Advanced GCP – Capstone Exam & Staff Engineer Roadmap

Capstone Exam – Multi-Region AI-Enabled Platform on GCP

Design and implement a production-grade, multi-region platform that combines all domains: landing zone, GKE, CI/CD, data systems, Vertex AI agents, and Zero Trust access.

Core Requirements:

- Org-level landing zone with at least dev/stage/prod projects.
- Private GKE cluster with namespaced workloads and workload identity.
- CI/CD pipeline (GitHub Actions) for Terraform and app deploys.
- Stateful service using Cloud SQL or AlloyDB.
- Vertex AI agentic service exposed via API Gateway or Cloud Run.
- Zero Trust access via IAP or BeyondCorp-style model.
- Full logging/monitoring with Cloud Monitoring and Cloud Logging.

Scoring Dimensions:

- Architecture correctness (30%)
- Security and reliability (25%)
- Code quality and Terraform structure (20%)
- Operational excellence (observability, CI/CD) (15%)
- Documentation and diagrams (10%)

Post-PCA → Staff Cloud Engineer Roadmap

Phase 1 – Solidify Foundations (3–6 months)

- Master Terraform for GCP (modules, state, testing).
- Deepen GKE knowledge: networking, security, node pools, autoscaling.
- Build 2–3 real side projects using CI/CD pipelines on GitHub.

Phase 2 – Platform Ownership (6–12 months)

- Take ownership of a platform area (e.g., cluster SRE, networking, CI/CD).
- Introduce policy-as-code and security baselines.
- Lead at least one production incident post-mortem and remediation project.

Phase 3 – Systems Thinking & AI Integration (12–24 months)

- Design cross-cutting architectures that integrate data systems and AI services.
- Deploy and maintain at least one Vertex AI-powered service in production.
- Mentor junior engineers on GCP and Kubernetes practices.

Phase 4 – Staff-Level Influence (24+ months)

- Define platform standards used by multiple teams.
- Drive multi-quarter technical initiatives (e.g., multi-region, zero trust, global observability).
- Act as a decision-maker in trade-offs between cost, performance, and complexity.