ACE Study Topics & Models

Blake Rogers

1. study topics
2. key links
3. exam guide and links by actual topic
4. list of google code labs (free, self-paced)
5. list of google quick-labs (cheap, timed)
6. mental models

Codes: Done/ReadAttention/IncompleteNot Done/Missing

Study Topics

- Resource structures - cloud id, google group, org, folder, project, resource
- Id, member, user, Group
- Iam, roles, service accts, permissions, security
- Bucket / object sharing
- Pricing calc estimates
- Cpus, memory, disk
- Clusters, Nodes, node pools, instances, instance group, template
- restart, health
- Scaling
- Gae, gke
- cloud functions
- App Configuration
- Stackdriver
- Dbs
- storage types
- Object life-cycles
- File upload with gsutil

- Serving content

Key Links

https://medium.com/@swongra/migrating-to-gcp-first-things-first-vpcs-c0cf00d9adff

“Firewall Rules” https://geekflare.com/gcp-firewall-configuration/

https://cloud.google.com/security-scanner/

https://cloud.google.com/iam/docs/job-functions/billing

https://cloud.google.com/resource-manager/docs/migrating-projects-billing

https://cloud.google.com/resource-manager/docs/managing-multiple-orgs

https://cloud.google.com/resource-manager/docs/migrating-projects-billing

https://cloud.google.com/iam/docs/understanding-roles /Project Mover

https://cloud.google.com/compute/docs/access/iam

https://cloud.google.com/compute/docs/instances/moving-instance-across-zones

https://cloud.google.com/storage/docs/collaboration

https://cloud.google.com/solutions/transferring-big-data-sets-to-gcp

Exam Guide & links by actual topic

Plan, config, Deploy, and Manage Application

1 Organization, Folders, Resources, Projects Billing

- 1.1 Setting up cloud projects and accounts. Activities include:
  - Creating projects
  - Assigning users to predefined IAM roles within a project
  - Managing users in Cloud Identity (manually and automated) - no access
    https://cloud.google.com/identity/docs/concepts
    https://cloud.google.com/identity/docs/concepts/groups
    https://cloud.google.com/identity/docs/concepts/membership
  - Enabling APIs within projects -
  - Provisioning one or more Stackdriver workspaces -
- 1.2 Managing billing configuration. Activities include:
  - Creating one or more billing accounts
  - Linking projects to a billing account
  - Establishing billing budgets and alerts
  - Setting up billing exports to estimate daily/monthly charges

1.3 Installing and configuring the command line interface (CLI), specifically the Cloud SDK (e.g., setting the default project). -

https://cloud.google.com/resource-manager/docs/migrating-projects-billing

https://cloud.google.com/resource-manager/docs/managing-multiple-orgs

https://cloud.google.com/resource-manager/docs/project-migration

* roles/resourcemanager.projectCreator- on org to add project to org

* roles/resourcemanager.projectMover - on proj, to move project to org

* You must be a Billing Account Creator and a Billing Administrator on the organization to which you want to migrate your project to migrate billing accounts.

Cloud Identity and IAM

5. Configuring access and security

- 5.1 Managing identity and access management (IAM). Tasks include:
    - Viewing IAM role assignments

    - Assigning IAM roles to accounts or Google Groups
      https://cloud.google.com/iam/docs/faq
    - Defining custom IAM roles
      https://cloud.google.com/iam/docs/understanding-roles /Project Mover
      https://cloud.google.com/iam/docs/understanding-roles#predefined_roles
      https://cloud.google.com/compute/docs/access/iam

- 5.2 Managing service accounts. Tasks include:
    - Managing service accounts with limited privilege
    - Assigning a service account to VM instances
- https://cloud.google.com/iam/docs/creating-managing-service-account-keys

Networking and VPC VPN

- 2.4 Planning and configuring network resources. Tasks include:
    - Differentiating load balancing options
    - Identifying resource locations in a network for availability
    - Configuring Cloud DNS
      https://cloud.google.com/dns/docs/overview

- 3.5 Deploying and implementing networking resources. Tasks include:
    - Creating a VPC with subnets (e.g., custom-mode VPC, shared VPC)
    - Launching a Compute Engine instance with custom network configuration (e.g., internal-only IP address, Google private access, static external and private IP address, network tags)
      https://cloud.google.com/vpc/docs/shared-vpc

    - https://cloud.google.com/vpc/docs/vpc-peering
    - Creating ingress and egress firewall rules for a VPC (e.g., IP subnets, tags, service accounts) -
    - Creating a VPN between a Google VPC and an external network using Cloud VPN
      https://cloud.google.com/vpn/docs/concepts/overview

- 4.5 Managing networking resources. Tasks include:
    - Adding a subnet to an existing VPC
    - Expanding a subnet to have more IP addresses

- Reserving static external or internal IP addresses
- Working with management interfaces (e.g., Cloud Console, Cloud Shell, Cloud SDK)

GCE **Deploying and implementing a cloud solution**

- 3.1 Deploying and implementing Compute Engine resources. Tasks include:
  - Launching a compute instance using Cloud Console and Cloud SDK (gcloud) (e.g., assign disks, availability policy, SSH keys)
  - Creating an autoscaled managed instance group using an instance template
  - Generating/uploading a custom SSH key for instances https://cloud.google.com/compute/docs/instances/adding-removing-ssh-keys
  - Configuring a VM for Stackdriver monitoring and logging
  - Assessing compute quotas and requesting increases

GCE Ensuring successful operation of a cloud solution

- 4.1 Managing Compute Engine resources. Tasks include:
  - Managing a single VM instance (e.g., start, stop, edit configuration, or delete an instance)

    https://cloud.google.com/compute/docs/instances/moving-instance-across-zones JL
  - SSH/RDP to the instance
  - Attaching a GPU to a new instance and installing CUDA libraries https://cloud.google.com/compute/docs/gpus/add-gpus
  - Viewing current running VM inventory (instance IDs, details)
  - Working with snapshots (e.g., create a snapshot from a VM, view snapshots, delete a snapshot) https://cloud.google.com/compute/docs/disks/create-snapshots https://cloud.google.com/compute/docs/disks/restore-and-delete-snapshots

- Working with images (e.g., create an image from a VM or a snapshot, view images, delete an image)
  https://cloud.google.com/compute/docs/images
- Working with instance groups (e.g., set autoscaling parameters, assign instance template, create an instance template, remove instance group) -
- Working with management interfaces (e.g., Cloud Console, Cloud Shell, GCloud SDK) -

Load balancer

Creating a load balancer to distribute application network traffic to an application (e.g., Global HTTP(S) load balancer, Global SSL Proxy load balancer, Global TCP Proxy load balancer, regional network load balancer, regional internal load balancer)

https://cloud.google.com/load-balancing/docs/

Firewalls

https://cloud.google.com/vpc/docs/firewalls

GKE deploy and manage

- 3.2 Deploying and implementing Google Kubernetes Engine resources. Tasks include:
    - Deploying a Google Kubernetes Engine cluster
    - Deploying a container application to Google Kubernetes Engine using pods
    - Configuring Google Kubernetes Engine application monitoring and logging
      https://cloud.google.com/monitoring/kubernetes-engine/
      https://cloud.google.com/kubernetes-engine/docs/how-to/audit-logging

- 4.2 Managing Google Kubernetes Engine resources. Tasks include:
    - Viewing current running cluster inventory (nodes, pods, services)
    - Browsing the container image repository and viewing container image details
      https://cloud.google.com/container-registry/docs/managing
    - Working with node pools (e.g., add, edit, or remove a node pool)
    - Working with pods (e.g., add, edit, or remove pods)
    - Working with services (e.g., add, edit, or remove a service)
    - Working with stateful applications (e.g. persistent volumes, stateful sets)
      https://cloud.google.com/kubernetes-engine/docs/how-to/stateful-apps
      https://cloud.google.com/binary-authorization/
    - Working with management interfaces (e.g., Cloud Console, Cloud Shell, Cloud SDK)

GAE Deploy scale/split traffic, Cloud Run, Cloud Function (serverless), PubSub

- 3.3 Deploying and implementing App Engine, Cloud Run, and Cloud Functions resources. Tasks include, where applicable:
  https://cloud.google.com/run/docs/
  https://cloud.google.com/tasks/docs/

    - Deploying an application, updating scaling configuration, versions, and traffic splitting

      https://cloud.google.com/appengine/docs/standard/python/splitting-traffic
    - Deploying an application that receives Google Cloud events (e.g., Cloud Pub/Sub events, Cloud Storage object change notification events)

- 4.3 Managing App Engine and Cloud Run resources. Tasks include:
    - Adjusting application traffic splitting parameters
    - Setting scaling parameters for autoscaling instances

    - Working with management interfaces (e.g., Cloud Console, Cloud Shell, Cloud SDK)

Deployment - Marketplace, Deployment Manager

- 3.6 Deploying a solution using Cloud Marketplace. Tasks include:
    - Browsing Cloud Marketplace catalog and viewing solution details
    - Deploying a Cloud Marketplace solution
- 3.7 Deploying application infrastructure using Cloud Deployment Manager. Tasks include:
    - Developing Deployment Manager templates
    - Launching a Deployment Manager template
      https://cloud.google.com/deployment-manager/docs/

Data And Storage

2.3 Planning and configuring data storage options. Considerations include:

- Product choice (e.g., Cloud SQL, BigQuery, Cloud Spanner, Cloud Bigtable)
- Choosing storage options (e.g., regional, multi-regional, nearline, coldline) -

https://medium.com/@prashantapaudel/gcp-certification-series-2-3-planning-and-configuring-data-storage-options-5a6bfbca8601
https://medium.com/@prashantapaudel/gcp-certification-series-section-2-planning-and-configuring-a-cloud-solution-2-1-580eb601f62f

- 3.4 Deploying and implementing data solutions. Tasks include:
  - Initializing data systems with products (e.g., Cloud SQL, Cloud Datastore, BigQuery, Cloud Spanner, Cloud Pub/Sub, Cloud Bigtable, Cloud Dataproc, Cloud Dataflow, Cloud Storage) - Y/N
    https://cloud.google.com/dataproc/docs/concepts/overview
    https://cloud.google.com/spanner/docs/
    https://cloud.google.com/datastore/docs/concepts/overview
    https://cloud.google.com/dataflow/docs/
    https://cloud.google.com/pubsub/docs/
    https://cloud.google.com/pubsub/docs/concepts
  - Loading data (e.g., command line upload, API transfer, import/export, load data from Cloud Storage, streaming data to Cloud Pub/Sub) -
    https://cloud.google.com/bigquery/docs/loading-data
    https://cloud.google.com/solutions/transferring-big-data-sets-to-gcp
    https://cloud.google.com/sql/docs/mysql/import-export/importing
    https://cloud.google.com/solutions/transferring-big-data-sets-to-gcp

- 4.4 Managing storage and database solutions. Tasks include:
  - Moving objects between Cloud Storage buckets
  - Converting Cloud Storage buckets between storage classes

- Setting object life cycle management policies for Cloud Storage buckets
  https://cloud.google.com/storage/docs/storage-classes
  https://cloud.google.com/storage/docs/collaboration
- Executing queries to retrieve data from data instances (e.g., Cloud SQL, BigQuery, Cloud Spanner, Cloud Datastore, Cloud Bigtable)
- Estimating costs of a BigQuery query
  https://cloud.google.com/bigquery/docs/estimate-costs
- Backing up and restoring data instances (e.g., Cloud SQL, Cloud Datastore)
  https://cloud.google.com/datastore/docs/export-import-entities
- Reviewing job status in Cloud Dataproc, Cloud Dataflow, or BigQuery
  https://cloud.google.com/bigquery/docs/managing-jobs
  https://cloud.google.com/dataflow/docs/
  https://cloud.google.com/dataproc/docs/concepts
- Working with management interfaces (e.g., Cloud Console, Cloud Shell, Cloud SDK)

StackDriver Log and Monitor and audit log

- 4.6 Monitoring and logging. Tasks include:
  Installing the Stackdriver Agent for monitoring and logging
  - Creating Stackdriver alerts based on resource metrics
  - Creating Stackdriver custom metrics
    https://cloud.google.com/monitoring/custom-metrics/
  - Configuring log sinks to export logs to external systems (e.g., on-premises or BigQuery)
    https://cloud.google.com/logging/docs/export/
  - Viewing and filtering logs in Stackdriver

- Viewing specific log message details in Stackdriver
- Using cloud diagnostics to research an application issue (e.g., viewing Cloud Trace data, using Cloud Debug to view an application point-in-time)
  https://cloud.google.com/trace/docs/trace-overview
  https://cloud.google.com/debugger/docs/
- Viewing Google Cloud Platform status
  https://status.cloud.google.com/
- Working with management interfaces (e.g., Cloud Console, Cloud Shell, Cloud SDK)

5.3 Viewing audit logs for project and managed services.

https://cloud.google.com/logging/docs/audit/

Labs

Google Codelabs

https://codelabs.developers.google.com/cloud/?cat=Cloud

Provision Services with GCP Marketplace

Deploy your infrastructure using deployment manager

Open Acct and manage billing

Secure instances and app with custom networks

google compute engine (gce) aka cloud-compute-engine

Networking 101 - n/a

Networking 102 - n/a

Customize Network w/ Subnet (20 min)

Setup network and load balancers - tutorial failed

** **ERROR:** (gcloud.compute.backend-services.create) Could not fetch resource: - Invalid value for field 'resource.loadBalancingScheme': 'EXTERNAL'. Backend Service based Network Load Balancing is not yet supported.*

Scale and load balance

Getting Started with App engine

IAM gcp-infra-cloud-iam

GKE deploy (36 min)

cloud-gke-workshop-v2/ (advanced features of gke)

https://codelabs.developers.google.com/codelabs/cloud-gke-workshop-v2/

Stackdriver Quickstart

Stackdriver monitor cloud infrastructure (15 min) -

Using Stackdriver (40 min)

Create a persistent Disk

Upload objects to Cloud storage GCS -

Intro to big table

intro to cloud spanner

Cloud SQL Quickstart

load and analyse w/ bigquery (15 min) -

GCS (Google Cloud Storage) Demo Lab - 25% failed steps

Use gsutil to Perform Operations on Buckets and Objects

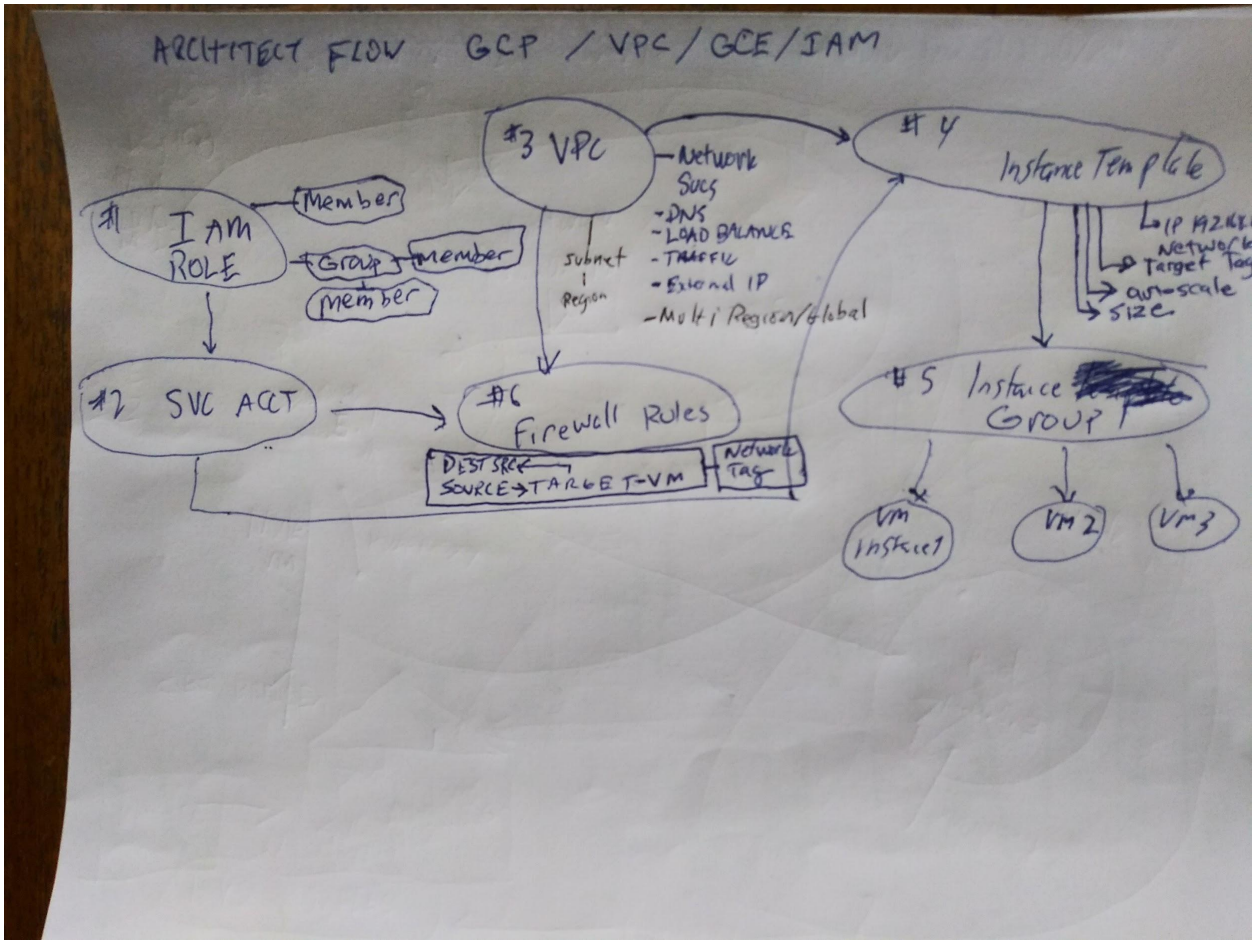
Deploy Spring Boot Application in App Engine standard

Google QuikLab

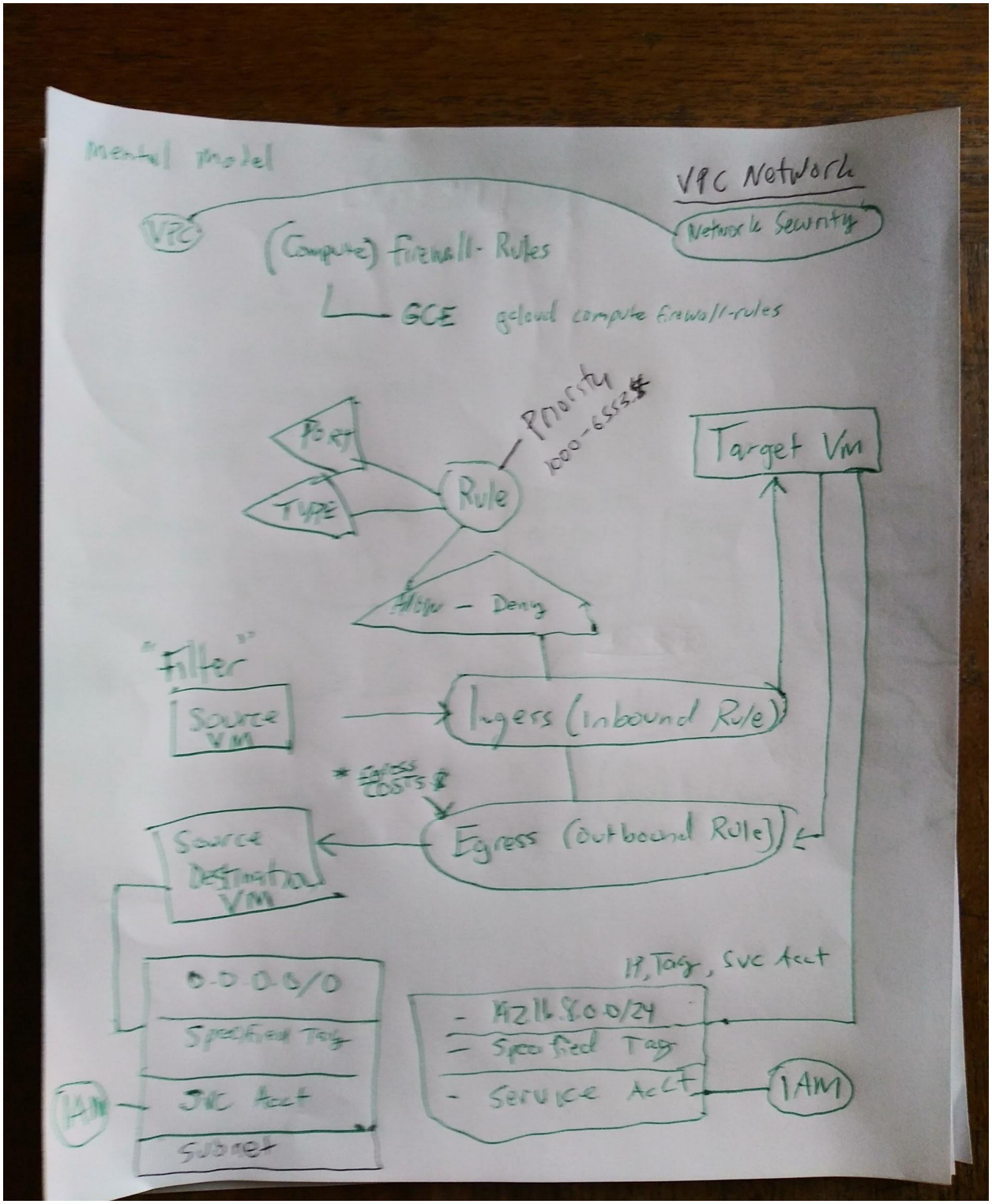
Using Bigquery in GCP
App Engine QuickStart
VPC Network Peering

Models

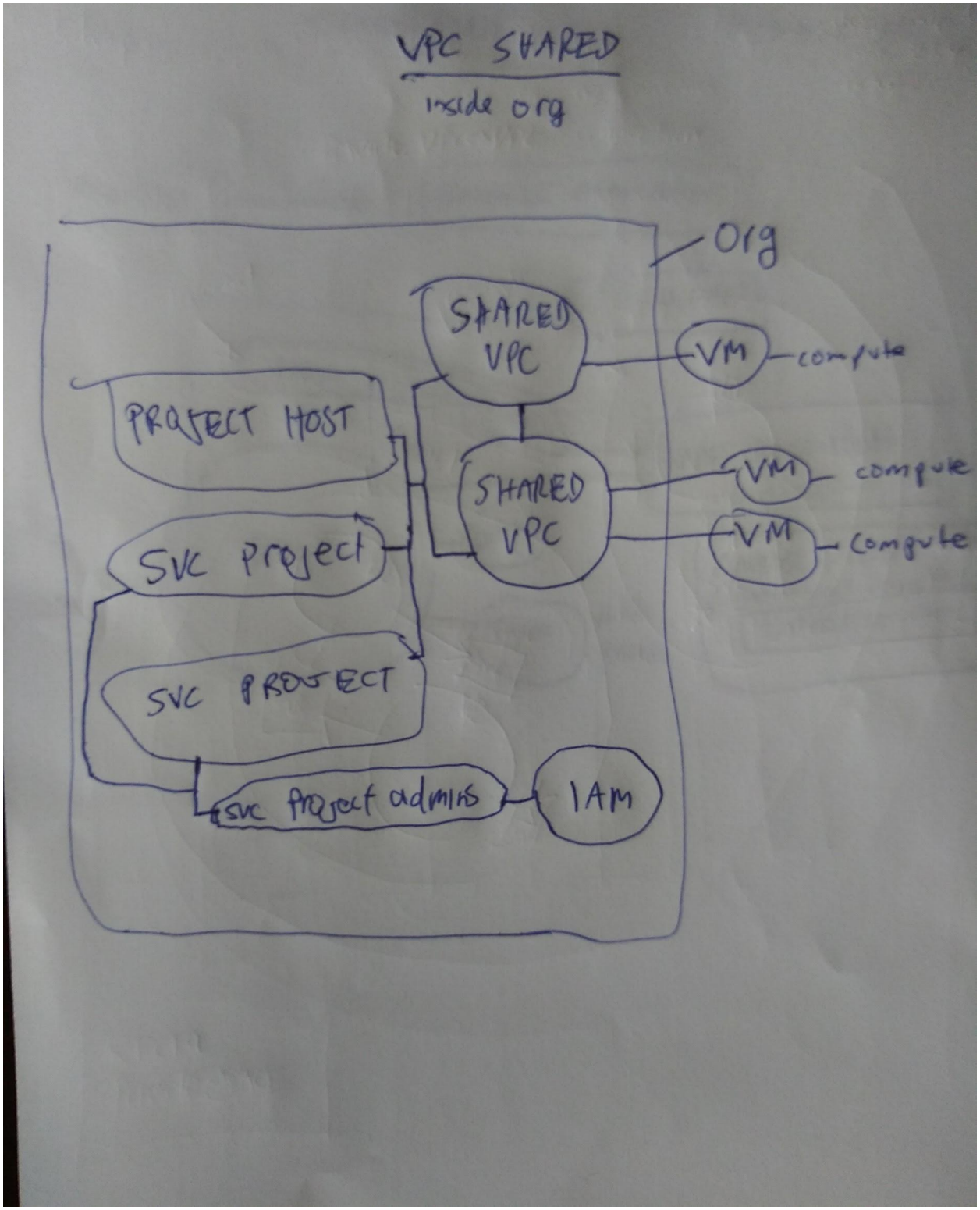
basic architecture



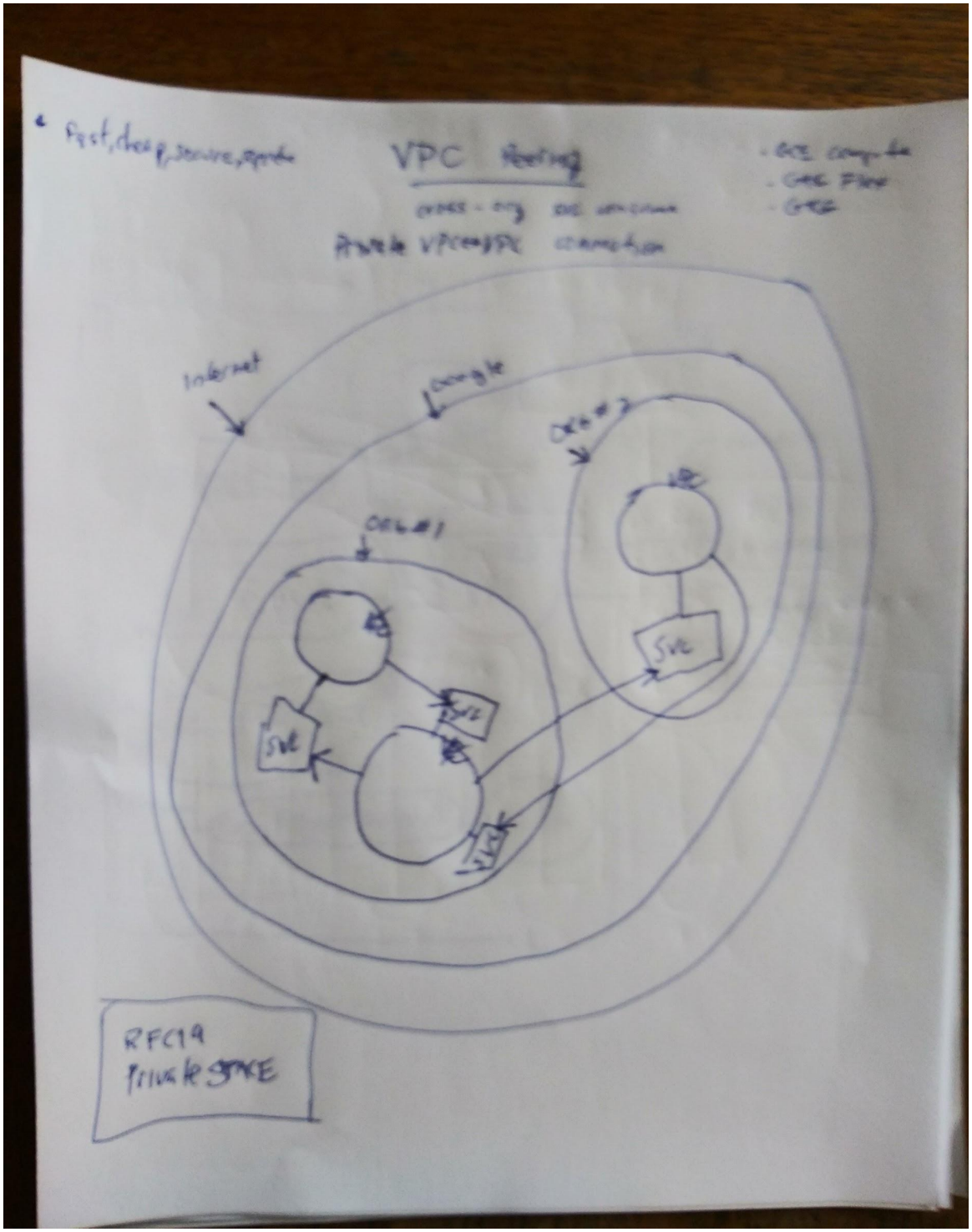
Firewall Rules



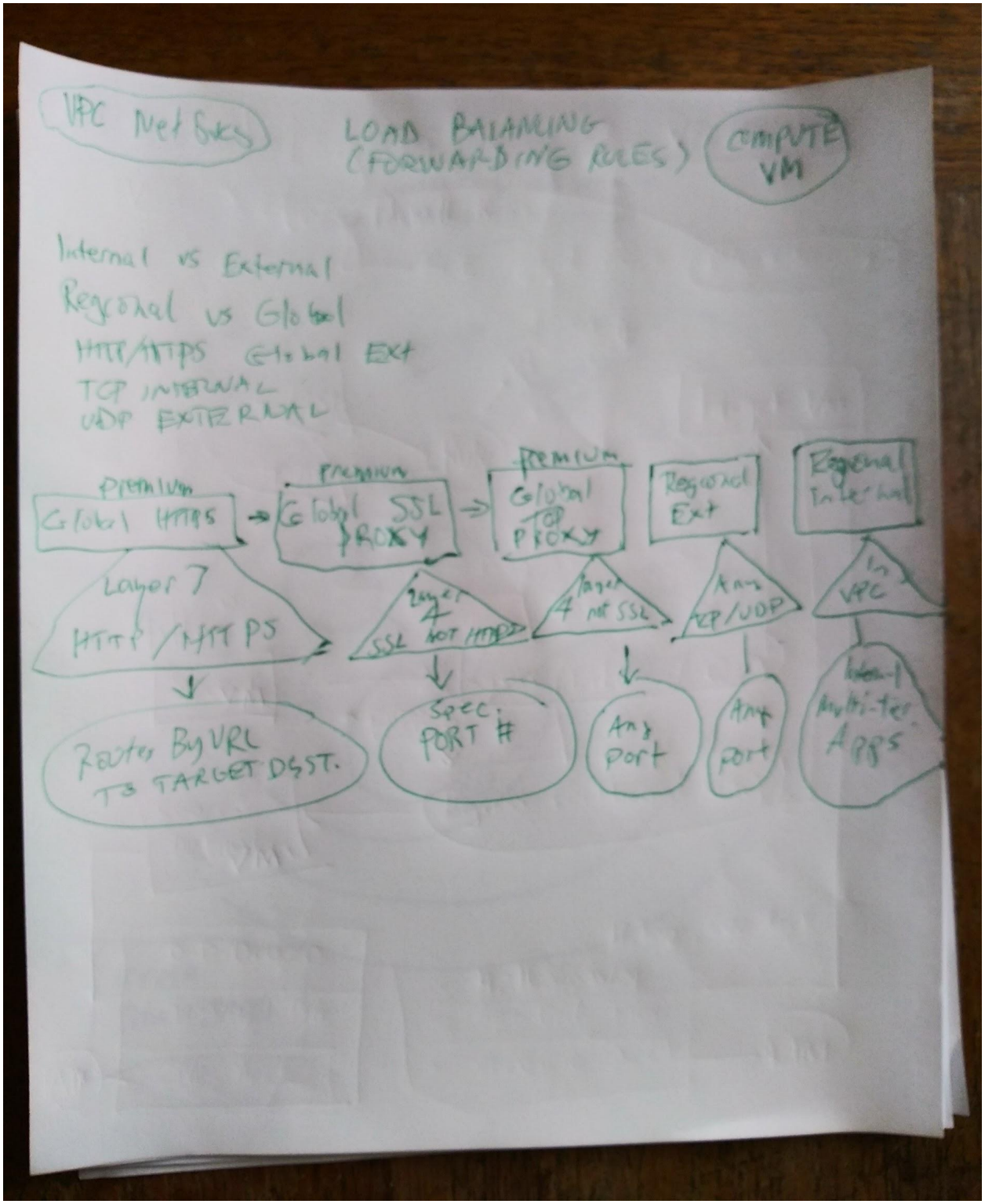
Shared VPC


VPC SHARED
inside org
Org
SHARED VPC
VM
compute
PROJECT HOST
SHARED VPC
VM
compute
SVC project
VM
compute
SVC PROJECT
SVC Project admins
IAM

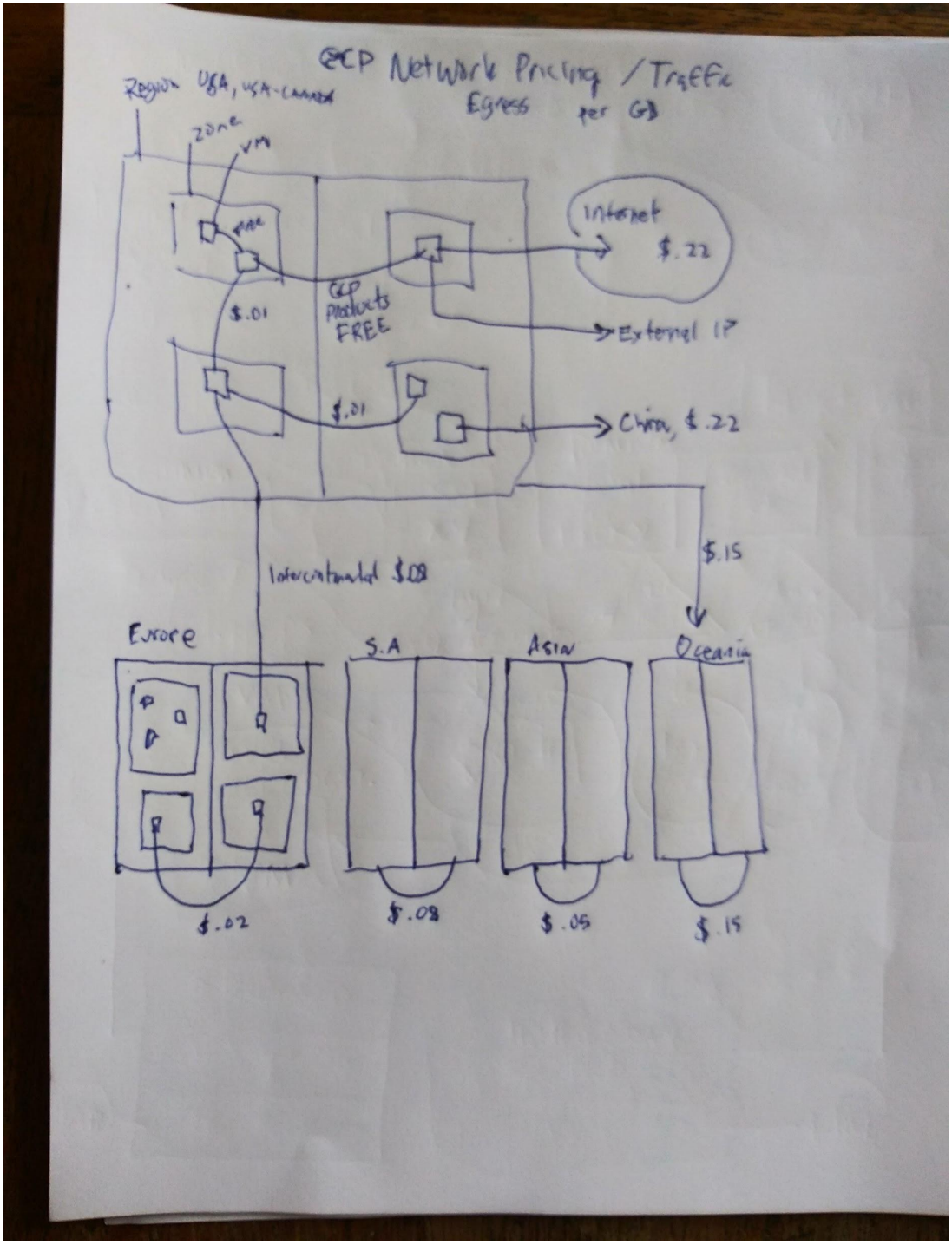
VPC peering



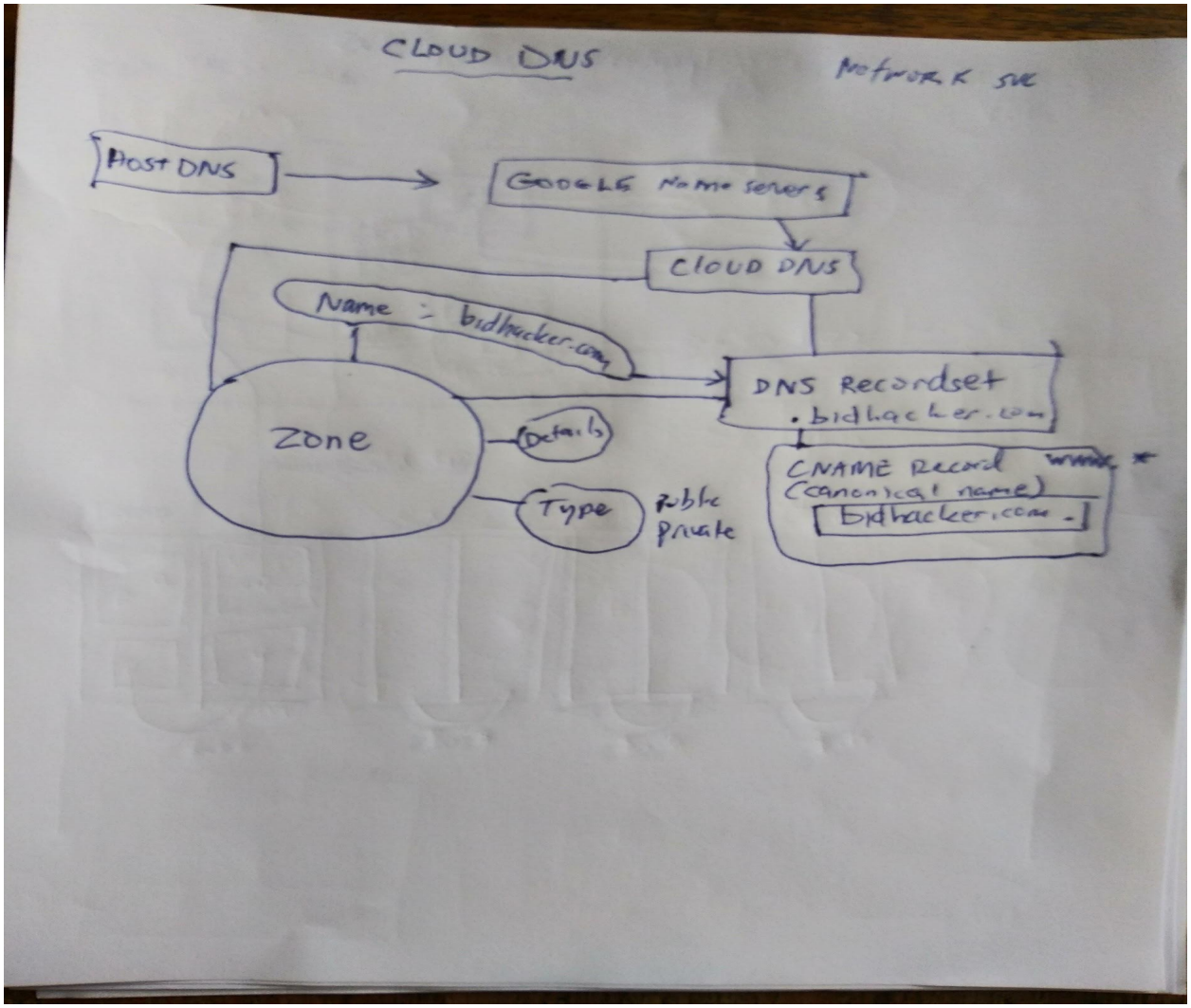
Load Balancer



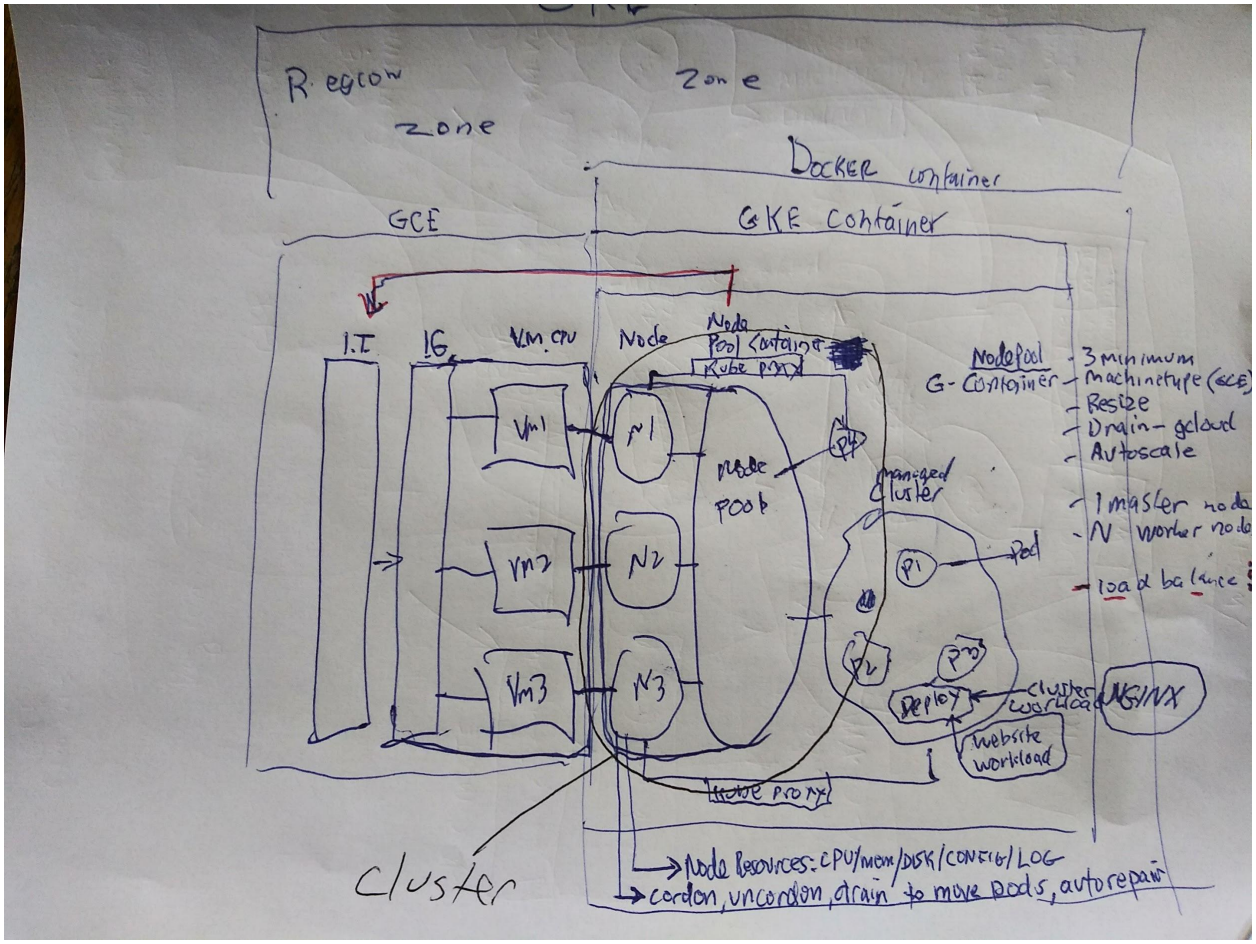
Egress Network Pricing



Cloud DNS


CLOUD DNS
Network Set
Host DNS
Google Name servers
CLOUD DNS
Name : bidhacker.com
DNS Recordset
.bidhacker.com
Zone
Details
Type
public
private
CNAME Record
(canonical name)
bidhacker.com.

Google Kubernetes Engine



GKE Nodes and Pods