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09/30/2019

<u>Homework 2</u>

Google Cloud Platform

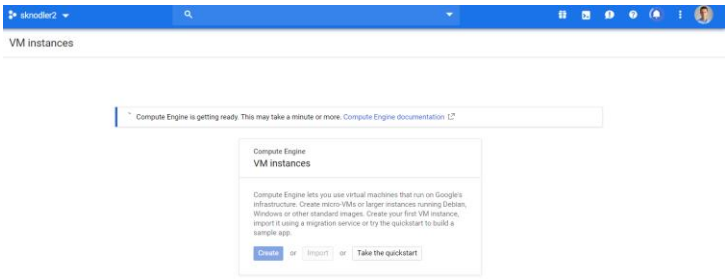
Section 4: Creating VM instances

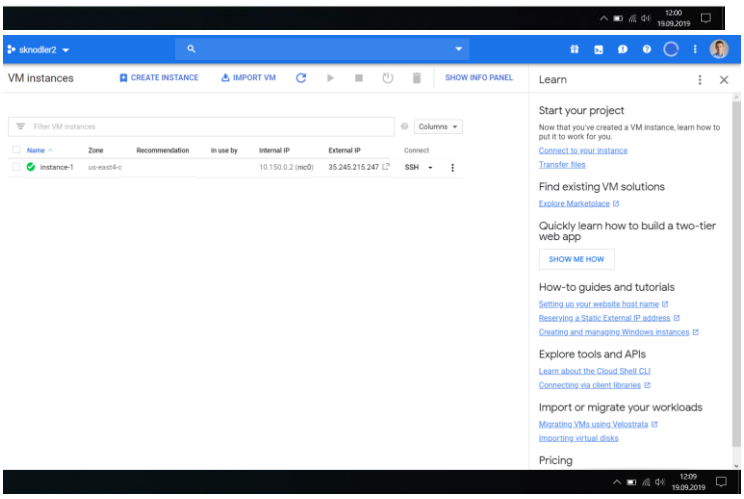
https://cloud.google.com/compute/docs/instances/create-start-instance

Complete the following sub-modules in Creating and Starting a VM Instance:

A. Creating an instance from a public image

I went to the instance page and created a new instance. I specified the zone, chose my machine configuration and chose a public linux OS image to create my instance. Next, I allowed access via HTTP and HTTPS and clicked on create.





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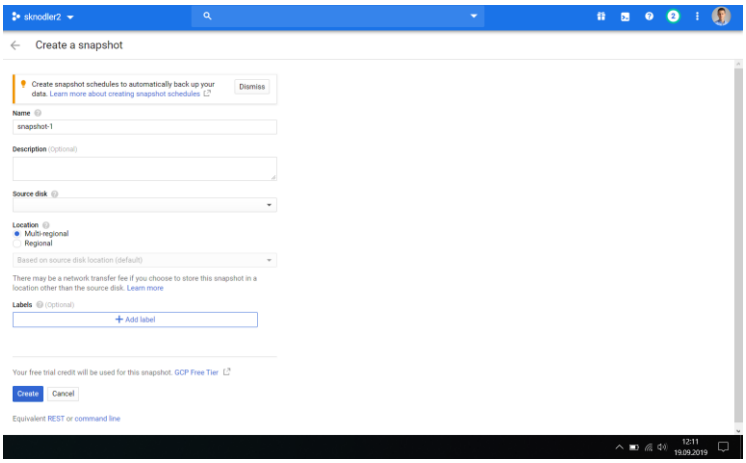
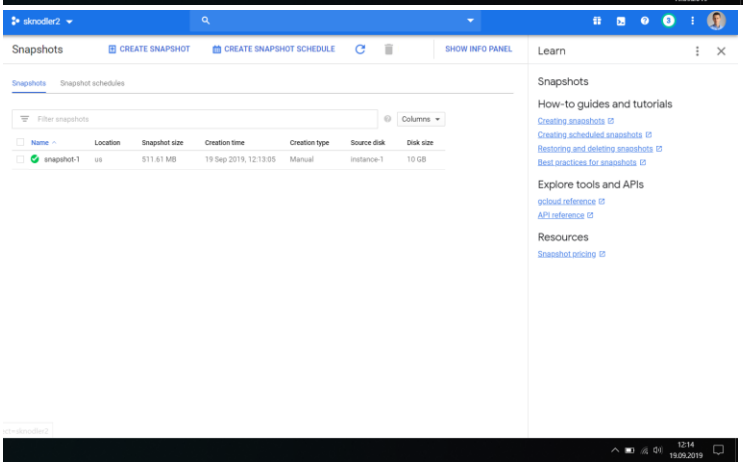
B. Creating an instance from a snapshot

a. Create a snapshot

I went to my snapshot section to create a persistent disk snapshot. This can reduce the risk of unexpected data loss. I selected my disk in the “source disk” section and chose to store the snapshot in a multi-regional location.





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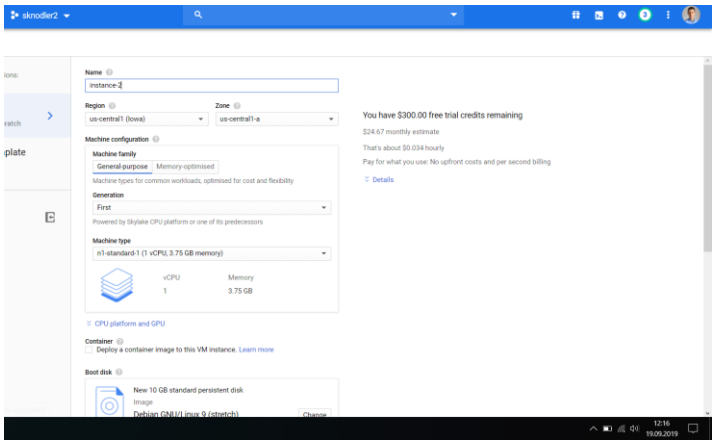
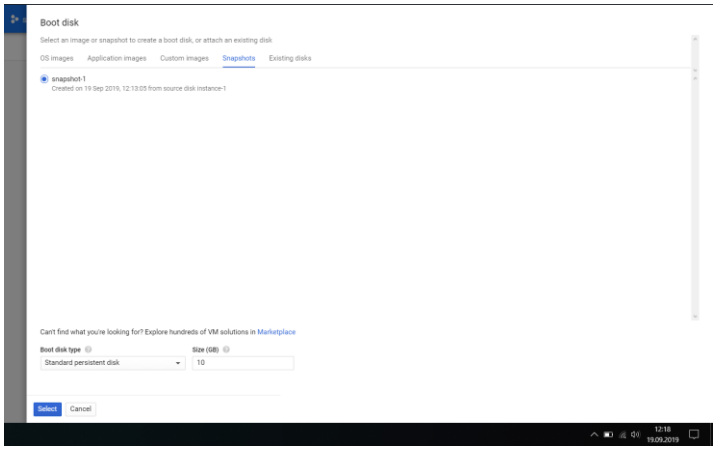
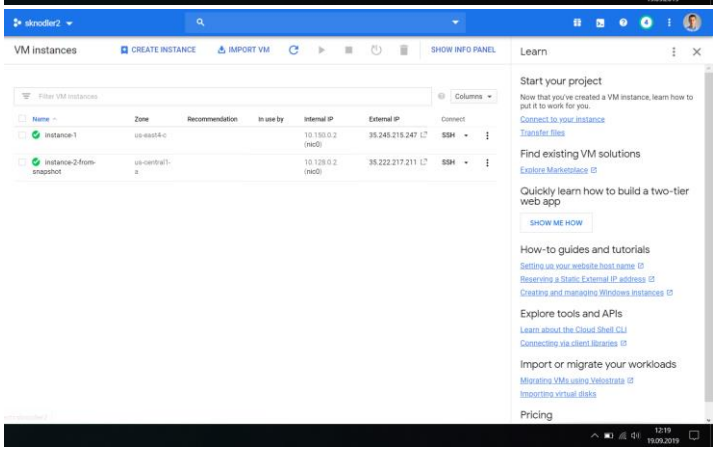
b. Create an instance from the snapshot
To do this, I went back to the instance page and selected my snapshot when choosing the boot disk.







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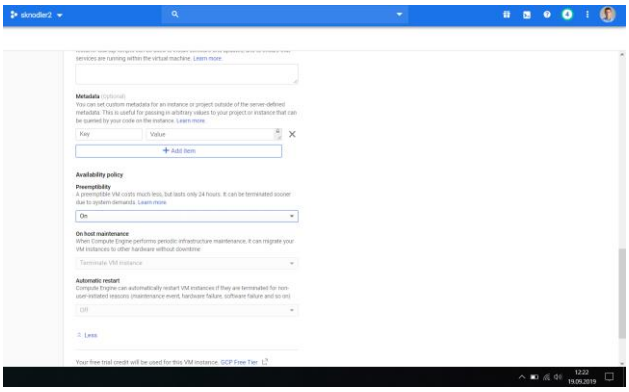
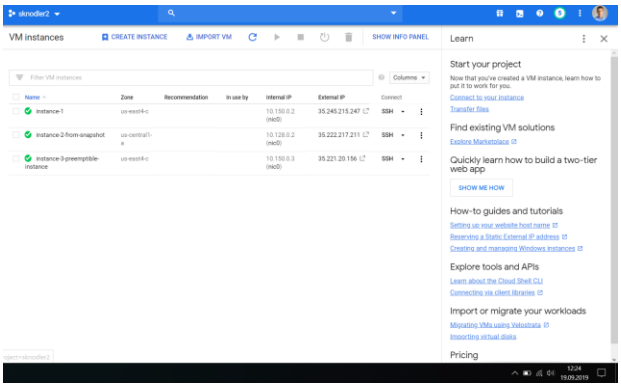
https://cloud.google.com/compute/docs/instances/create-start-preemptible-instance

Complete the following sub-module in Creating and Starting a Preemptible VM Instance:

A. Creating a preemptible instance
   To do this, I created a new instance but chose Preemptibility "On". This setting disables automatic restart for the instance, and sets the host maintenance action to Terminate.





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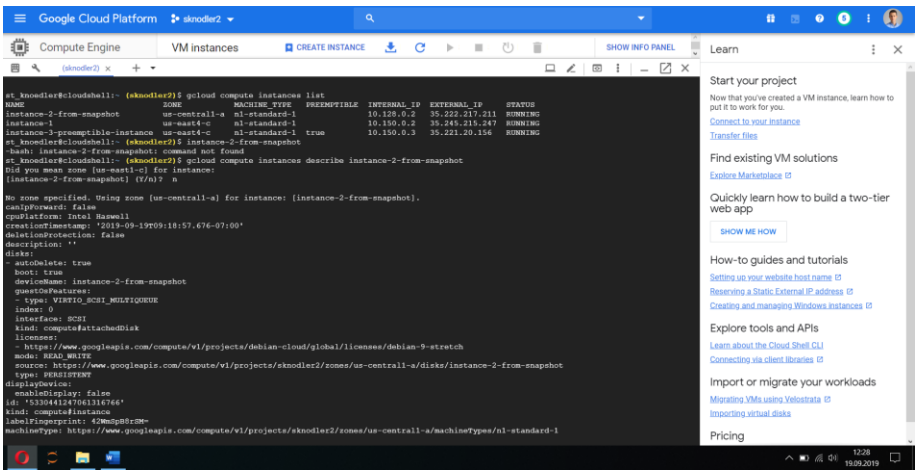
https://cloud.google.com/compute/docs/instances/instance-life-cycle

Complete the following sub-module in Instance Life Cycle:

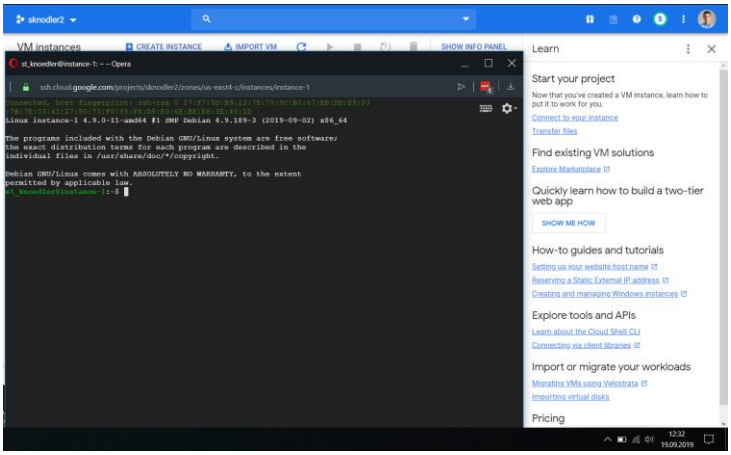
A. Checking an instance's status (Check any instance that you created earlier)
List all instances and their status: *gcloud compute instances list*
Describe the status of a single instance: *gcloud compute instances describe instance-2-from-snapshot*
→ I selected "n" as I did not mean the zone "us-east1-c" – the right instance was described in the following…



https://cloud.google.com/compute/docs/instances/connecting-to-instance

Complete the following sub-modules in Connecting to instances:

A. Connecting to Linux instances
In the list of virtual machine instances, I clicked on SSH in the row of the instance that I wanted to connect to.



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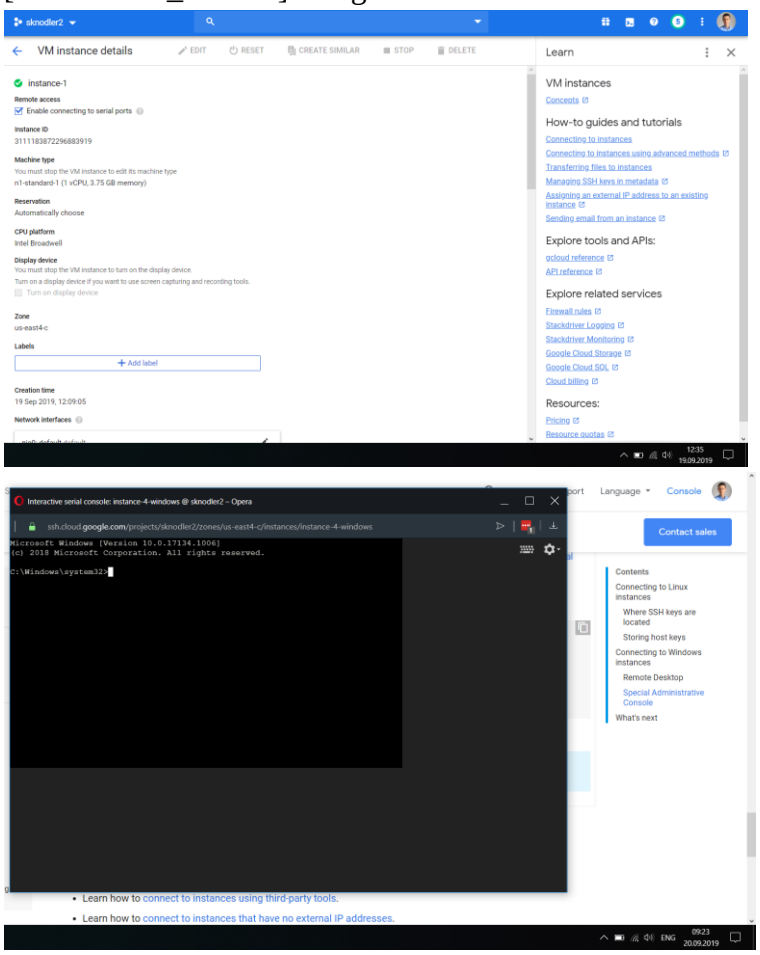
B. Connecting to Windows instances

a. Special Administrative Console - Connecting to an instance through the command line

I created a windows instance. Then, I enabled connecting to serial ports in that instance. Under Remote access, I clicked the drop-down list next to Connect to serial console, and select Serial port 2. A Windows Special Administrative Console (SAC) opens. I entered 1. Cmd 2. ch -sn [CHANNEL_NAME] and got connected:



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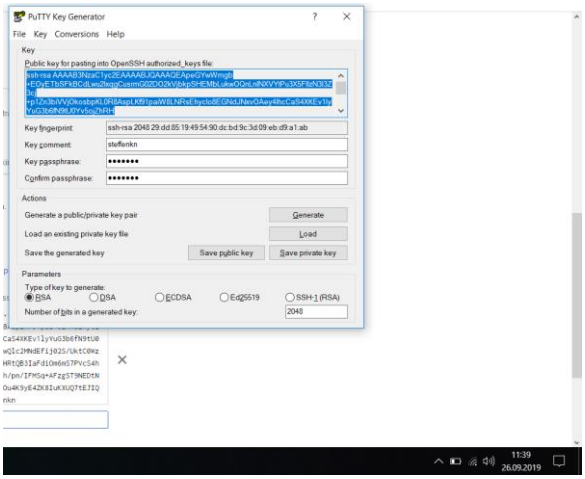
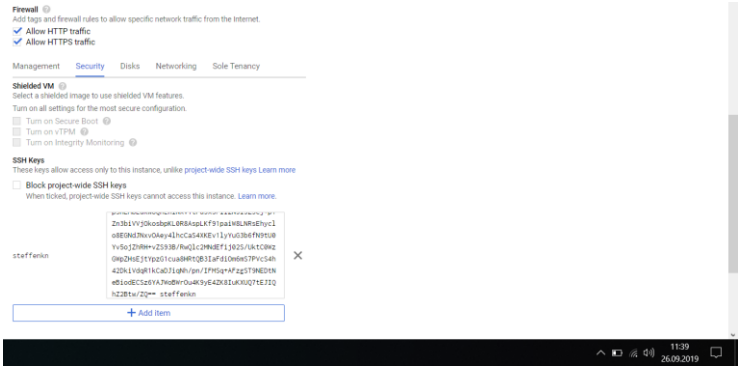
https://cloud.google.com/compute/docs/instances/connecting-advanced

Complete the following sub-module in Connecting to instances using advanced methods:

A. Connecting using third-party tools (SSH)
   I used Putty key gen to create a key pair (public and private). I saved the private key on my local computer and copied the public key.



Next, I added the public key to the instance:



Next, I opened Putty and entered the public IP of the instance. Then, I opened SSH → Auth. And selected my private key that I have stored on my local computer earlier.

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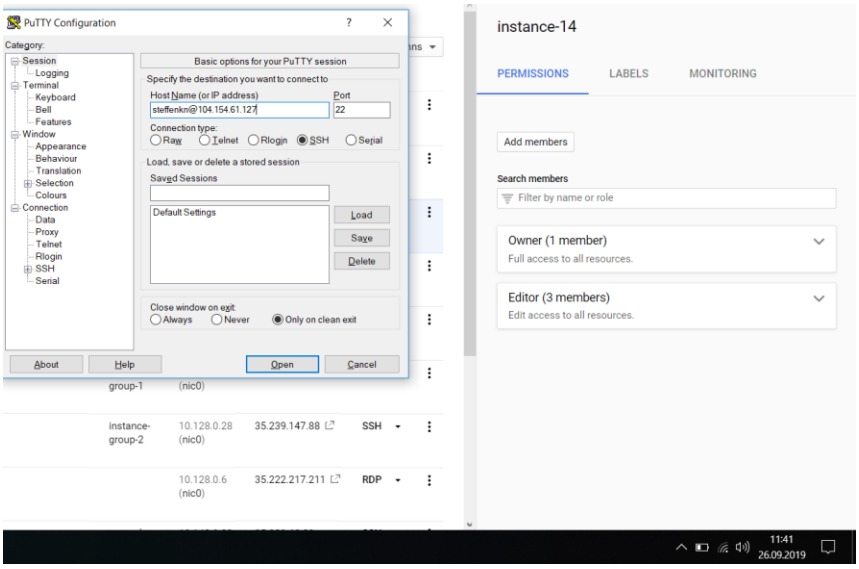
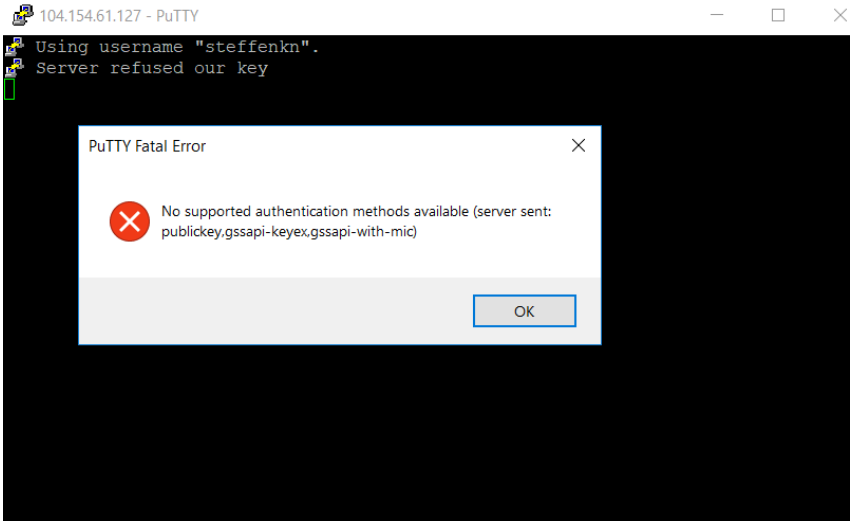
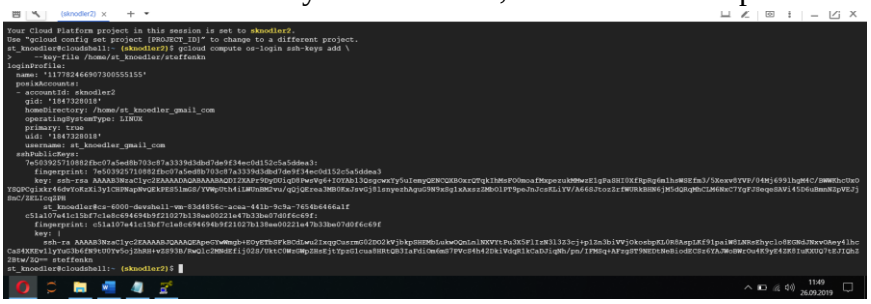


When connecting, I got an error message. I have tried this steps 100x with different keys and credentials but I could not connect with my computer.



Also tried to add the key via command, which did not help:



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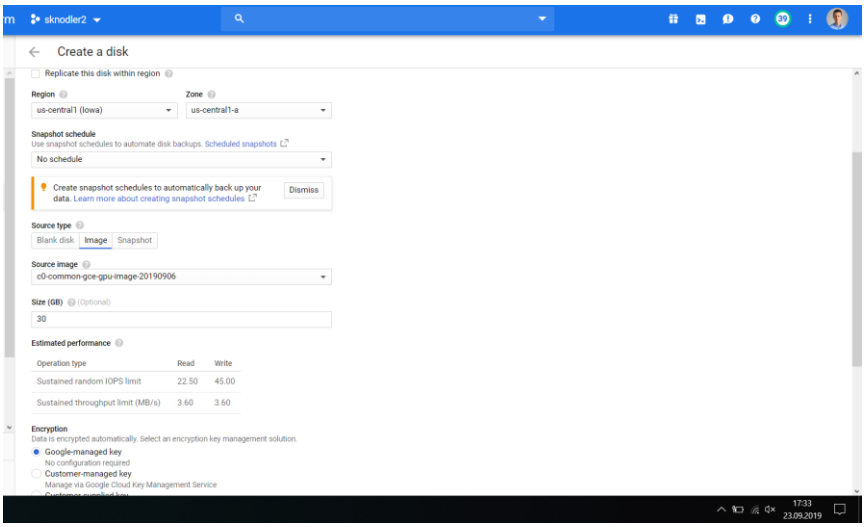
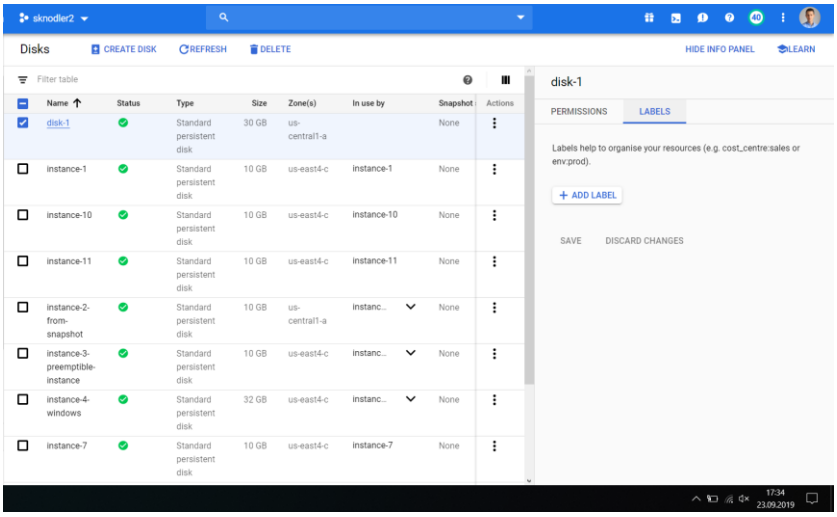
https://cloud.google.com/compute/docs/disks/create-root-persistent-disks

Complete the following sub-module in Creating Customized Boot Disks:

A. Creating a standalone boot persistent disk from an image
   I went to new disk page and selected under source type an image from which I wanted to create the boot persistent disk.





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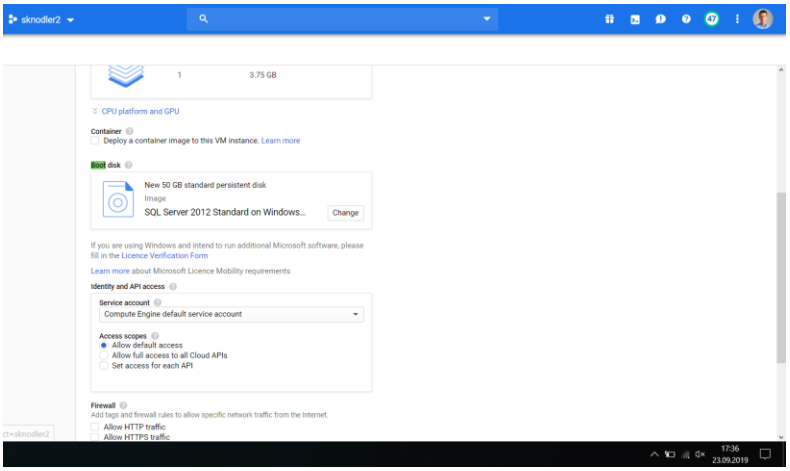
https://cloud.google.com/compute/docs/instances/sql-server/creating-sql-server-instances

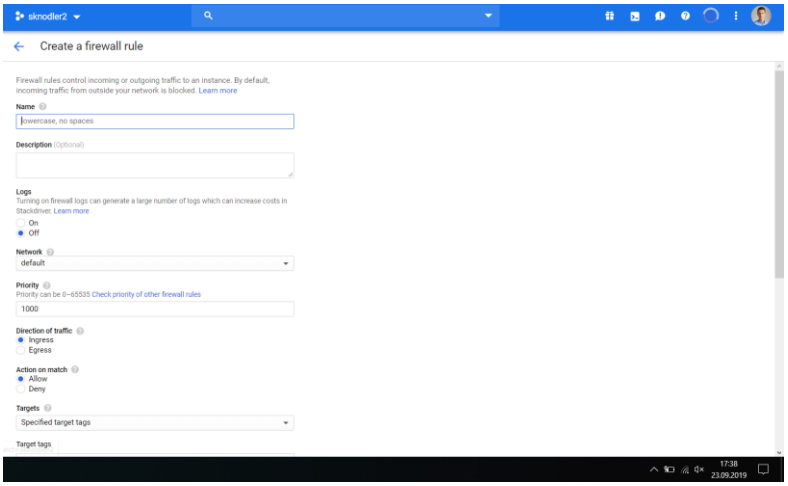
Complete the following sub-module in Creating SQL Server Instances:

A. Creating a SQL Server Instance (Console)

I went to the instance again and, selected under the boot disk a SWL server image.



After I created the instance, I created a firewall rule to allow access to SQL Server on my new instance. Therefore, I used the default SQL Server port is 1433. I selected the VPC network where my SQL Server instance is located. I chose ingress traffic and I allowed all IPs to access with “Allow from any source”. In the protocols and port sections, I allowed the Sql port tcp:1433;



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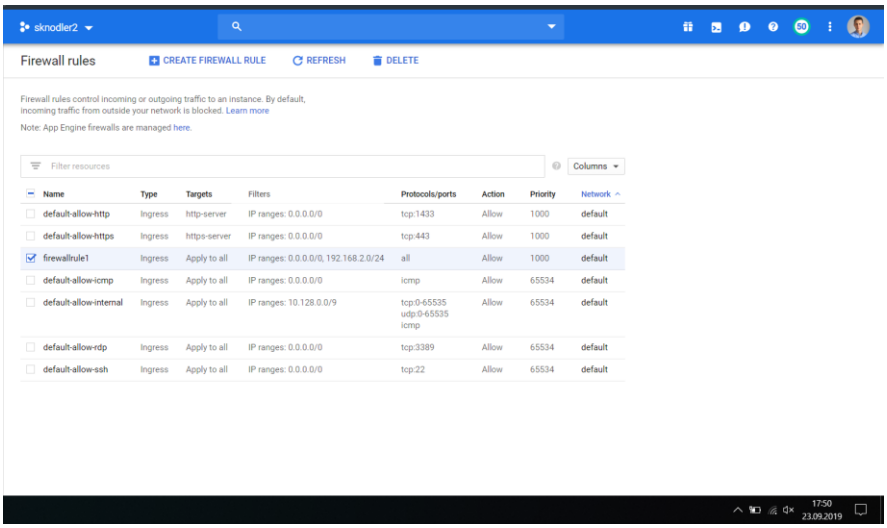


Section 5: Managing your instances

https://cloud.google.com/compute/docs/instances/stop-start-instance#stopping_an_instance

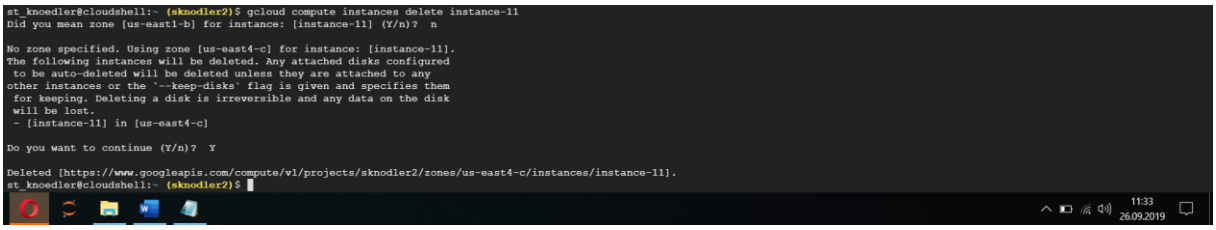
Complete the following sub-module in Stopping and Starting an Instance:

A. Stopping an Instance (GCloud)
   Please see the code below that I entered:

https://cloud.google.com/compute/docs/instances/deleting-instance

Complete the following sub-module in Deleting an Instance:

A. Deleting an Instance (GCloud)
   Please see the code below that I entered:



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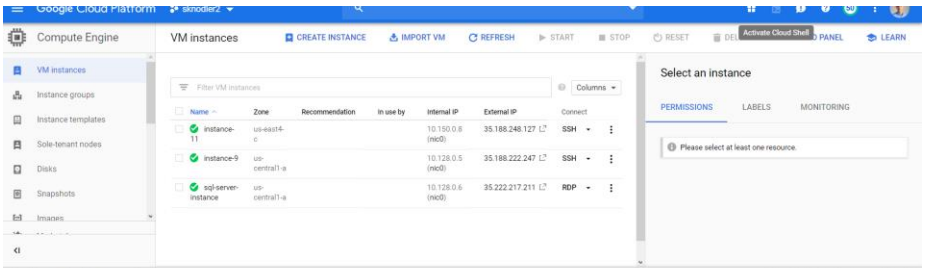
https://cloud.google.com/compute/docs/instances/moving-instance-across-zones

Complete the following sub-module in Moving an instance between zones:

A. Moving an instance automatically (GCloud)
   Please see the code below that I entered in the command box:



https://cloud.google.com/compute/docs/instances/managing-instances

Complete the following sub-module in Performing Other Tasks With Your Instances:

A. Copy files between an instance and local computer
   I uploaded the file “test.txt” from my local computer and chose it in the directory to copy to my instance. Please see the code below: (copy speed 0.3 KB/s)

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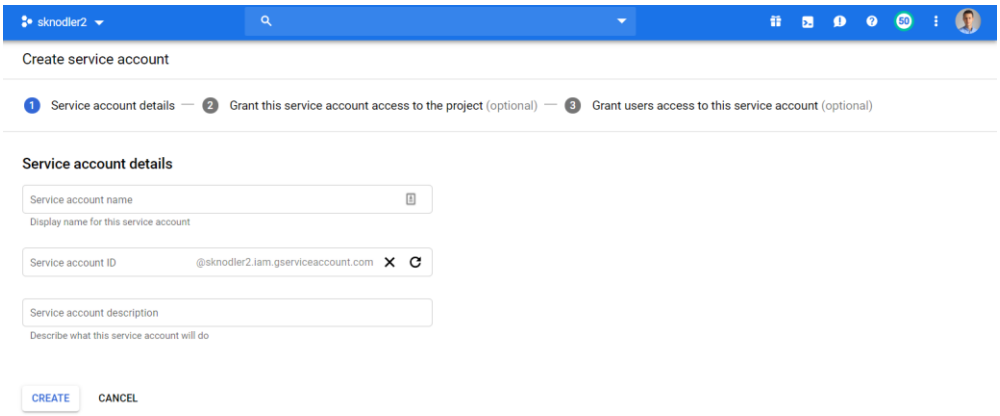
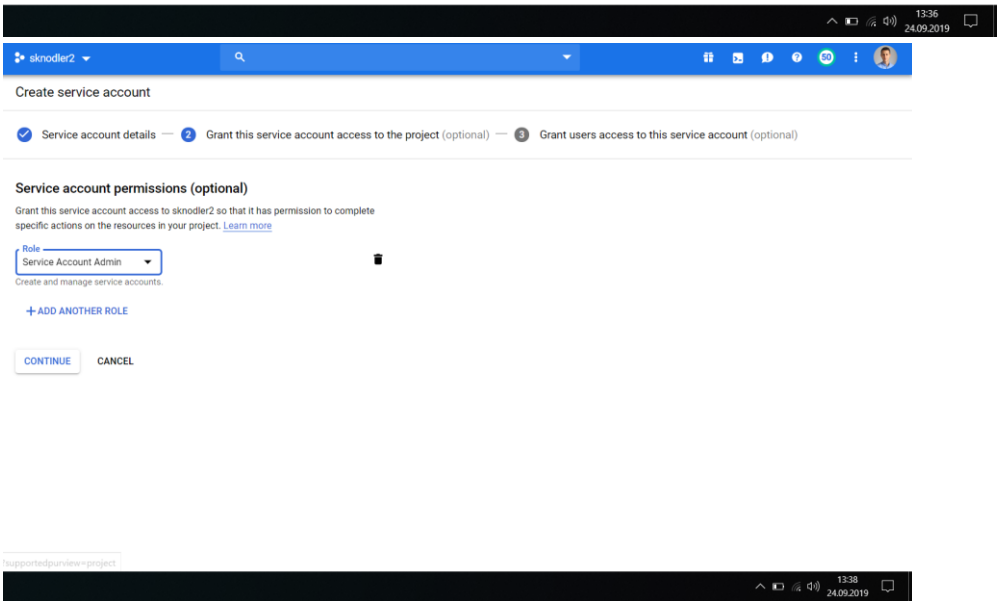
https://cloud.google.com/compute/docs/access/create-enable-service-accounts-for-instances

Complete the following sub-modules in Creating and enabling service accounts for instances:

A. Creating a new service account
   I Opened the Service Accounts page in the GCP Console. I chose my project, a name for my account name, my service account ind granted the service account admin role.





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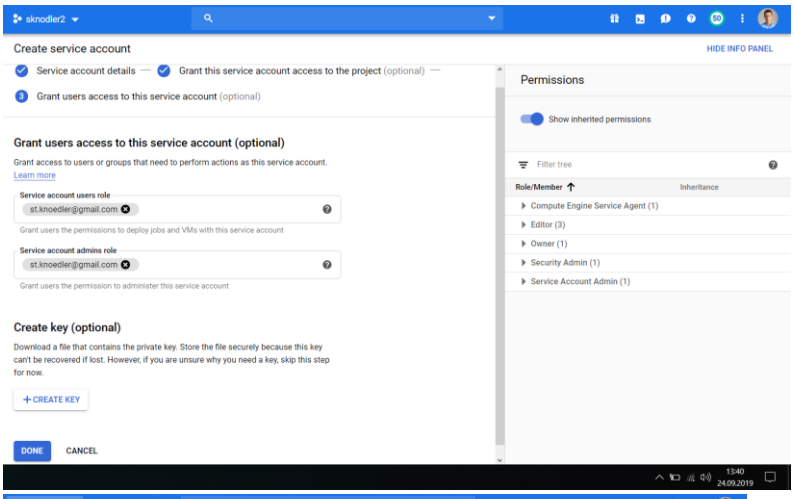
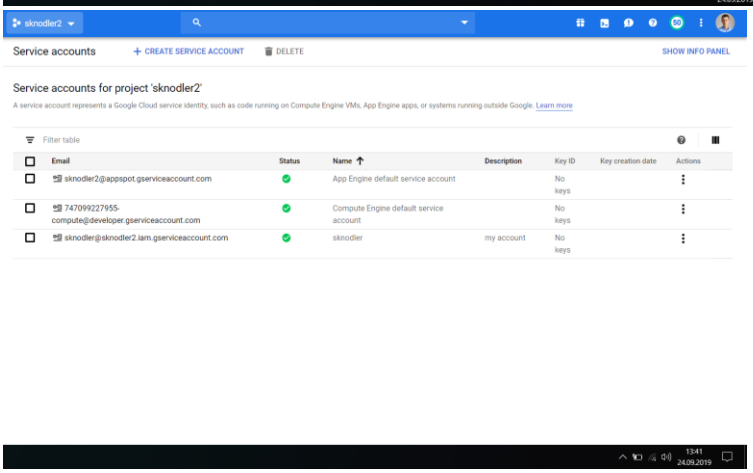
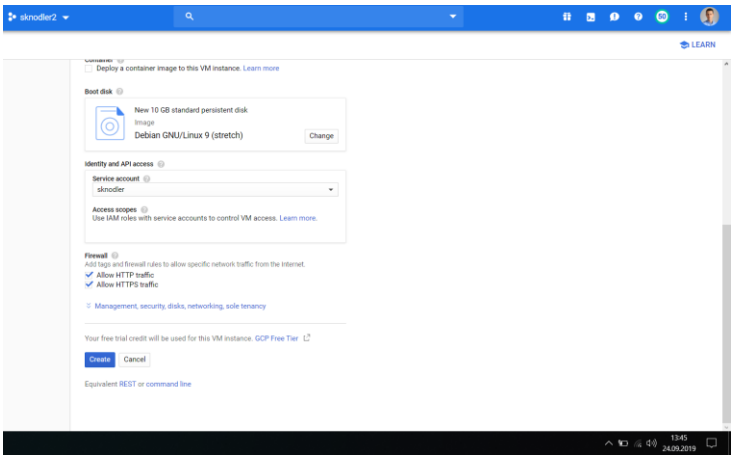




I copied the service account email and granted IAM roles to the new service account "sknodler@sknodler2.iam.gserviceaccount.com":

B. Setting up a new instance to run as a service account

I created a new instance and chose under Identity and API access "sknodler" (the new service account)



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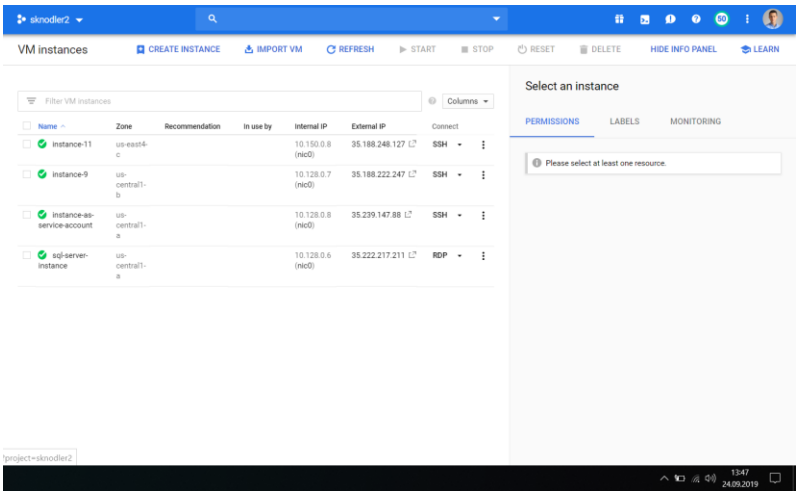
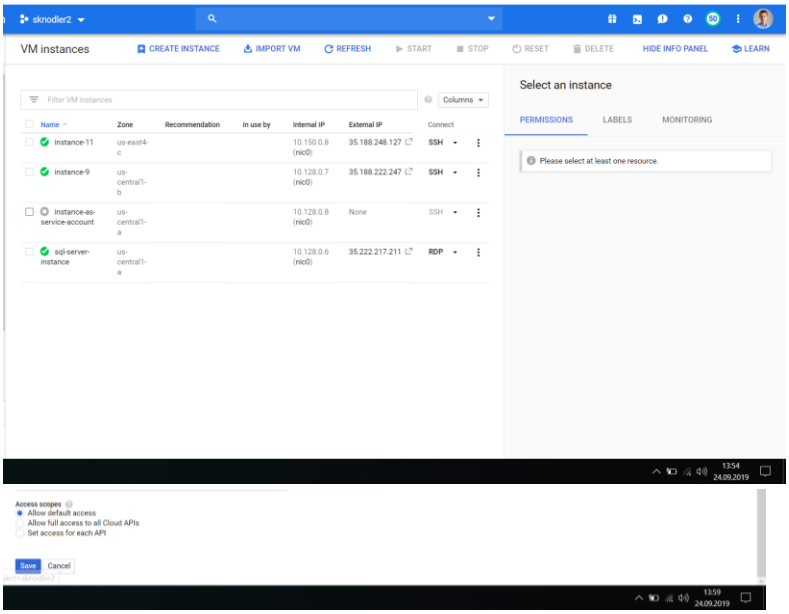


I also did the GCloud but forgot to take a screen shot, I ran:
*gcloud compute instances create instance-12 *
--service-account sknodler@sknodler2.iam.gserviceaccount.com

C. Changing the service account and access scopes for an instance
I had to stop my instance first. Next, I clcked on the instance and chose “edit”. Then, I changed the access scope to “Allow full access to all Cloud APIs”



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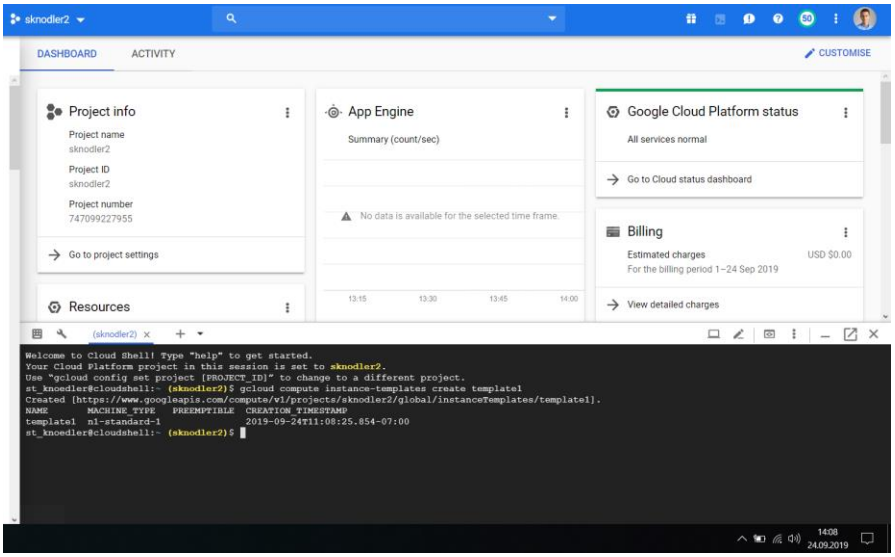
Section 6: Creating and Managing Instance Templates

https://cloud.google.com/compute/docs/instance-templates/create-instance-templates

Complete the following sub-modules in Creating Instance Templates:

A. Creating a new instance template (GCloud)
   Please see the code/script below in the screenshot that I entered:



   I did create a default template. When looking in the documentation, this is the following parameter that are chosen. However, The second screenshot shows how I could also specify the parameters:

If you do not provide explicit template settings, `gcloud compute` creates a template with the following default values:

- Machine type: n1-standard-1
- Image: The latest Debian image
- Boot disk: A new standard boot disk named after the instance
- Network: The `default` VPC network
- IP address: An ephemeral external IP address

You can also explicitly provide these configuration settings. For example:

```
gcloud compute instance-templates create example-template-custom \
    --machine-type n1-standard-4 \
    --image-family debian-9 \
    --image-project debian-cloud \
    --boot-disk-size 250GB
```

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B. Creating an instance template that specifies a subnet
First, I listed my subnets from which I could choose. Next, I created a template with a subnet that was earlier listed. Please look at my code in the screenshot below:

```
st_knoedler@cloudshell:~ (sknodler2)$ gcloud compute networks subnets list
NAME     REGION                    NETWORK  RANGE
default  us-west2                  default  10.168.0.0/20
default  asia-northeast1           default  10.146.0.0/20
default  asia-northeast2           default  10.174.0.0/20
default  us-west1                  default  10.138.0.0/20
default  southamerica-east1        default  10.158.0.0/20
default  europe-west6              default  10.172.0.0/20
default  europe-west4              default  10.164.0.0/20
default  asia-east1                default  10.140.0.0/20
default  europe-north1             default  10.166.0.0/20
default  asia-southeast1           default  10.148.0.0/20
default  us-east4                  default  10.150.0.0/20
default  europe-west1              default  10.132.0.0/20
default  europe-west2              default  10.154.0.0/20
default  europe-west3              default  10.156.0.0/20
default  australia-southeast1      default  10.152.0.0/20
default  asia-south1               default  10.160.0.0/20
default  us-east1                  default  10.142.0.0/20
default  us-central1               default  10.128.0.0/20
default  asia-east2                default  10.170.0.0/20
default  northamerica-northeast1   default  10.162.0.0/20
st_knoedler@cloudshell:~ (sknodler2)$ gcloud compute instance-templates create template-qa \
>     --region us-central1 \
>     --subnet default
Created [https://www.googleapis.com/compute/v1/projects/sknodler2/global/instanceTemplates/template-qa].
NAME         MACHINE_TYPE   PREEMPTIBLE  CREATION_TIMESTAMP
template-qa  n1-standard-1              2019-09-24T11:17:03.042-07:00
st_knoedler@cloudshell:~ (sknodler2)$
```

Section 7: Creating and Managing Groups of Instances

https://cloud.google.com/compute/docs/instance-groups/creating-groups-of-managed-instances

Complete the following sub-modules in Creating managed instance groups (MIG):

A. Creating a managed instance group (Console and GCloud)
Please look at the code below. I chose my earlier created templace to create the instance group “example-group”

```
st_knoedler@cloudshell:~ (sknodler2)$ gcloud compute instance-groups managed create example-group   --base-instance-name test   --size 3   --template te
mplate1
Did you mean zone [us-east1-c] for managed instance group:
[example-group] (Y/n)?  Y

Created [https://www.googleapis.com/compute/v1/projects/sknodler2/zones/us-east1-c/instanceGroupManagers/example-group].
NAME           LOCATION    SCOPE  BASE_INSTANCE_NAME  SIZE  TARGET_SIZE  INSTANCE_TEMPLATE  AUTOSCALED
example-group  us-east1-c  zone   test                0     3            template1          no
st_knoedler@cloudshell:~ (sknodler2)$
```

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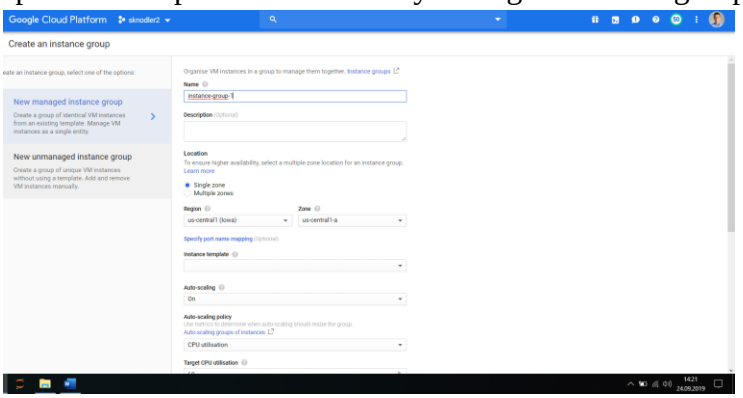
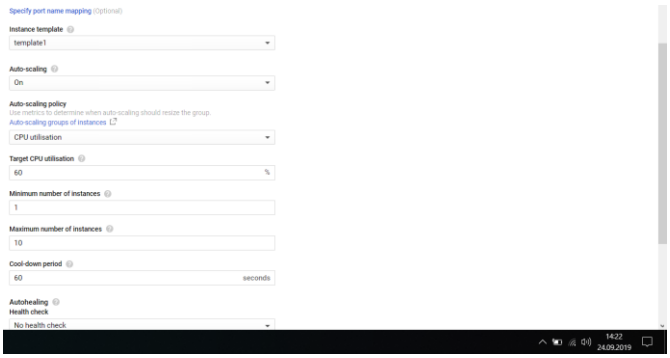
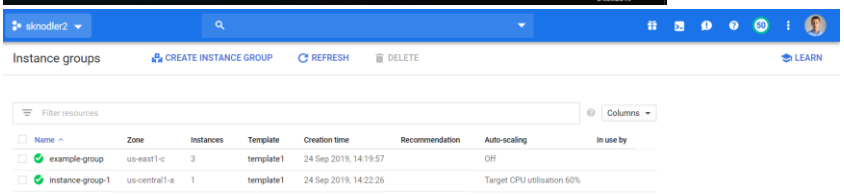
I did the same in the console. I went to the instance group page and selected my earlier specified template-1 to create my managed instance group







Please see above the two groups that I created through console and gcloud.

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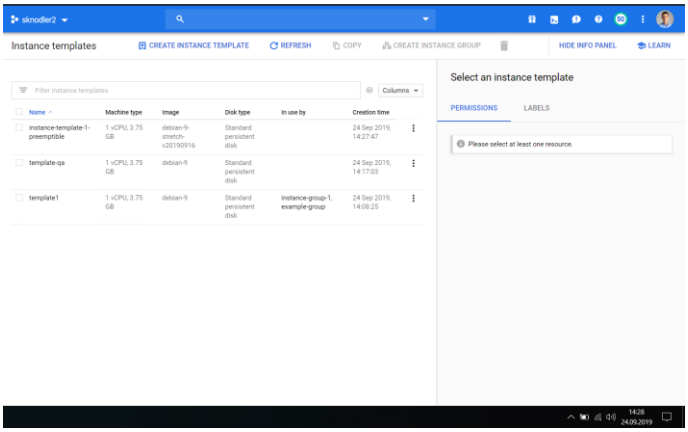
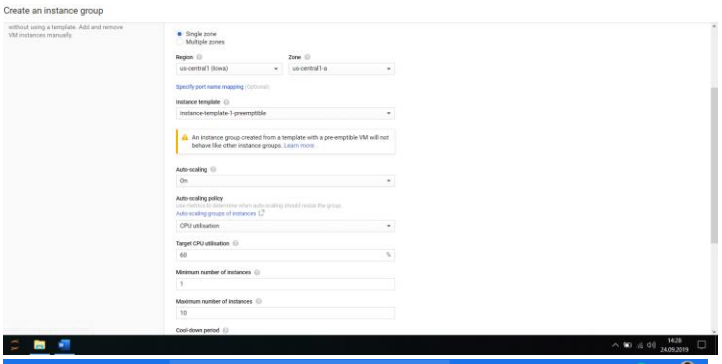
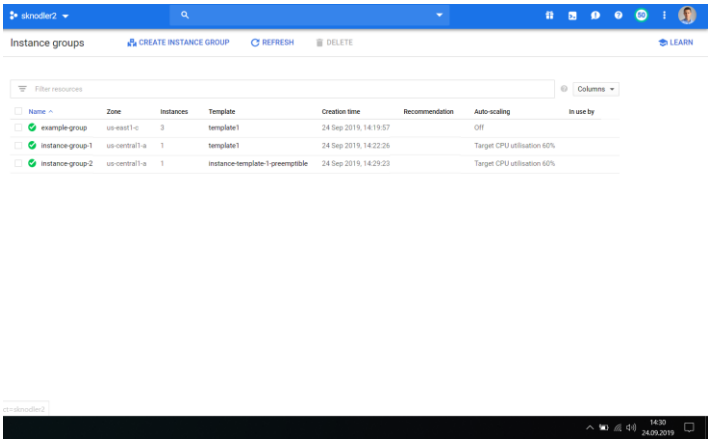
B. Creating groups of preemptible instances

I went to the instance template page, and clicked on “create instance template”. IN the settings, I chose Preemptibility to “On”



Then, I used the template to create a managed instance group. To do this, I went into instance groups and chose my template for the instance.





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https://cloud.google.com/compute/docs/instance-groups/autohealing-instances-in-migs

Complete the following sub-module in Setting up health checking and autohealing for instances in

MIGs:

A. Setting up a health check and an autohealing policy (Console and GCloud)

Create a health check
In gcloud, I created a health check for autohealing that is more conservative than a load balancing health check. Therefore, this health check looks for a response on port 80 and tolerates some failures before it marks the instance as unhealthy. So if it does not get a response after 3 tries, the instance will be marked as unhealthy.

```
st_knoedler@cloudshell:~ (sknodler2)$ gcloud compute health-checks create http example-check --port 80 \
>     --check-interval 30s \
>     --healthy-threshold 1 \
>     --timeout 10s \
>     --unhealthy-threshold 3
Created [https://www.googleapis.com/compute/v1/projects/sknodler2/global/healthChecks/example-check].
NAME           PROTOCOL
example-check  HTTP
st_knoedler@cloudshell:~ (sknodler2)$
```

Next, I create a firewall rule to allow health check to connect. As the health checks come from 130.211.0.0/22 and 35.191.0.0/16, I allowed those ip addresses. I using the default network.

```
st_knoedler@cloudshell:~ (sknodler2)$ gcloud compute firewall-rules create allow-health-check \
>     --allow tcp:80 \
>     --source-ranges 130.211.0.0/22,35.191.0.0/16 \
>     --network default
Creating firewall...Created [https://www.googleapis.com/compute/v1/projects/sknodler2/global/firewalls/allow-health-check].
Creating firewall...done.
NAME                  NETWORK  DIRECTION  PRIORITY  ALLOW   DENY  DISABLED
allow-health-check    default  INGRESS    1000      tcp:80        False
st_knoedler@cloudshell:~ (sknodler2)$
```

Last, I applied the health check by configuring an autohealing policy for my regional or zonal managed instance group “instance-group-1”.

```
st_knoedler@cloudshell:~ (sknodler2)$ gcloud compute instance-groups managed update instance-group-1     --health-check example-check     --initial-dela
y 300     --zone us-central1-a
Updated [https://www.googleapis.com/compute/v1/projects/sknodler2/zones/us-central1-a/instanceGroupManagers/instance-group-1].
st_knoedler@cloudshell:~ (sknodler2)$
```

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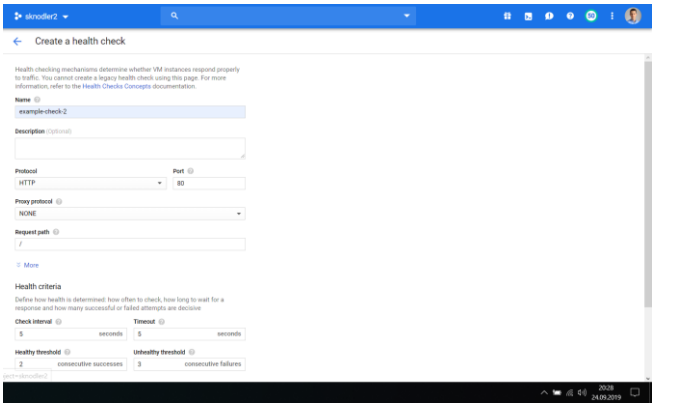
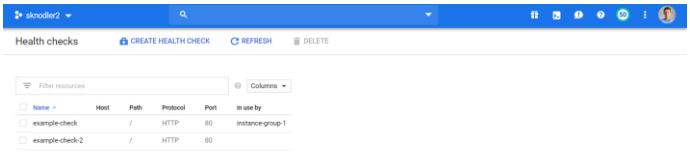
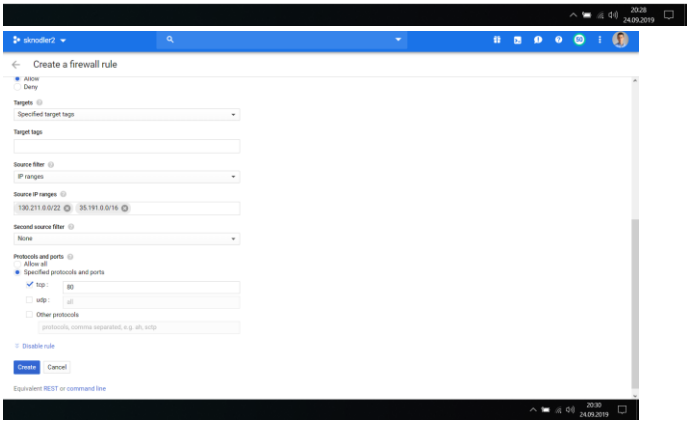
I did the same in the console. First, creating the health check and second, creating the new firewall rule that allows the access to the health check.







Next, I edited my managed instance group to apply my health check. Therefore, I chose the health check under auto-healing and added a delay of 300 seconds so that the health check tries to contact the instance with some time in between. Otherwise, I could create a new instance even if not really necessary.

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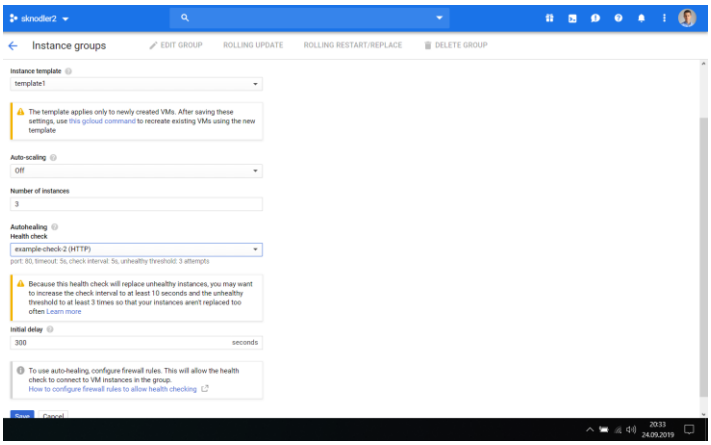
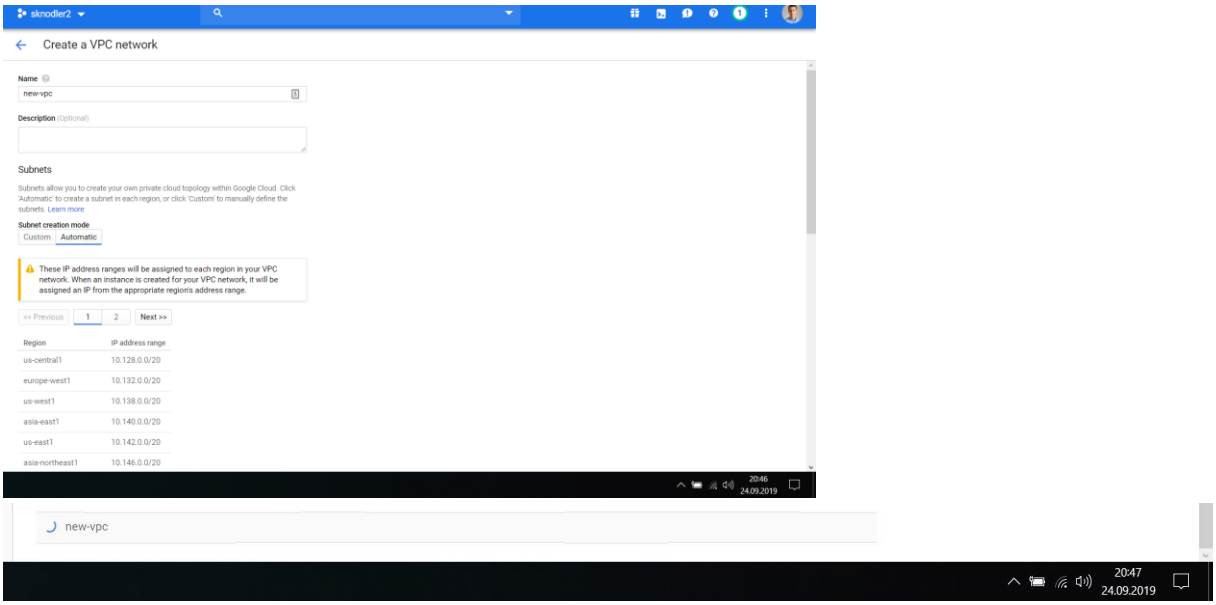


Section 8: Virtual Private Cloud (VPC)

https://cloud.google.com/vpc/docs/using-vpc

Complete the following sub-modules in Using VPC networks:

A. Creating an auto mode network (Console)
   Auto mode networks create one subnet in each GCP region automatically when I create the network. Therefore, when a new regions become available, new subnets in those regions are automatically added to the auto mode network. I opened the vpc network page and created a new vpc network. I chose automatic for the subnet creation mode and in the fireeall settings I chose my predefined firewall. Last but not least, I chose the “dynamic routing mode”.



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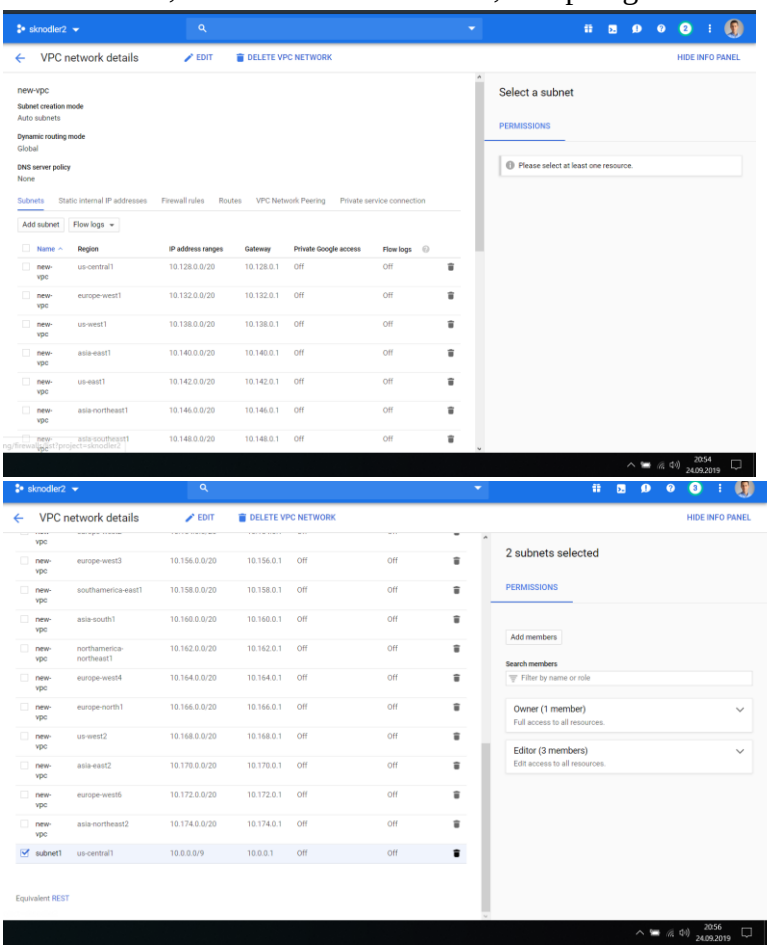
B. Creating a custom mode network (GCloud)
Please see the code below. I created a new custom mode network and chose dynamic routing = global.

```
st_knoedler@cloudshell:~ (sknodler2)$ gcloud compute networks create new-vpc-1     --subnet-mode=custom     --bgp-routing-mode=global
Created [https://www.googleapis.com/compute/v1/projects/sknodler2/global/networks/new-vpc-1].
NAME       SUBNET_MODE  BGP_ROUTING_MODE  IPV4_RANGE  GATEWAY_IPV4
new-vpc-1  CUSTOM       GLOBAL
```

C. Create subnets
I went to the vpc network page and clicked oon my new vpc network. Then, I chose "add subnet", chose a name "subnet1", the iprange and reion to for my subnet.



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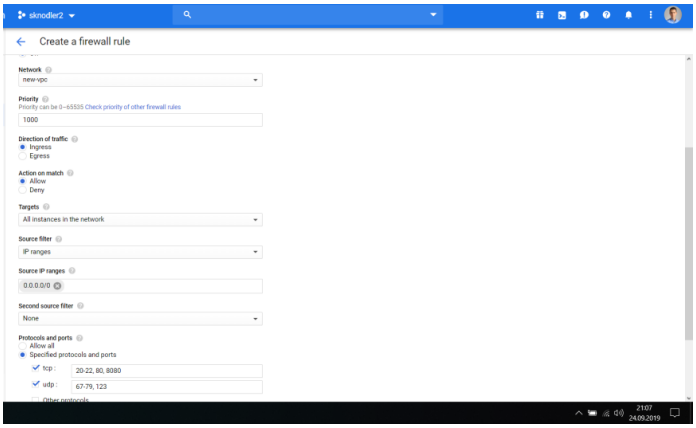
D. Create firewall rules

I went t my firewalls page and created a new firewall that allows ingress tcp ports: 20-22, 80, 8080 as well as udp ports 47-79, 123. I allowed all source ips with 0.0.0.0/0.

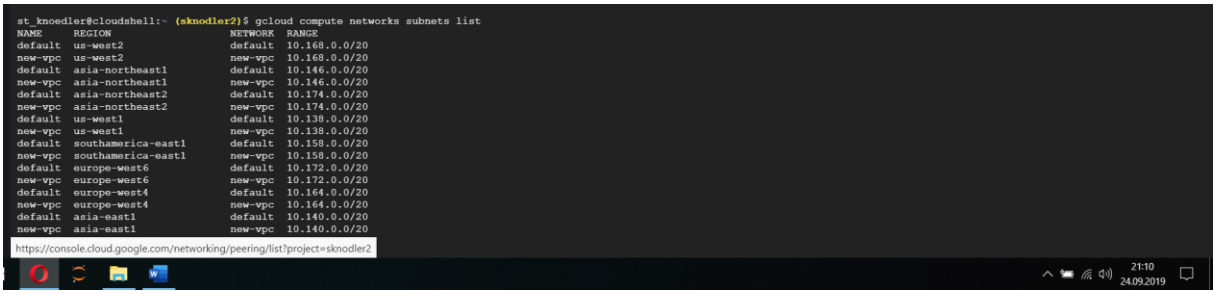


new-firewall-vpc	Ingress	Apply to all	IP ranges: 0.0.0.0/0	tcp:20-22,80,8080 udp:67-79,123	Allow	1000	new-vpc
new-vpc-allow-internal	Ingress	Apply to all	IP ranges: 10.128.0.0/9	all	Allow	65534	new-vpc

Rows per page: 50 1 - 11 of 11

E. Listing subnets (GCloud)

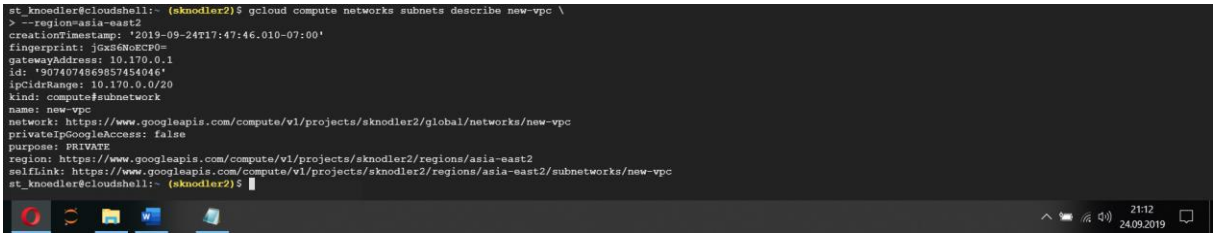
Please see code below



```
st_knoedler@cloudshell:~ (sknodler2)$ gcloud compute networks subnets list
NAME     REGION                   NETWORK  RANGE
default  us-west2                 default  10.168.0.0/20
new-vpc  us-west2                 new-vpc  10.168.0.0/20
default  asia-northeast1          default  10.146.0.0/20
new-vpc  asia-northeast1          new-vpc  10.146.0.0/20
default  asia-northeast2          default  10.174.0.0/20
new-vpc  asia-northeast2          new-vpc  10.174.0.0/20
default  us-west1                 default  10.138.0.0/20
new-vpc  us-west1                 new-vpc  10.138.0.0/20
default  southamerica-east1       default  10.158.0.0/20
new-vpc  southamerica-east1       new-vpc  10.158.0.0/20
default  europe-west6             default  10.172.0.0/20
new-vpc  europe-west6             new-vpc  10.172.0.0/20
default  europe-west4             default  10.164.0.0/20
new-vpc  europe-west4             new-vpc  10.164.0.0/20
default  asia-east1               default  10.140.0.0/20
new-vpc  asia-east1               new-vpc  10.140.0.0/20
https://console.cloud.google.com/networking/peering/list?project=sknodler2
```

F. Describing a subnet (GCloud)

Please see code below



```
st_knoedler@cloudshell:~ (sknodler2)$ gcloud compute networks subnets describe new-vpc \
> --region=asia-east2
creationTimestamp: '2019-09-24T17:47:46.010-07:00'
fingerprint: jGxS6NoECP0=
gatewayAddress: 10.170.0.1
id: '9074074869857454046'
ipCidrRange: 10.170.0.0/20
kind: compute#subnetwork
name: new-vpc
network: https://www.googleapis.com/compute/v1/projects/sknodler2/global/networks/new-vpc
privateIpGoogleAccess: false
purpose: PRIVATE
region: https://www.googleapis.com/compute/v1/projects/sknodler2/regions/asia-east2
selfLink: https://www.googleapis.com/compute/v1/projects/sknodler2/regions/asia-east2/subnetworks/new-vpc
st_knoedler@cloudshell:~ (sknodler2)$
```

G. Deleting subnets (GCloud)

Please see code below:

```
st_knoedler@cloudshell:~ (sknodler2)$ gcloud compute networks subnets delete subnet1 \
> --region=us-central1
The following subnetworks will be deleted:
 - [subnet1] in [us-central1]

Do you want to continue (Y/n)?  Y

Deleted [https://www.googleapis.com/compute/v1/projects/sknodler2/regions/us-central1/subnetworks/subnet1].
st_knoedler@cloudshell:~ (sknodler2)$
```

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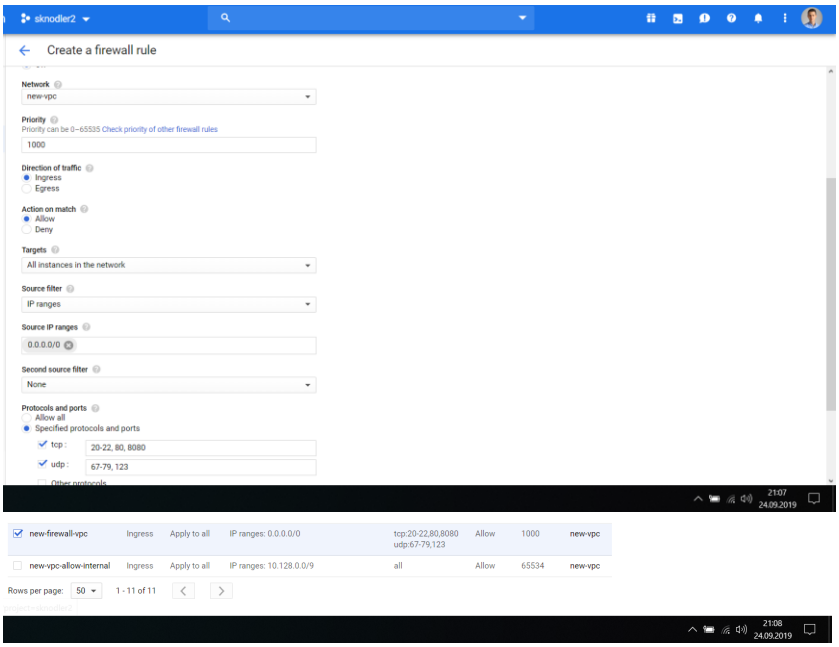
H. Deleting a network (GCloud)
   Please see code below

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

Complete the following sub-modules in Using firewall rules:

A. Creating Firewall Rules (Console)



B. Configuration examples - Recreate sample network configurations in the scenarios listed below
   a. Example 1: Deny all ingress TCP connections except those to port 80 from subnet1

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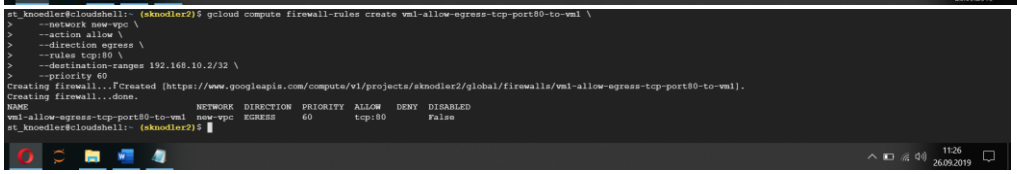
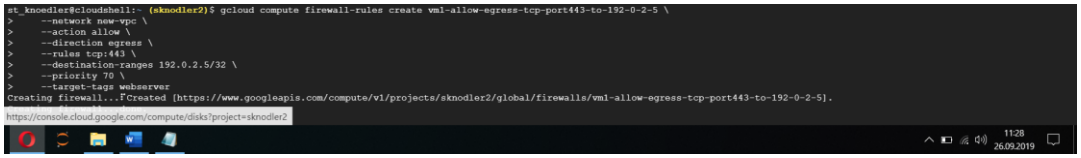
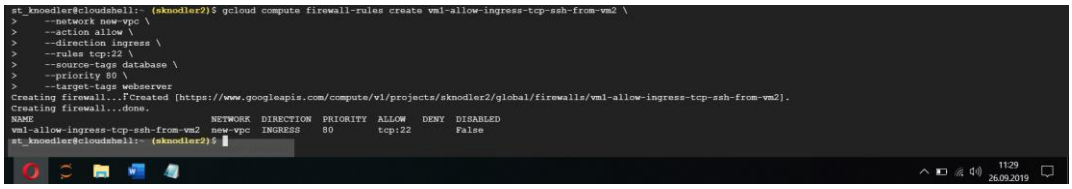
b. Example 2: Deny all egress TCP connections except those to port 80 of vm1



c. Example 3: Allow egress TCP connections to port 443 of an external host



d. Example 4: Allow SSH connections from vm2 to vm1



Section 9: Clean up

https://cloud.google.com/shell/docs/quickstart#clean-up

To avoid incurring charges to your Google Cloud Platform account for the resources used in this

I went to the Projects page in the console. Clicked the trash can icon next to the project I created. This shuts down the project and schedules it for deletion

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