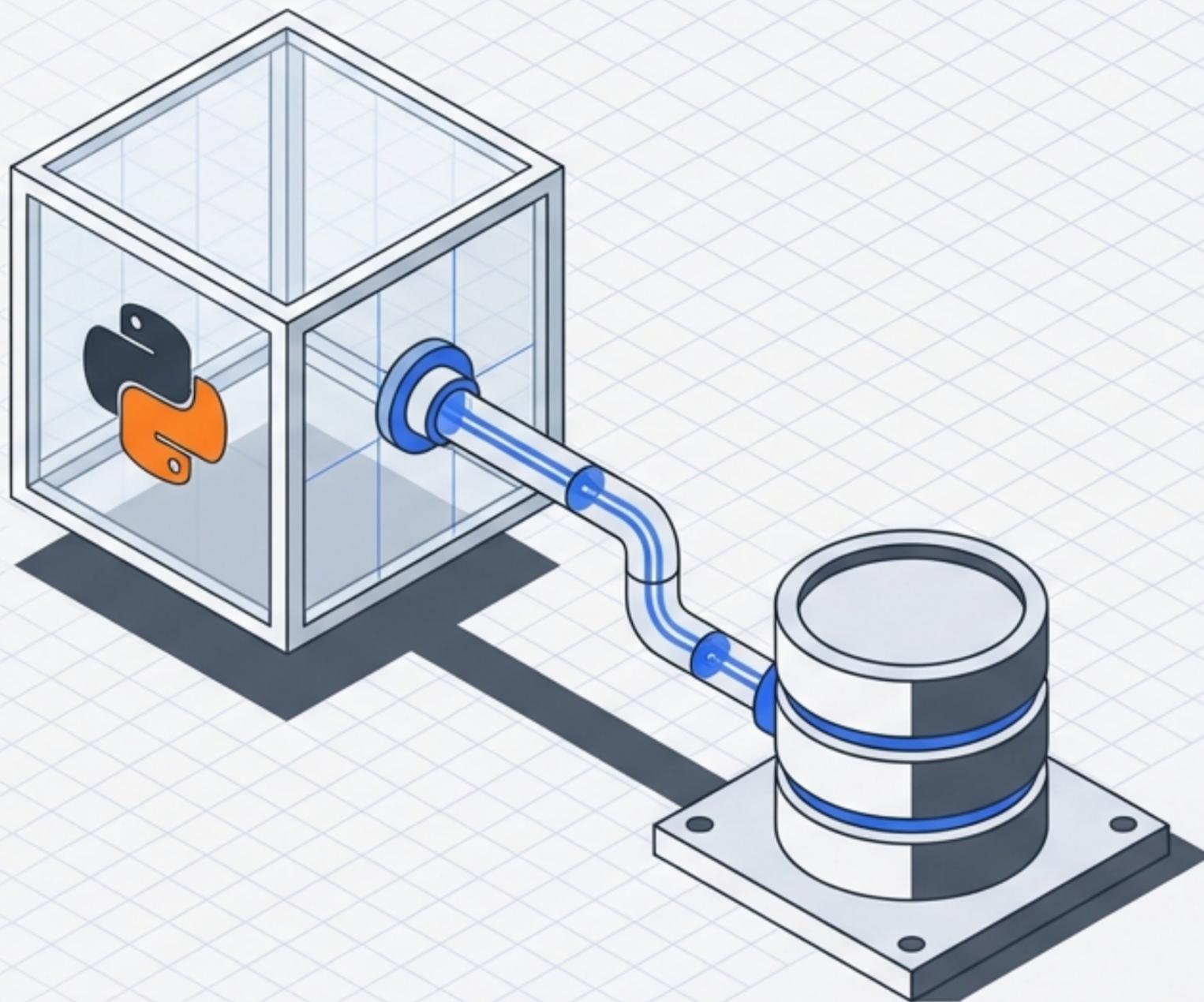


RAD Platform: Sample Module

Reference Architecture Blueprint

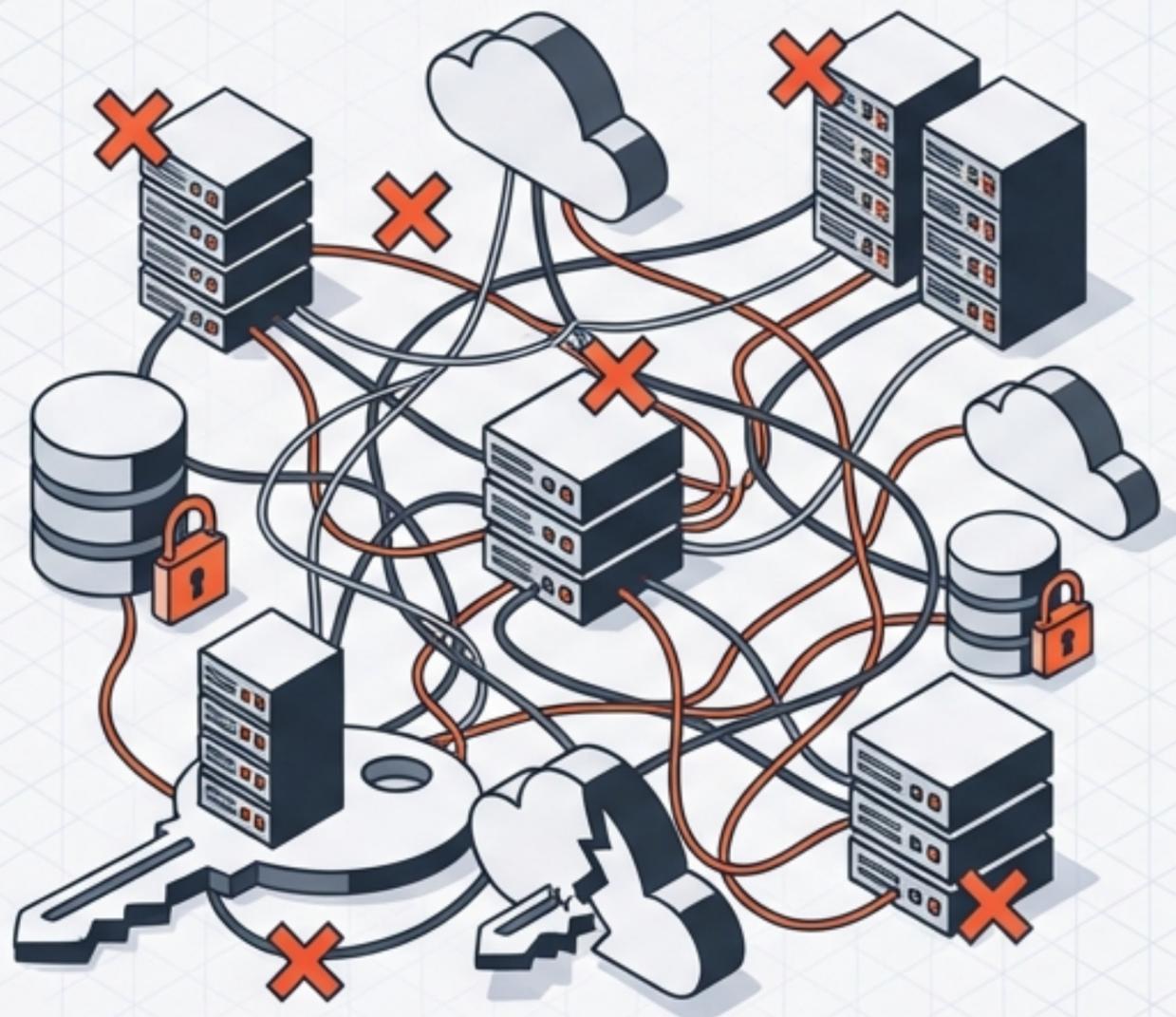


A production-ready standard for Serverless Python applications on Google Cloud. Defines infrastructure, security, and networking patterns.

v1.0 / Technical Standard

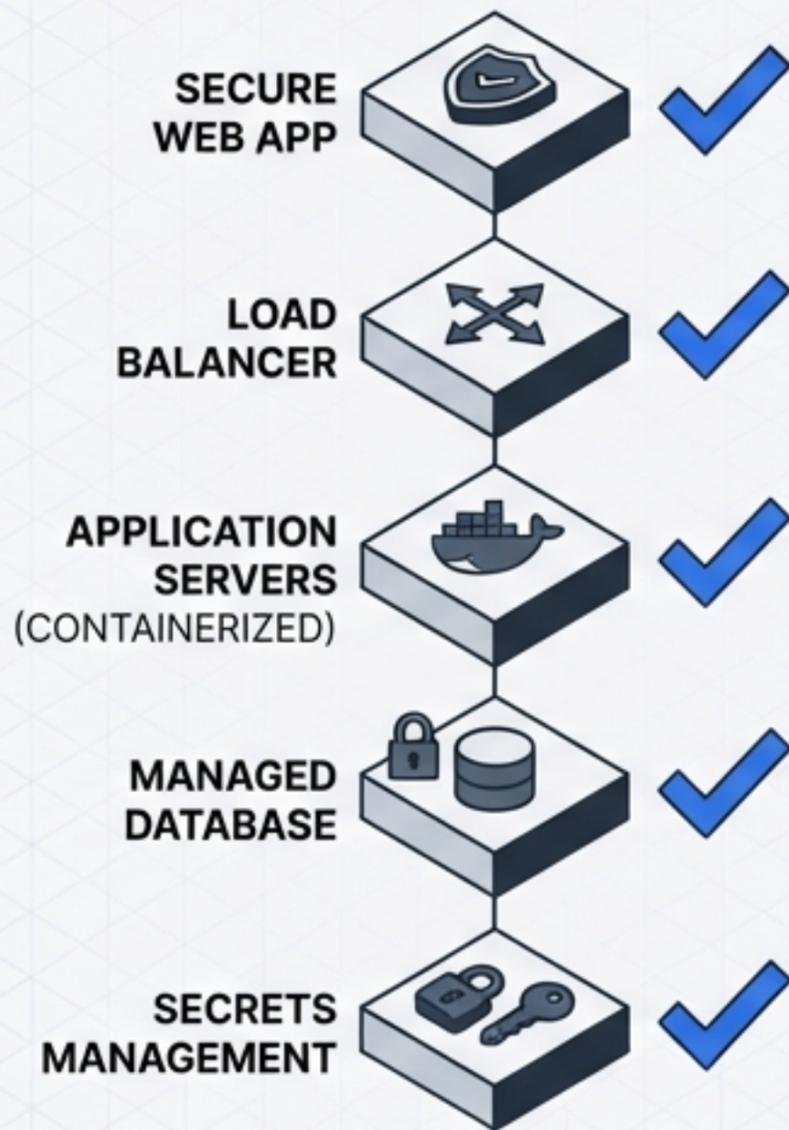
A Standardized Pattern for Secure Web Applications

Ad-hoc Deployment



Manual configuration, security gaps, drift.

RAD Sample Deployment



Automated, secure, compliant.

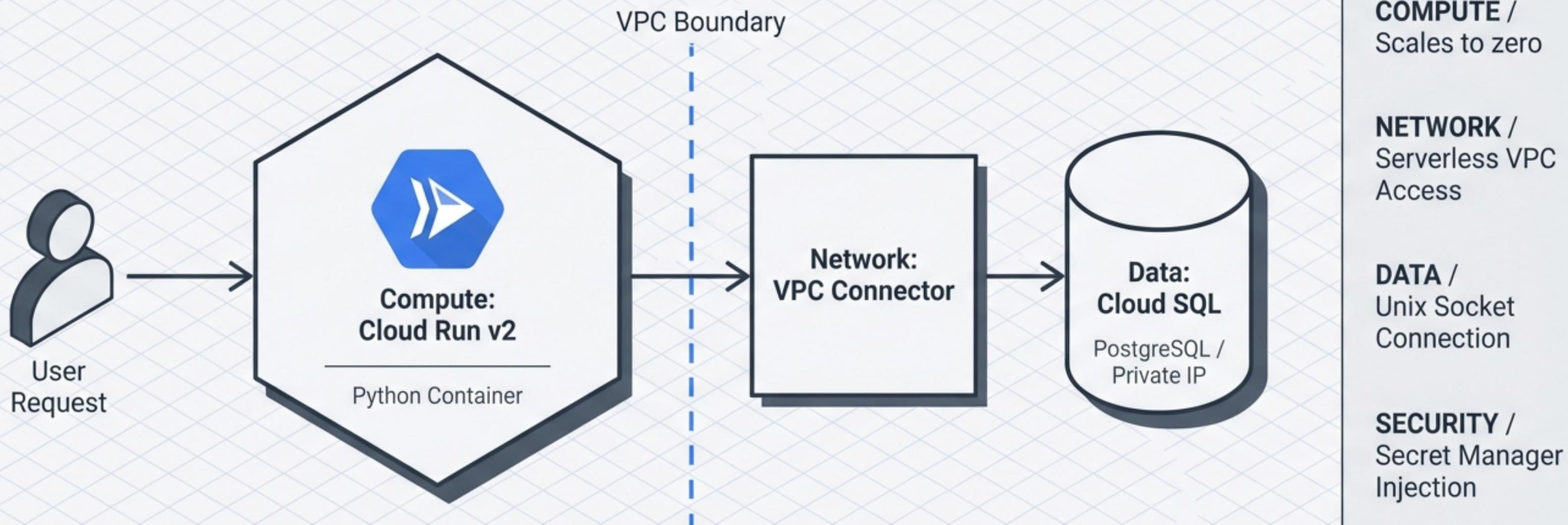
Containerization
Docker Runtime

Database Init
Automated Schema

Secrets
Secret Manager Integration

Networking
Private VPC Access

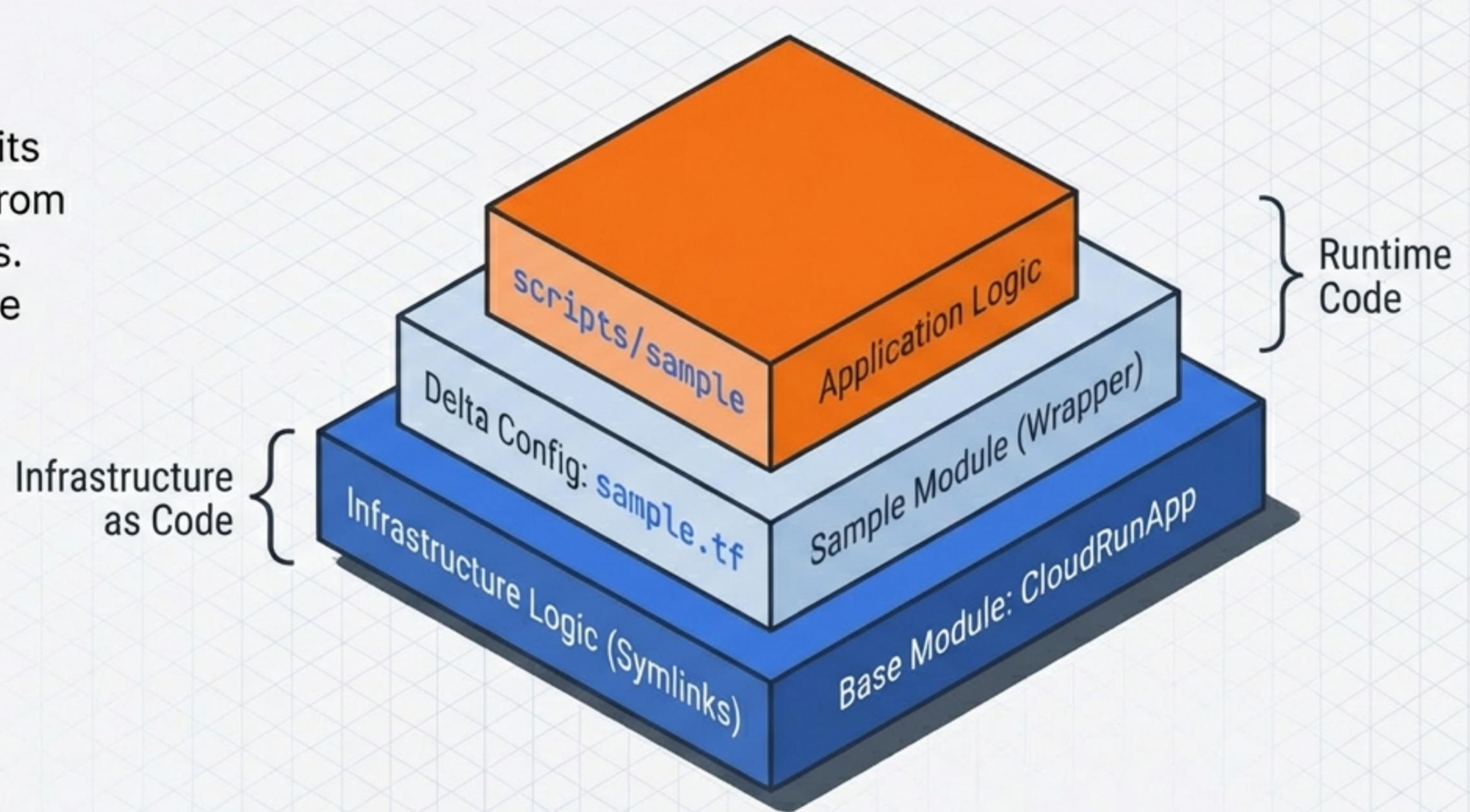
Serverless Topology and Request Flow



The Wrapper Module Strategy

Inheritance model for consistency and flexibility.

The `Sample` module inherits core infrastructure logic from `CloudRunApp` via symlinks. Specific configurations are applied in `sample.tf`.



Compute Engine: Cloud Run v2 Specifications

Resource Allocation

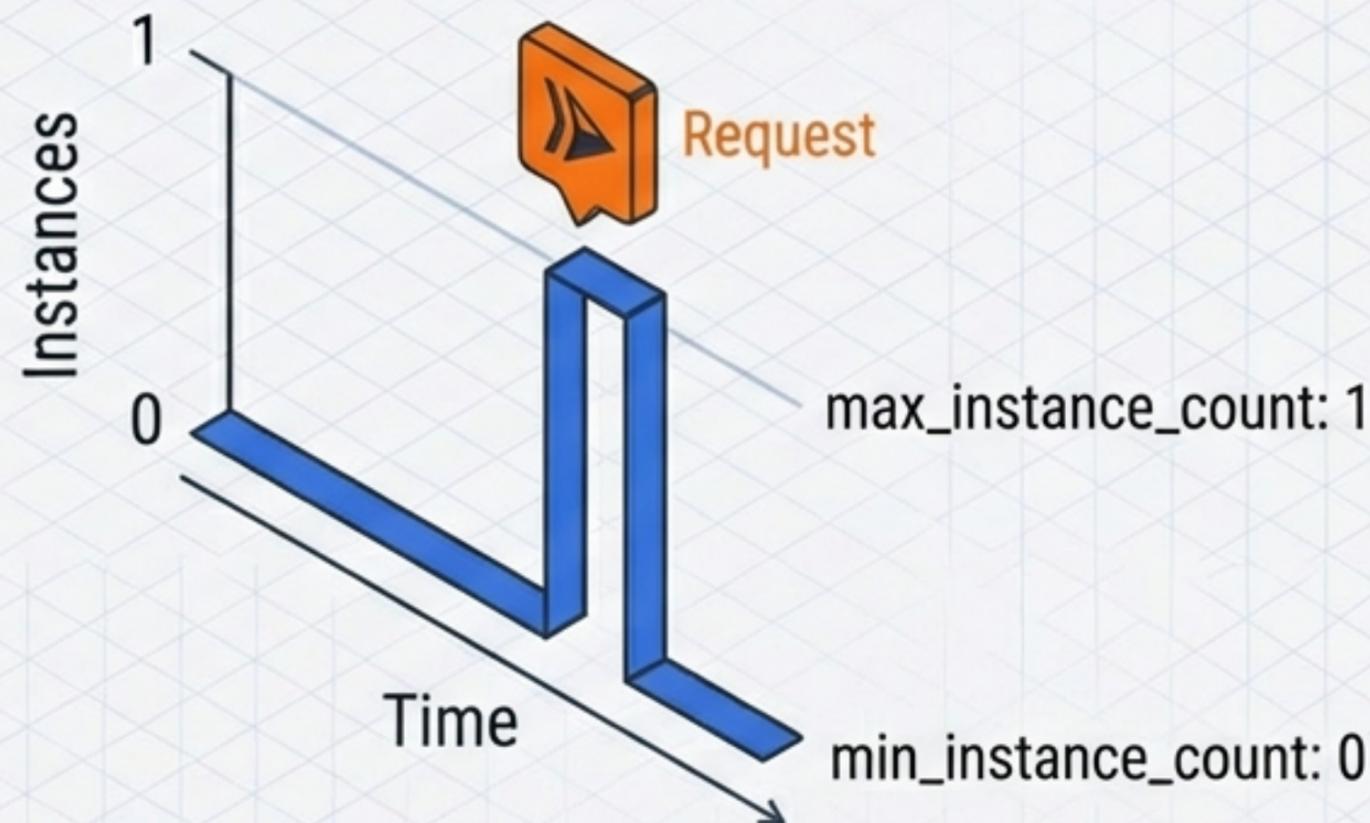
Source File: `service.tf`

Runtime: `Python 3.11-slim`

vCPU: `1000m (1 vCPU)`

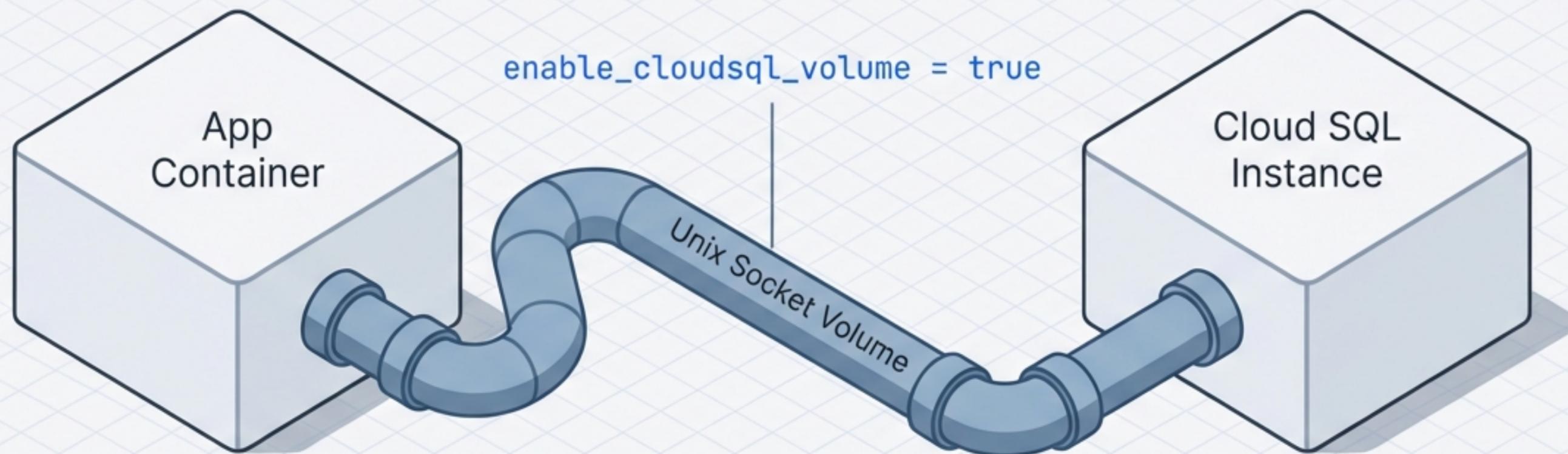
Memory: `512Mi (Configurable)`

Feature: `CPU Boost Enabled`



Optimized for cost efficiency. The container scales to zero when idle and utilizes **CPU boost** for rapid cold starts.

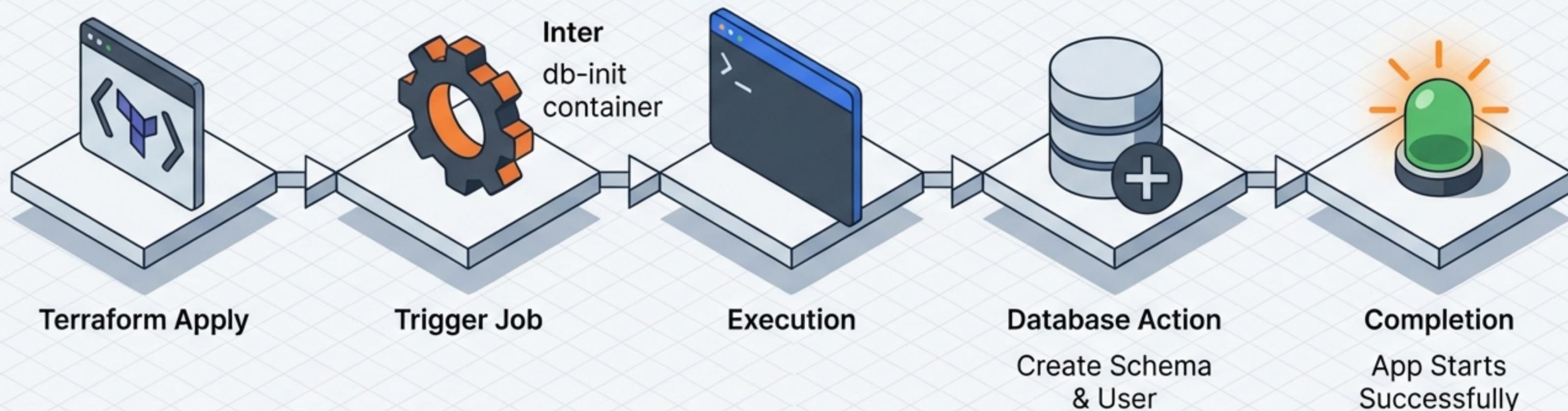
Data Persistence and Connectivity



1. Discovery `scripts/core/get-sqlserver-info.sh` finds instance.
2. Credential `random_password` resource generates secure token.
3. Storage Password stored immediately in **Secret Manager**.
4. Access App connects via **Private IP** or **Unix Socket**.

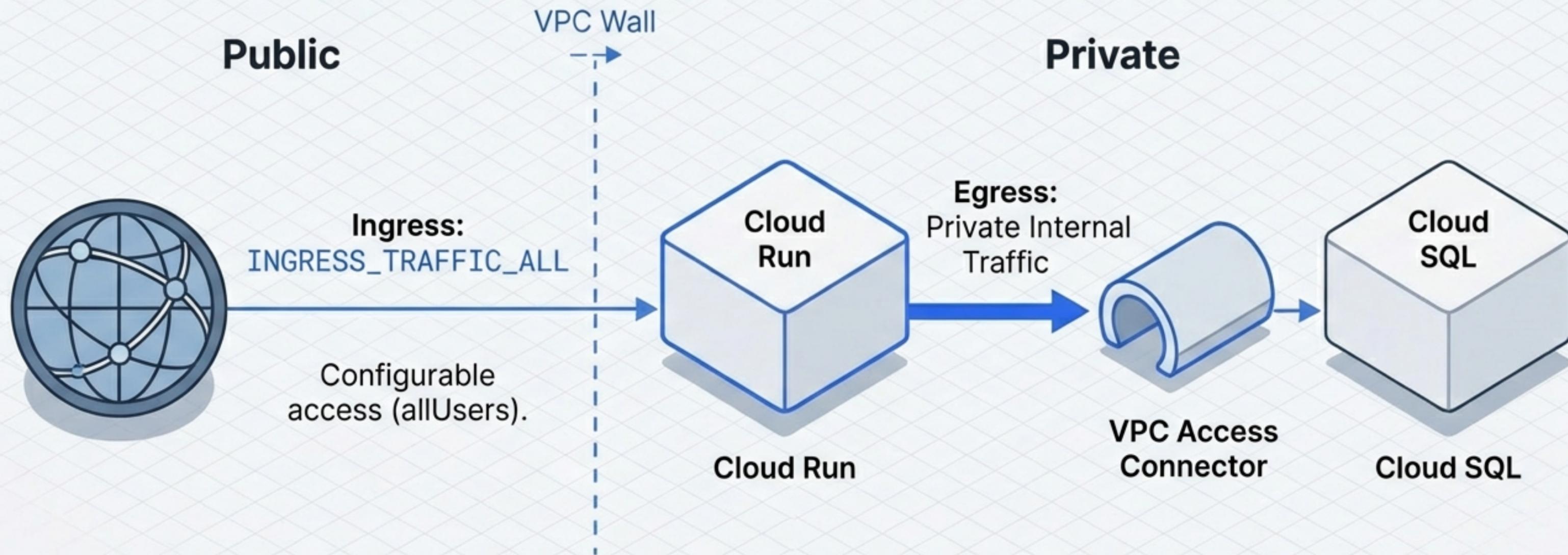
Day 0 Operations: Automated Initialization

Solves the “Chicken and Egg” problem of creating database users before the app runs.



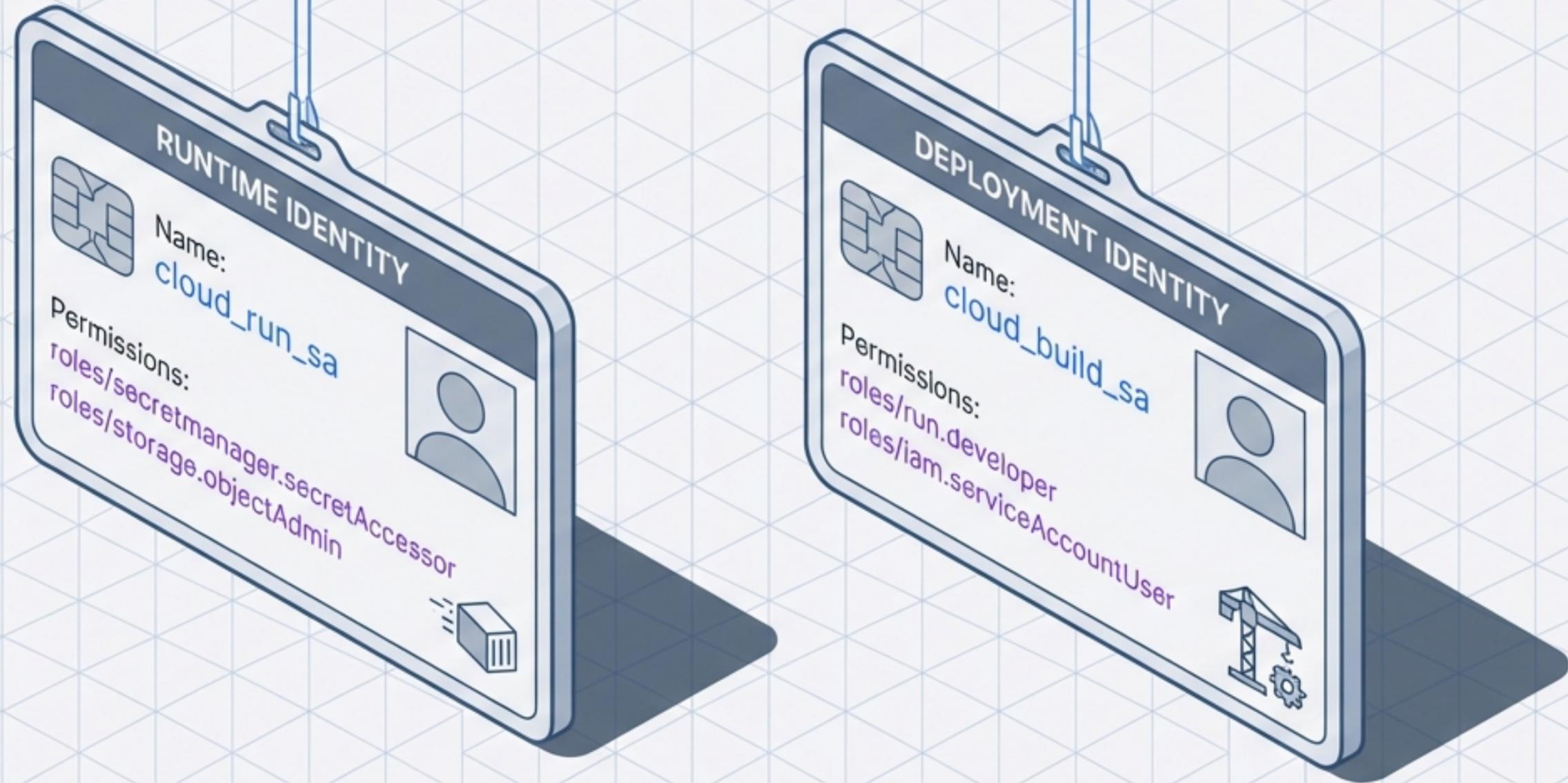
Inter
Runtime: [postgres:15-alpine](#)

Networking and VPC Boundaries



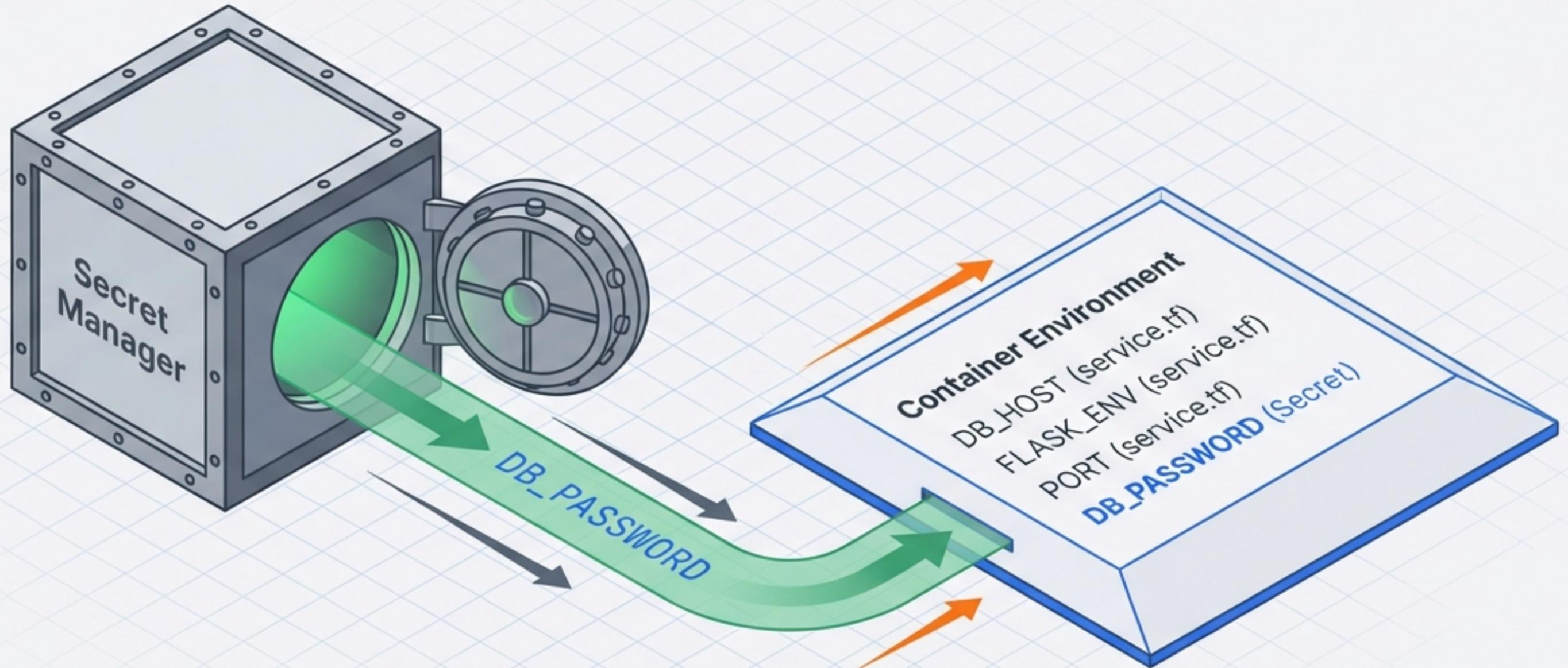
Network discovery is handled dynamically via `scripts/core/get-network-info.sh`.

IAM & Identity Architecture



Principle of Least Privilege: Separation of runtime and deployment duties.

Secrets and Configuration Management

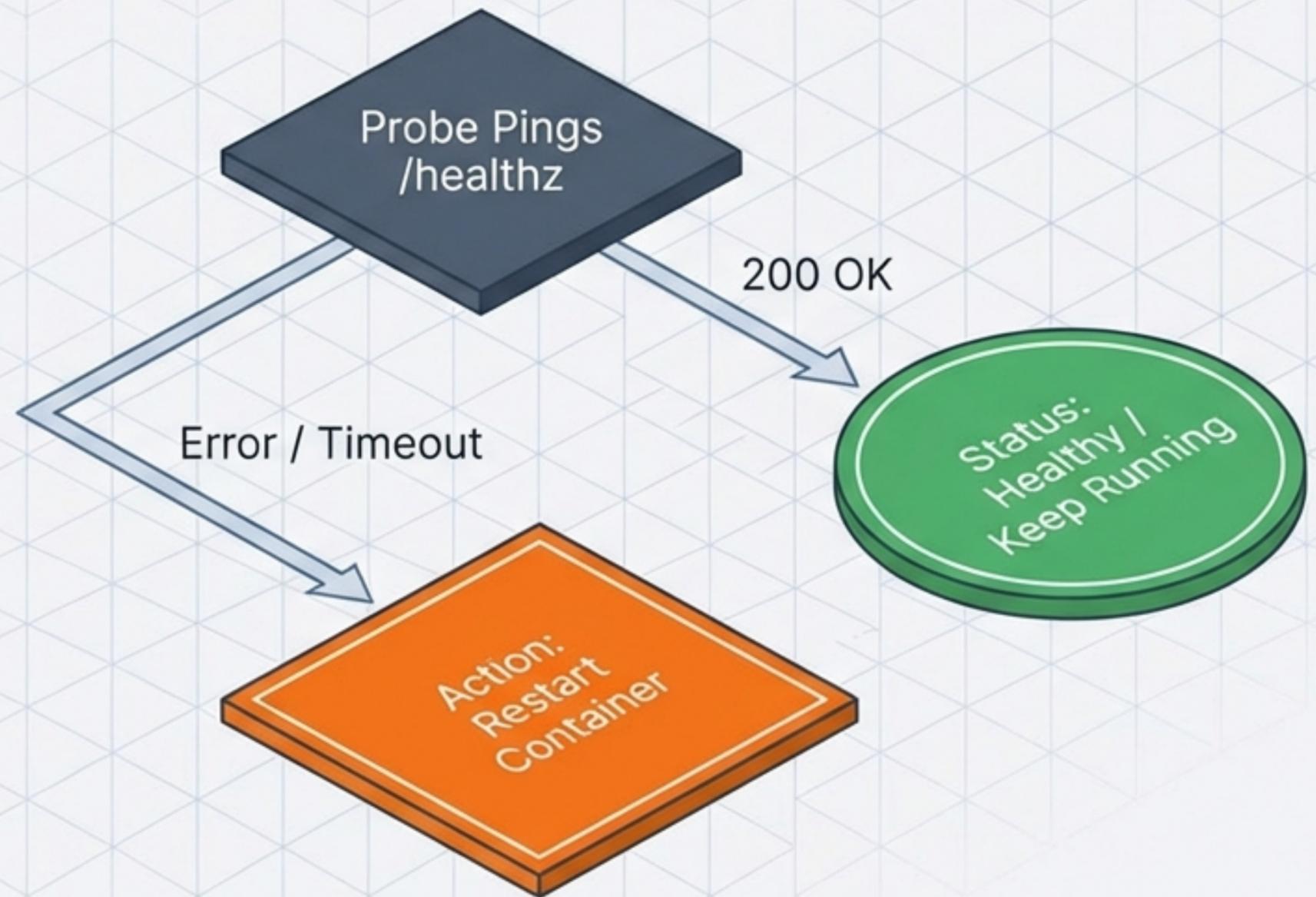


No hardcoded credentials. All sensitive data resides in Secret Manager and is injected only at runtime.

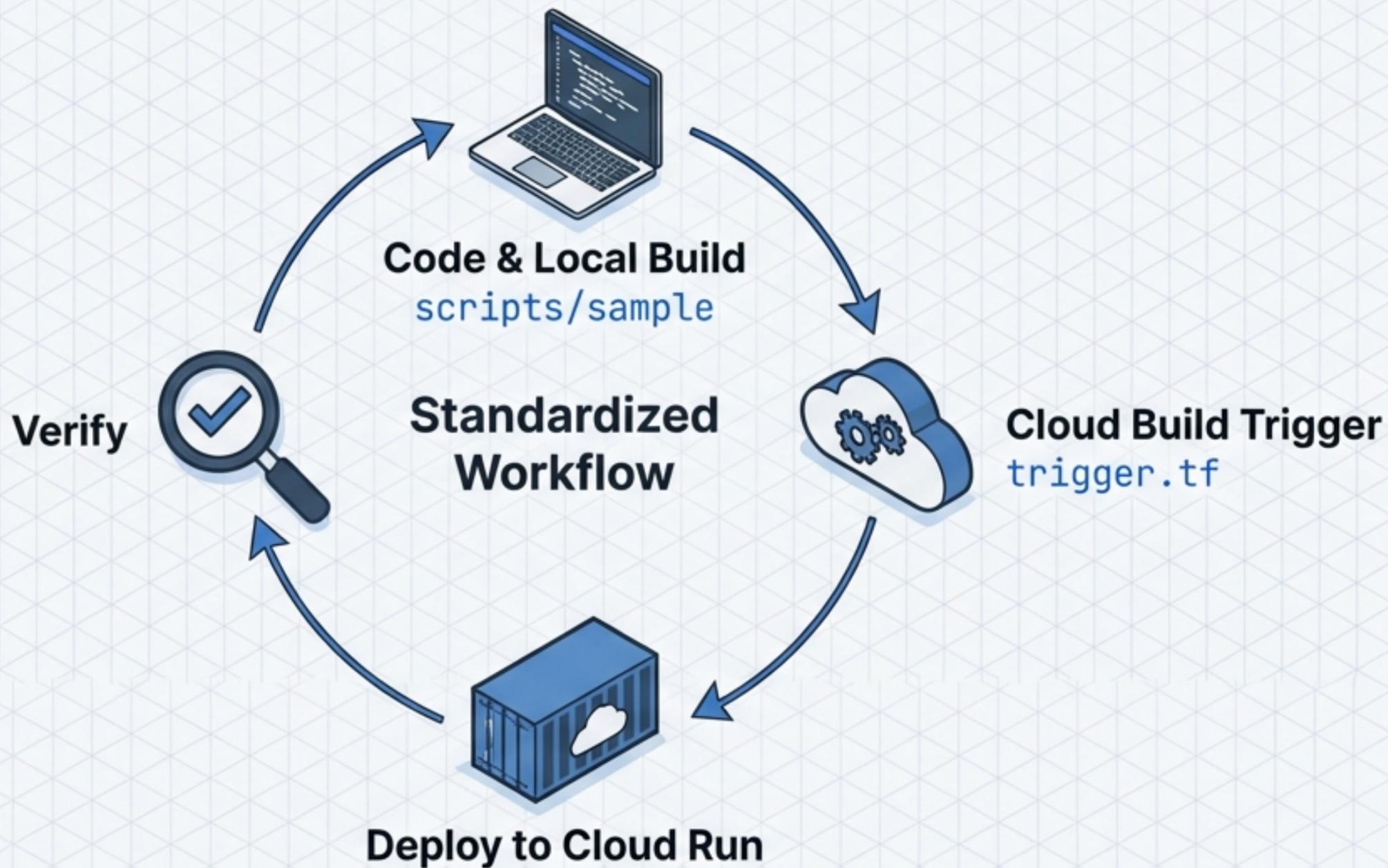
Observability and Reliability

Self-Healing Logic

- Startup Probe: Confirms application initialization.
- Liveness Probe: Periodic health checks during operation.



Developer Experience (DevEx) & CI/CD



Supports building from source ([Dockerfile](#)) or using upstream images.

Capability Matrix: Out-of-the-Box Features



Wrapper Architecture: Inherits platform standards, allows custom logic.



Automated DB Init: Solves Day 0 schema provisioning.



Secure Secrets: Native Secret Manager integration.



Observability: Pre-configured Startup & Liveness probes.



Custom Builds: Integrated `Dockerfile` support.

Roadmap and Recommended Enhancements

Current State

Future Evolution

allUsers Access



Granular IAM (restrict `roles/run.invoker`)



Service Account Keys



Workload Identity Federation



Standard Stdout



Structured JSON Logging

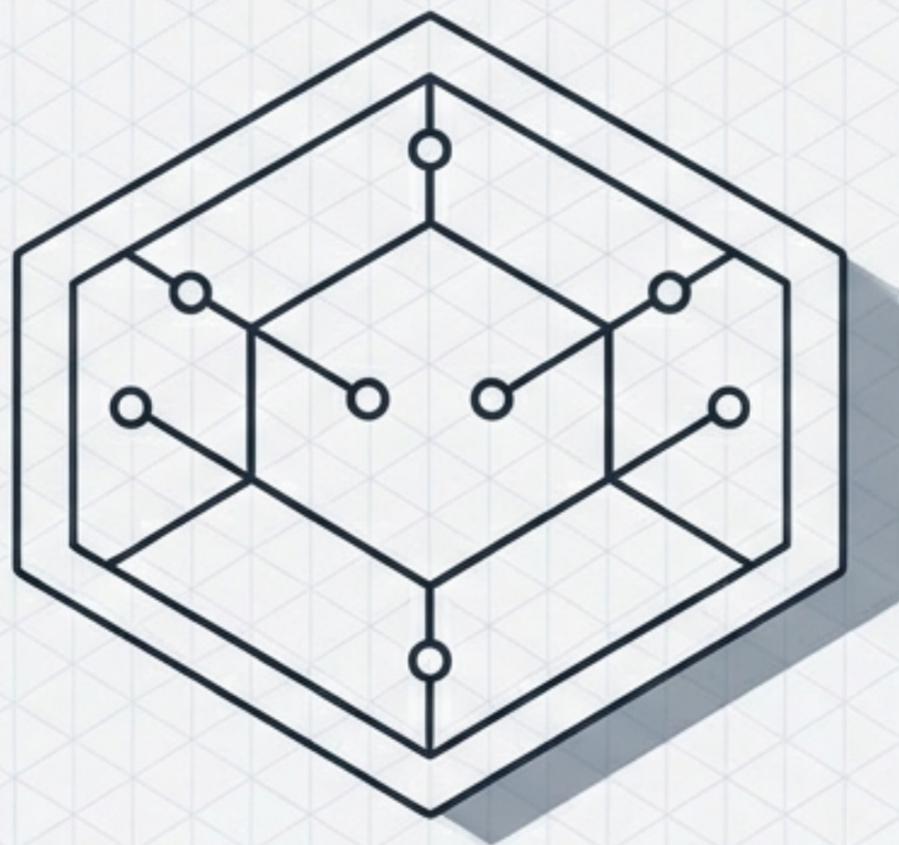


Direct Ingress



Cloud CDN Integration





The RAD Sample Standard

The Sample module effectively balances rigid platform best practices with the flexibility required for custom application logic.

- 1. Review [sample.tf](#)
- 2. Customize [scripts/sample](#)
- 3. Deploy with Terraform

[git.repo/modules/sample](#)