Google Cloud Platform

GOOGLE CLOUD CERTIFICATION REVIEW

CLOUD ARCHITECT – VIRTUAL MACHINES MODULE 2 REVIEW FOR EXAM

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GOOGLE CLOUD PLATFORM CERTIFIED CLOUD ARCHITECT

- GCP A Google Certified Professional - Cloud Architect enables organizations to leverage Google Cloud technologies. Through an understanding of cloud architecture and Google technology, this individual can design, develop, and manage robust, secure, scalable, highly available, and dynamic solutions to drive business objectives.
- A Google Certified Professional - Cloud Architect has demonstrated in our assessment their ability to:
- check Design and plan a cloud solution architecture
- check Manage and provision the cloud solution infrastructure
- check Design for security and compliance
- check Analyze and optimize technical and business processes
- check Manage implementations of cloud architecture
- check Ensure solution and operations reliability

GCP CLOUD ARCHITECT OVERVIEW

- Here is the page to review.
- https://cloud.google.com/certification/cloud-architect

- Beta Exam Cost $120
- Beta Exam Time 4 Hours
- Beta Exam Case Studies
- Very Poor Choice of test vendor. (Clearly the lowest bidder) availability/flexibility for testing. Why they used Kryterion which has only one place to test if that in many cities is beyond me for a giant like Google. Unlike Pearson and Vue which have a significant network of test centers. Example in Jacksonville there is one location which was a junior college that had a 4 hour/3 day a week testing schedule. I checked Atlanta which had a few more sites…. Unlike VUE/Pearson that can have 20 locations in a city…

THOUGHTS ON EXAM

- Personally I thought the exam was written in a very unprocessed and more to be desired approach.
- Did not appear to use best practices in exam development such as Bloom.
- Consistent grammar errors and thus appeared somewhat rushed out.
- Case studies were vague. I did like how they have the case studies listed on exam Guide. https://cloud.google.com/certification/guides/cloud-architect/
- Exam did have a technical merit but as a routine test developer I see the need for a better exam guide and test JTA to be completed.

THE TECHNICAL REVIEW

- Case studies were part of the exam and you needed to review and answer the appropriate solution for the specific questions. Case study had numerous questions similar but had a slight question or answers so you needed to pay attention.
- Tested only on a few Compute engine items. Two is what I remember.
- Tested on Containers. I only saw one question here.
- Tested on Google App Engine actually more than I hoped for. Must have been 6 questions on GAE.
- Tested on Cloud Storage. You needed to know the difference between the Storage types and when you would place them.

THE TECHNICAL REVIEW

- Storage around every aspect and needed to discern between Nearline and Coldline. Big Data , Regional and Standard storage. Persistent Storage (Block) Must have been around 10 questions here..
- Tested on DataProc, Dataflow, Cloud Datastore, BigQuery and Bigtable areas in Data Products.
- Tested on Backup and Recovery, DR and BC as you would expect.
- Interesting there were questions on billing. Know some about how VMS are billed and also storage.
- DevOps. Basic Question about how DevOps mainly around continuous availability.

TECHNICAL REVIEW

- Cloud Best Practices. Projects, API Management, Peformance, etc.
- SQL – Know the SQL Versions at a high level.. MySQL and PostgreSQL database service.
- Container Management. They loved this area.. Know how to manage Containers in Google. At least 5 questions around Docker, StackDriver Monitoring and Google Container Engine.
- DNS zones and Records.
- Cloud Load balancing and Auto Scaling.

Google Cloud Platform

GOOGLE CLOUD CERTIFICATION REVIEW

CLOUD ARCHITECT – VIRTUAL MACHINES COMPUTE ENGINE MODULE 2

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VIRTUAL MACHINES

Google Virtual Machines..

	Compute Engine	Container Engine	App Engine Standard	App Engine Flexible	Cloud Functions
Language support	Any	Any	Java 7 Python 2.7 Go PHP	Java 8 Python 2.7/3.5 Go Node.js Ruby Custom Runtimes	Triggers
Usage model	IaaS	IaaS PaaS	PaaS	PaaS	Microservices Architecture
	Server	Cluster	Autoscaling managed servers		Serverless
Primary use case	General Workloads	Container Workloads	Scalable web applications Mobile backend applications		Lightweight Event Actions

VIRTUAL MACHINES

Virtual Machines – Remember some of Googles VMS are used for different purposes. Either for an IaaS or PaaS service approach.

Cloud Functions is geared towards a serverless approach and focused on microservices

App Engine is focused on PaaS and can be delivered in two different solutions (Standard or Flexible)

Container Engine- Awesome solution for developers wanting a simple and lightweight container.

Note! A Compute Engine instances can run Linux and Windows Server

VIRTUAL MACHINES

Virtual Machines - Compute Engine

---IaaS

- Can be predefined or custom
- vCPU and Memory
- Networking
- OS (Linux or Window)

VIRTUAL MACHINES - PRICING

Per-minute billing, sustained use discounts

10 minute minimum

Preemptible instances

Live at most 24 hours

Can be pre-empted with a 30 second notification via API

Discounted significantly

Custom machine types https://cloud.google.com/custom-machine-types/

Customize amount of memory and CPU

Built in Recommendation Engine
https://cloud.google.com/compute/docs/instances/preemptible

Notifies you of under utilized instances

VIRTUAL MACHINES

- ***Inferred instances*** means that for billing purposes, the same type of machine used in the same zone will be combined into a single charge so that you get the most discount as if it were one machine in use the whole time

VIRTUAL MACHINES - DISCOUNTS

Discounts

Google does discounts their resources

Billed for minimum of **10 minutes** and thereafter **every minute**.

Lower price for a PREMPTIVE instances..

Longer term use also discounted.

Custom-type is discounted on a percent of total use

Inferred instances means that for billing purposes, the same type of machine used in the same zone will be combined into a single charge so that you get the most discount -- as if it were one machine in use the whole time

VIRTUAL MACHINES

Storage

Standard, SSD (Can Scale PDs) or local SSD

Can resize disks and migrate with no downtime

https://cloud.google.com/compute/docs/disks/performance

	Standard persistent disks	SSD persistent disks	Local SSD (SCSI)	Local SSD (NVMe)
Maximum sustained IOPS				
Read IOPS per GB	0.75	30	266.7	453.3
Write IOPS per GB	1.5	30	186.7	240
Read IOPS per instance	3,000	15,000 - 40,000*	400,000	680,000
Write IOPS per instance	15,000	15,000 - 30,000*	280,000	360,000
Maximum sustained throughput (MB/s)				
Read throughput per GB	0.12	0.48	1.04	1.77
Write throughput per GB	0.12	0.48	0.73	0.94
Read throughput per instance	180	240 - 800*	1,560	2,650
Write throughput per instance	120	240 - 400*	1,090	1,400

* SSD persistent disks can achieve greater IOPS and throughput performance on instances with greater numbers of vCPUs. Read SSD persistent disk performance limits for details.

VIRTUAL MACHINES

Networking

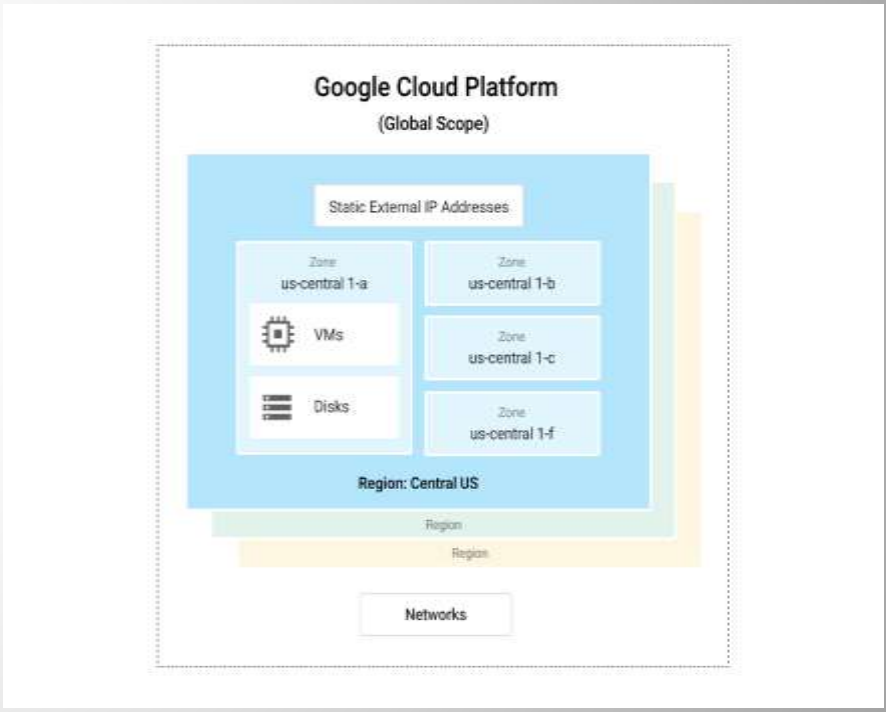
Networking Features

- Default and Custom Networks
- Inbound/Outbound Firewalls
- Regional load balancing and Network Load balancing
- Global and multiregional Subnetworks

QUESTION REVIEW - VIRTUAL MACHINES

Global, regional, and zonal resources

- Global resources include preconfigured disk images, disk snapshots and networks.
- Regional resources include static external IP addresses.
-Zonal resources include VM instances, their types, and disks.



VIRTUAL MACHINES

Supported Protocols

- TCP
- UDP
- ICMP

Note – Supports Ipv4 only

Every VM Instances belongs to a network.

Default network is used if none selected… More on this…….

Legacy and Subnets….

VIRTUAL MACHINES

Subnetworks Benefits

Subnets are ways to group similar or related resources

- If you a VPN this allows you to target the VPN tunnels To a specific region for better control and performance.
- Benefit where you don’t need to know much networking nor layout a network right away.
- Define IP ranges in two ways.
- ---Auto
- ---Custom

VIRTUAL MACHINES

VM ACCESS

Linux -SSH from console, SSH from Cloudshell via SDK

-SSH from computer, 3rd party key and client

Needs FW rule (tcp 22)

Windows -RDP

- Needs FW rule (tcp 3389)

-Powershell Terminal

VIRTUAL MACHINES

KNOW THIS FOR TEST ALERT!!!

Auto restart refers to what behavior the VM should take after a hardware failure or a system event.

- If marked auto restart, the system will try to launch a replacement VM.
- Auto restart does not restart the VM if it was terminated due to a user event, such as shutting down and terminating the VM.
- NOTE: If the VM availability policy is set to the default, live migrate, during regular system maintenance your VM will be migrated to different hardware so there is no downtime

VIRTUAL NETWORKING MACHINES

Billing for traffic *egress*

- To the Internet (varies by region)
- from one region to another (in the same network)
- - different rates for same continent regions vs intercontinental
- Between zones within a region

Your not billed for

- Traffic *ingress*
- VM to VM traffic in a single zone (same region, network)
- Traffic to GCP services (*limits apply*, see documentation)

QUESTION REVIEW - VIRTUAL NETWORKING

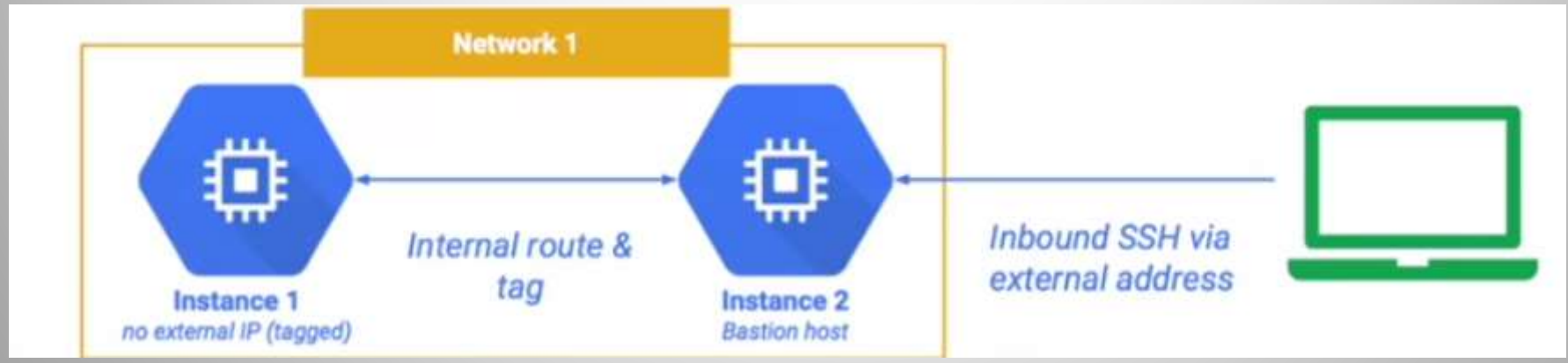
Connecting with an External IP --- Bastion Hosts

Why.. Perhaps you need to scale with SSH(Limit by SSH and CIDR)

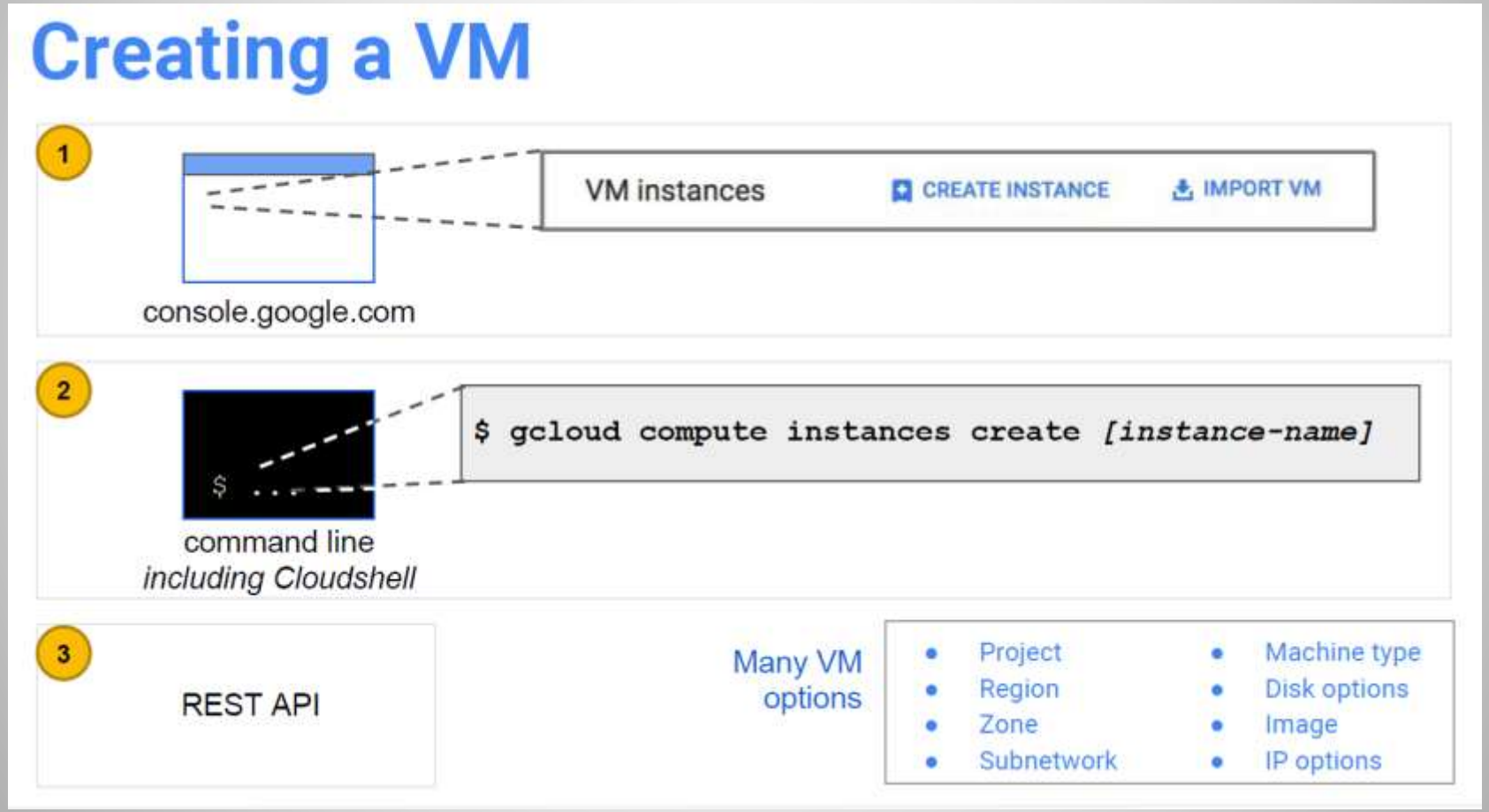
You could also connect with a Site to Site VPN

You could also use a NAT Gateway…

Bastion hosts you may see on your exam…..Hint…..

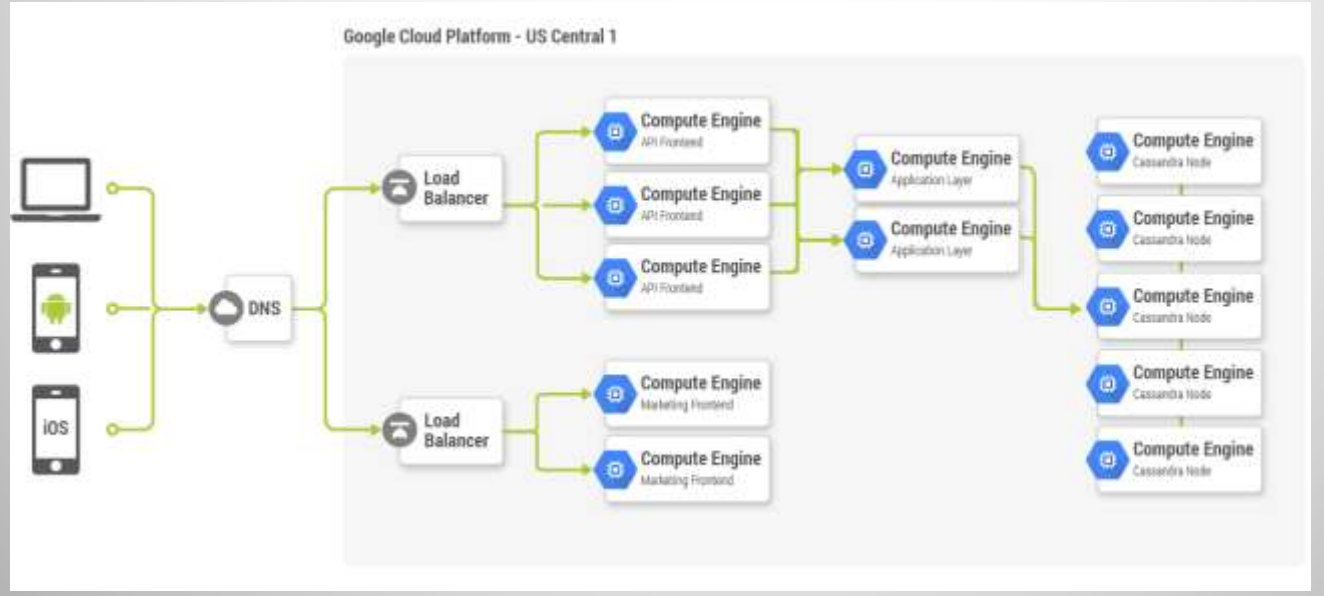


VIRTUAL MACHINES - CREATE



VIRTUAL MACHINES - CREATE

- Each zone supports a combination of Ivy Bridge, Sandy Bridge, Haswell, Broadwell, and Skylake platform. When you create an instance in the zone, your instance will use the default processor supported in that zone. For example, if you create an instance in the us-central1-a zone, your instance will use a Sandy Bridge processor.



VIRTUAL MACHINES - CREATE

- A managed instance group uses an instance template to create a group of identical instances. You control a managed instance group as a single entity.

Create for Migrating, Aligning assets, scaling and recovering after failures.

Two types..

1. Zonal
2. Regional

VIRTUAL MACHINES – INSTANCE GROUPS

- A managed instance group uses an instance template to create or update the instances that are part of the group. You can create an instance template once and can reuse it for multiple groups and configuration.
- IMPORTANT!! -- An instance template is a global resource that is not bound to a zone or a region. However, you can still specify some zonal resources in an instance template, which restricts the template to the zone where that resource resides.
- IMPORTANT!! By default, instances in the group will be placed in the Default and randomly assign Ips from the Regional Range

VIRTUAL MACHINES – INSTANCE GROUPS

- Unmanaged instance groups are groups of dissimilar instances that you can arbitrarily add and remove from the group. Unmanaged instance groups DO NOT offer autoscaling, rolling update support, or the use of instance templates so Google recommends creating managed instance groups whenever possible.
- IMPORTANT!! *Use unmanaged instance groups only if you need to apply load balancing to your pre-existing configurations or to groups of dissimilar instances.*

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VIRTUAL MACHINES – IMAGES

Contents of an image

- Boot loader
- Operating system
- File system structure
- Software
- Customizations

Image storage

- A tar and gzip'd file
- In a private area of GCS managed by the image service

VIRTUAL MACHINES – IMAGES

Images in Compute Engine

--Public base

Google, 3rd party vendors, and community; Premium images (p)

-- Private and custom images

Create new image from VM - pre-configured and installed SW

Import from on-prem, workstation, or another cloud

Management features: image sharing, image family, deprecation

VIRTUAL MACHINES – IMAGES

- Virtualbox or AWS
- Image can be stored in Cloud Storage

VIRTUAL MACHINES – DISKS

Compute Engine VM comes with a single root persistent disk

- Image is loaded onto root disk during boot process

  Bootable - you can attach to a VM and boot from it

  Snapshots - incremental backups

  Durable -- can survive VM terminate

  Some SW is installed and OS is configured by GCE

Each persistent disk can be up to 64 TB in size, so there is no need to manage arrays of disks to create large logical volumes. Each instance can attach only a limited amount of total persistent disk space and a limited number of individual persistent disks

VIRTUAL MACHINES – DISK OPTIONS

	Persistent disk HDD	Persistent disk SSD	Local SSD disk	RAM disk
Data redundancy	Yes	Yes	No	No
Encryption at rest	Yes	Yes	Yes	N/A
Snapshotting	Yes	Yes	No	No
Bootable	Yes	Yes	No	Not
Use case	General, bulk file storage	Very random IOPS	High IOPS + low latency	low latency + risk of data loss

https://cloud.google.com/compute/docs/disks/

VIRTUAL MACHINES – DISKS

Cloud Persistent Disk

- Single file system is best
- Resize (grow) disks
- Resize filesystem
- Built-in redundancy
  Built-in snapshot service
- Automatic encryption prior to write - use your keys

Computer Hardware Disk

- Partitioning
- Repartition disk
- Reformat
- Redundant disk arrays
- Subvolume management and snapshots
- Encrypt files before write to disk

IMPORTANT !! A single file system gives the best performance on Persistent disk

VIRTUAL MACHINES – SNAPSHOTS

- Snapshot is not available for local SSD
- Creates an *incremental* backup to GCS
- Snapshots can be restored to a new persistent disk
- Don't use for database migration across zones

VIRTUAL MACHINES – MOVE VM TO ALTERNATE ZONE

- Two ways to do this usually to support availability

1. Manual
2. Automatic

Notes

Don't use on a VM with a local SSD. The local SSD data cannot be backed up and will just be discarded.

Persistent disks must be attached to only the VM you are going to move, not to multiple VMs.

Sufficient quota must exist for all the resources copied during duplication, or the process will fail.

VIRTUAL MACHINES – MOVE VM TO ALTERNATE ZONE

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CLOUD ARCHITECT – PRACTICE QUESTIONS

QUESTION REVIEW - VIRTUAL NETWORKING

1. Your looking at setting up additional storage for a single filesystem. What type of storage would be best for this case?

a. Hard Disk

b. Cloud Persistent

c. SSD

d. SCSI

QUESTION REVIEW - VIRTUAL NETWORKING

2. What is the minimum amount of time your charged for a Virtual Machine?

a. 1 Minute
b. 10 Minutes
c. 1 hour
d. 24 hours

QUESTION REVIEW - VIRTUAL NETWORKING

3. What would be the proper IP schema based on the following scenario.

You have been contacted by a major railroad that would like to setup their applications and VMs in the GCP cloud. Customer is asking that there services are setup with an ephemeral IP address range that is dedicated to their services. They don't expect this to be the lowest cost option and would prefer a static solution. What type of IP would you recommend in the GCP Cloud? (Select one)

a. Internal
b. Dedicated
c. Static
d. External

QUESTION REVIEW - VIRTUAL NETWORKING

4. You have been contacted by a customer to discuss a GCP solution for their events and messaging application. Customer is currently on another provider and using their application on microservices platform. What virtual machine service on GCP is geared towards a serverless approach and focused on microservices?

a. Container Engine
b. Cloud Functions
c. App Engine
d. Compute Engine

QUESTION REVIEW - VIRTUAL NETWORKING

5. Your company is thinking about migrating their VMS and would like to ensure they can migrate the VM Images to any zone in the GCP Cloud. Customer would like to know if that's possible and why? (Select one)

a. Yes, VM images are Global resources and thus can moved between zones.

b. No, VM images are zonal resources so that image stays in the zone it

QUESTION REVIEW - VIRTUAL NETWORKING

6. You are currently looking at segmenting specific VM resources into a logical manner for ease of management. What subnet best practice when it comes to defining subnets would you want to use? (Choose two)

a. Auto

b. Custom

c. Customized

d. Autonomous

TECHNICAL REVIEW

- Thank you.
- Good Luck on the exam!