LAB 3.1

Q1:

routes of auto mode vpc

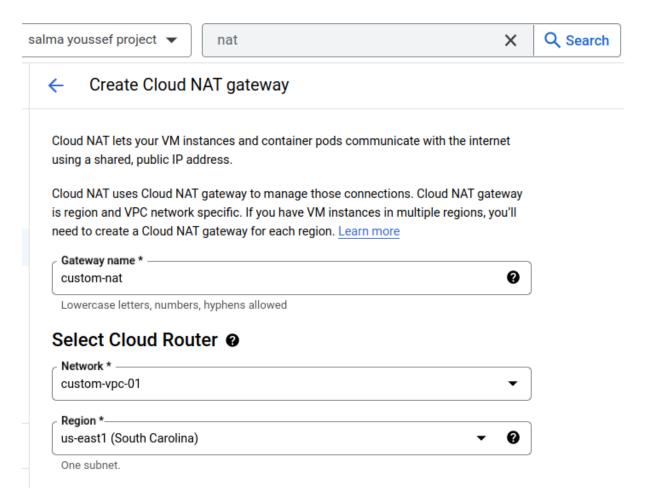| Name ↑	Description	Destination IP range	Priority	Instance tags	Next hop
default-route-0c9bc1807d8d5856	Default local route to the subnetwork 10.200.0.0/20.	10.200.0.0/20	0	None	Virtual network auro-vpc
default-route-1a7d5313910ed005	Default local route to the subnetwork 10.174.0.0/20.	10.174.0.0/20	0	None	Virtual network auro-vpc
default-route-204911e701424fdd	Default local route to the subnetwork 10.154.0.0/20.	10.154.0.0/20	0	None	Virtual network auro-vpc
default-route-2aa4083c883721f5	Default local route to the subnetwork 10.150.0.0/20.	10.150.0.0/20	0	None	Virtual network auro-vpc
default-route-2add12272d687176	Default local route to the subnetwork 10.194.0.0/20.	10.194.0.0/20	0	None	Virtual network auro-vpc
default-route-368981c2947d3ae5	Default local route to the subnetwork 10.206.0.0/20.	10.206.0.0/20	0	None	Virtual network auro-vpc
default-route-36af79aab14e0edb	Default local route to the subnetwork 10.160.0.0/20.	10.160.0.0/20	0	None	Virtual network auro-vpc
default-route-3a318844f5b33461	Default local route to the subnetwork 10.178.0.0/20.	10.178.0.0/20	0	None	Virtual network auro-vpc
default-route-45e49ad743291ddd	Default route to the Internet.	0.0.0.0/0	1000	None	Default internet gateway
default-route-4852ac0573fe8781	Default local route to the subnetwork 10.172.0.0/20.	10.172.0.0/20	0	None	Virtual network auro-vpc
default-route-4b828c1f0307566d	Default local route to the subnetwork 10.166.0.0/20.	10.166.0.0/20	0	None	Virtual network auro-vpc
default-route-4c0f09ec02b64742	Default local route to the subnetwork 10.146.0.0/20.	10.146.0.0/20	0	None	Virtual network auro-vpc
default-route-4ccb056695c5463e	Default local route to the subnetwork 10.180.0.0/20.	10.180.0.0/20	0	None	Virtual network auro-vpc
default-route-4ce0771a27c00461	Default local route to the subnetwork 10.148.0.0/20.	10.148.0.0/20	0	None	Virtual network auro-vpc
default-route-5ba6d9239a3941ba	Default local route to the subnetwork 10.182.0.0/20.	10.182.0.0/20	0	None	Virtual network auro-vpc
default-route-6297eb440153c0ec	Default local route to the subnetwork 10.140.0.0/20.	10.140.0.0/20	0	None	Virtual network auro-vpc
default-route-71a09350fc445db2	Default local route to the subnetwork 10.192.0.0/20.	10.192.0.0/20	0	None	Virtual network auro-vpc
default-route-7374c1d2a151c97d	Default local route to the subnetwork 10.184.0.0/20.	10.184.0.0/20	0	None	Virtual network auro-vpc
default-route-773b3bba936102f1	Default local route to the subnetwork 10.162.0.0/20.	10.162.0.0/20	0	None	Virtual network auro-vpc
default-route-86674f9a4ec4603f	Default local route to the subnetwork 10.158.0.0/20.	10.158.0.0/20	0	None	Virtual network auro-vpc
default-route-8c2ecb7c481e4d9c	Default local route to the subnetwork 10.156.0.0/20.	10.156.0.0/20	0	None	Virtual network auro-vpc
default-route-9740775f50b9441d	Default local route to the subnetwork 10.188.0.0/20.	10.188.0.0/20	0	None	Virtual network auro-vpc
default-route-a4518a3b2169c62a	Default local route to the subnetwork 10.128.0.0/20.	10.128.0.0/20	0	None	Virtual network auro-vpc
default-route-a820b47f2115389b	Default local route to the subnetwork 10.190.0.0/20.	10.190.0.0/20	0	None	Virtual network auro-vpc
default-route-b939731454d1c1fb	Default local route to the subnetwork 10.186.0.0/20.	10.186.0.0/20	0	None	Virtual network auro-vpc
default-route-be4ba33b7ec1ba18	Default local route to the subnetwork 10.138.0.0/20.	10.138.0.0/20	0	None	Virtual network auro-vpc
default-route-c3956045942a77f6	Default local route to the subnetwork 10.142.0.0/20.	10.142.0.0/20	0	None	Virtual network auro-vpc
default-route-c6d512cd6a433ba5	Default local route to the subnetwork 10.152.0.0/20.	10.152.0.0/20	0	None	Virtual network auro-vpc
default-route-c8623e758c53ccf0	Default local route to the subnetwork 10.132.0.0/20.	10.132.0.0/20	0	None	Virtual network auro-vpc
default-route-c943855fb1d62782	Default local route to the subnetwork 10.202.0.0/20.	10.202.0.0/20	0	None	Virtual network auro-vpc
default-route-cbb1e420d4fd757e	Default local route to the subnetwork 10.204.0.0/20.	10.204.0.0/20	0	None	Virtual network auro-vpc
default-route-d0476b05a2372fec	Default local route to the subnetwork 10.164.0.0/20.	10.164.0.0/20	0	None	Virtual network auro-vpc
default-route-e4b6f2752926a1fa	Default local route to the subnetwork 10.170.0.0/20.	10.170.0.0/20	0	None	Virtual network auro-vpc
default-route-ea168066f111d4ab	Default local route to the subnetwork 10.208.0.0/20.	10.208.0.0/20	0	None	Virtual network auro-vpc
default-route-f254334b5e7e9baf	Default local route to the subnetwork 10.198.0.0/20.	10.198.0.0/20	0	None	Virtual network auro-vpc
default-route-fee13c92314447de	Default local route to the subnetwork 10.168.0.0/20.	10.168.0.0/20	0	None	Virtual network auro-vpc

No, none of them can be deleted.

Q2:

routes of custom mode vpc

ENABLE API

None

Maximum transmission unit
1460

SUBNETS	STATIC INTERNAL IP ADDRESSES	FIREWALLS	ROUTES	VPC NETWORK PEERING	PRIVATE SERVICE CONNECTION

ADD ROUTE   DELETE

≡ Filter   Enter property name or value   ❓

	Name ↑	Description	Destination IP range	Priority	Instance tags	Next hop
☐	default-route-36dcfb42c803073c	Default local route to the subnetwork 10.0.0.0/24.	10.0.0.0/24	0	None	Virtual network custom-vpc-01
☐	default-route-7ff2fe505287a0d9	Default local route to the subnetwork 10.0.1.0/24.	10.0.1.0/24	0	None	Virtual network custom-vpc-01
☐	default-route-f8897aaddb38c2ae	Default route to the Internet.	0.0.0.0/0	1000	None	Default internet gateway

EQUIVALENT REST

Q3:
by deleting the default route of the internet.

Q4:
creating NAT

← **Create Cloud NAT gateway**

Cloud NAT lets your VM instances and container pods communicate with the internet using a shared, public IP address.

Cloud NAT uses Cloud NAT gateway to manage those connections. Cloud NAT gateway is region and VPC network specific. If you have VM instances in multiple regions, you'll need to create a Cloud NAT gateway for each region. Learn more

Gateway name *

custom-nat   ❓

Lowercase letters, numbers, hyphens allowed

Select Cloud Router ❓

Network *

custom-vpc-01   ▼

Region *

us-east1 (South Carolina)   ▼   ❓

One subnet.

create a router:

Create a router

Google Cloud Router dynamically exchanges routes between your Virtual Private Cloud (VPC) and on-premises networks by using Border Gateway Protocol (BGP)

Name *

nat-router   ❓

Lowercase letters, numbers, hyphens allowed

Description

Network *
custom-vpc-01   ❓

Region *
us-east1 (South Carolina)   ❓

BGP peer keepalive interval   seconds   ❓

CREATE   CANCEL

← **Create Cloud NAT gateway**

Cloud Router *
nat-router   ▾ ❓

Cloud NAT mapping ❓

Source (internal)
Custom   ▾ ❓

Select which subnets to map to the Cloud NAT gateway. Primary IP addresses are used by VM instances and secondary IP addresses are used by container pods. Learn more

Subnets

Subnet name 1
subnet-1 (10.0.0.0/24)   ▾

IP ranges 1 *
Selected: all   ▾

+ ADD SUBNET AND IP RANGE

All VMs from selected subnet IP ranges will be able to communicate with Internet

Cloud NAT IP addresses
Automatic (recommended)   ▾ ❓

Destination (external)

LAB 3.2

Q1:
create HTTP(S) LB:

frontend:

backend:

health check:

allow-http

Logs ❓
Off
view in Logs Explorer

Network
custom-vpc-01

Priority
1000

Direction
Ingress

Action on match
Allow

Source filters

IP ranges   0.0.0.0/0

Protocols and ports
tcp:80

Updating firewall rule "allow-http"...   ✕

Enforcement

all the instances of LB are healthy

← **Load balancer details**   ✏ EDIT   🗑 DELETE

All unmatched (default)   All unmatched (default)   nginx-backecd-service

Backend

Backend services

1. nginx-backecd-service

Endpoint protocol	Named port	Timeout	Health check	Cloud CDN	Logging
HTTP	http	30 seconds	nginx-health-ckeck	Enabled VIEW CDN DETAILS	Disabled

∨ ADVANCED CONFIGURATIONS

Name ↑	Type	Scope	Healthy	Autoscaling	Balancing mode	Selected ports ❓	Capacity
instance-group-nginx	Instance group	us-east1	✅ 3 of 3	On: Target CPU utilization 60%	Max backend utilization: 80%	80	100%

salma youssef project

load

Search

50

services

Load balancing

+ CREATE LOAD BALANCER   C REFRESH   🗑 DELETE   💬 HELP A

cing

LOAD BALANCERS   BACKENDS   FRONTENDS

ℹ Faster web performance and improved web protection with Cloud CDN and Cloud Armor. Learn more

≡ Filter   Enter property name or value

	Name	Load balancer type ↑	Protocols	Region	Backends
☐	nginx-lb	HTTP(S)	HTTP		✅ 1 backend service (1 instance group, 0 network endpoint groups)

ctor

ctory

ains

ice Connect

e

tes

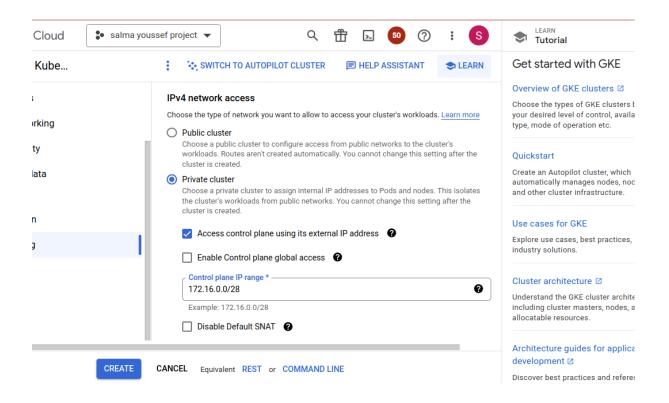To view or delete load balancing resources like forwarding rules and target proxies, go to the load balancing components view.

Q2:

LAB 3.3

Q1:

create private cluster:

Kube... | ⋮ ∴ SWITCH TO AUTOPILOT CLUSTER | ▣ HELP ASSISTANT | ≋ LEARN

Get started with GKE

Overview of GKE clusters ⧉

sics

Control plane version

Choose whether you'd like to upgrade the cluster's control plane version manually or let GKE do it automatically. Learn more

ol ∨

○ Static version
Manually manage the version upgrades. GKE will only upgrade the control plane and nodes if it's necessary to maintain security and compatibility, as described in the release schedule. Learn more

● Release channel
Let GKE automatically manage the cluster's control plane version. Learn more

Release channel
Regular channel (default) ▾

Version
1.24.8-gke.2000 (default) ▾

These versions have passed internal validation and are considered production-quality, but don't have enough historical data to guarantee their stability. Known issues generally have known workarounds. Release notes

CREATE | CANCEL | Equivalent REST or COMMAND LINE

Choose the types of GKE clusters your desired level of control, availa type, mode of operation etc.

Quickstart

Create an Autopilot cluster, which automatically manages nodes, nod and other cluster infrastructure.

Use cases for GKE

Explore use cases, best practices, industry solutions.

Cluster architecture ⧉

Understand the GKE cluster archite including cluster masters, nodes, a allocatable resources.

Architecture guides for applica development ⧉

Discover best practices and referer

Kube... | ⋮ ∴ SWITCH TO AUTOPILOT CLUSTER | ▣ HELP ASSISTANT | ≋ LEARN

Get started with GKE

Overview of GKE clusters ⧉

orking

Maximum Pods per node
110 ❓

ty

Mask for Pod address range per node: /24

lata

Network tags ❓

n

Node Pool Pod Address Range

g

ields are incorrect

ⓘ The cluster settings specify a default cluster level pod address range, but you can override that setting at the node pool level.

☑ Automatically create secondary ranges ❓

Pod secondary range name ❓ | Pod address range ❓

Example: 192.168.0.0/16

CREATE | CANCEL | Equivalent REST or COMMAND LINE

Choose the types of GKE clusters your desired level of control, availa type, mode of operation etc.

Quickstart

Create an Autopilot cluster, which automatically manages nodes, nod and other cluster infrastructure.

Use cases for GKE

Explore use cases, best practices, industry solutions.

Cluster architecture ⧉

Understand the GKE cluster archite including cluster masters, nodes, a allocatable resources.

Architecture guides for applica development ⧉

Discover best practices and referer

Q2:
create deployment:

tes Engine ← Create a deployment HIDE INFO PANEL 🗩 HELP ASSISTANT

2 Configuration

A deployment is a configuration which defines how Kubernetes deploys, manages, and scales your container image. Kubernetes will ensure your system matches this configuration. Three replicas will be created by default.

Deployment name *
nginx-deployment

Namespace *
default

Labels

Use Kubernetes labels to control how workloads are scheduled to your nodes. Labels are applied to all nodes in this node pool and cannot be changed once the cluster is created.

Key 1 *
app

Value 1
nginx-deployment

+ ADD KUBERNETES LABEL

Deployment name

The name of the deployment. Must be unique to the r of the cluster, and can be up to 253 characters long a lower case alphanumeric characters, "." and "-".

---

tes Engine ← C O PANEL 🗩 HELP ASSISTANT

YAML output

YAML declaration of the resources that will be deployed.

```
1   ---
2   apiVersion: "apps/v1"
3   kind: "Deployment"
4   metadata:
5     name: "nginx-deployment"
6     namespace: "default"
7     labels:
8       app: "nginx-deployment"
9   spec:
10    replicas: 3
11    selector:
12      matchLabels:
13        app: "nginx-deployment"
14    template:
15      metadata:
16        labels:
17          app: "nginx-deployment"
18      spec:
19        containers:
20        - name: "nginx-1"
21          image: "nginx:latest"
22  ---
23  apiVersion: "autoscaling/v2"
```

CLOSE

Deployment details

Active revisions

↓ Revision	Name	Status	Summary	Created on	P
1	nginx-deployment-7f99d59897	✓ OK	nginx-1: nginx:latest	Feb 5, 2023, 8:00:07 PM	3

Managed pods

Revision	Name	Status	Restarts	Created on ↑
1	nginx-deployment-7f99d59897-kp8kp	✓ Running	0	Feb 5, 2023, 8:00:07 PM
1	nginx-deployment-7f99d59897-rb2dw	✓ Running	0	Feb 5, 2023, 8:00:07 PM
1	nginx-deployment-7f99d59897-mr725	✓ Running	0	Feb 5, 2023, 8:00:08 PM

Documentation

Expose deployment

To let users access your deployment, you can exp
external traffic

EXPOSE

Documentation

Deployments - a replicated, stateless application
cluster

Pods - the smallest deployable unit in Kubernetes

Services - allow your application to receive traffic

Autoscaling pods - scale the application based on
custom metrics

```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to salma-youssef-project.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
salmamyoussef99@cloudshell:~ (salma-youssef-project)$ gcloud container clusters get-credentials nginx-cluster --zone us-east1-b --project salma-yo
ussef-project
Fetching cluster endpoint and auth data.
kubeconfig entry generated for nginx-cluster.
```

```
salmamyoussef99@cloudshell:~ (salma-youssef-project)$ kubectl run nginx-deployment --image nginx
pod/nginx-deployment created
salmamyoussef99@cloudshell:~ (salma-youssef-project)$ []
```

```
salmamyoussef99@cloudshell:~ (salma-youssef-project)$ kubectl get deployment nginx-deployment
NAME               READY   UP-TO-DATE   AVAILABLE   AGE
nginx-deployment   3/3     3            3           10m
salmamyoussef99@cloudshell:~ (salma-youssef-project)$ []
```

```
salmamyoussef99@cloudshell:~ (salma-youssef-project)$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
nginx-deployment                    1/1     Running   0          4m24s
nginx-deployment-7f99d59897-kp8kp   1/1     Running   0          11m
nginx-deployment-7f99d59897-mr725   1/1     Running   0          11m
nginx-deployment-7f99d59897-rb2dw   1/1     Running   0          11m
salmamyoussef99@cloudshell:~ (salma-youssef-project)$ []
```

Q3:

```
salmamyoussef99@cloudshell:~ (salma-youssef-project)$ kubectl expose deployment nginx-deployment --type=LoadBalancer --port=8080

service/nginx-deployment exposed
```

```
salmamyoussef99@cloudshell:~ (salma-youssef-project)$ kubectl get services
NAME               TYPE          CLUSTER-IP     EXTERNAL-IP      PORT(S)          AGE
kubernetes         ClusterIP     10.216.0.1     <none>           443/TCP          3h50m
nginx-deployment   LoadBalancer  10.216.14.144  34.74.171.163    8080:30366/TCP   7m20s
```
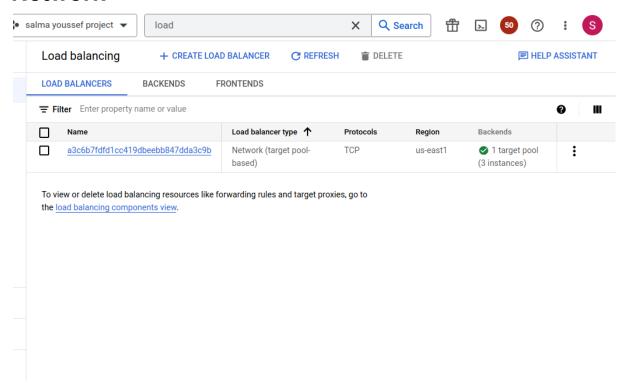
Q4:
Network

salma youssef project ▾   load   ✕   🔍 Search   🎁 ▣ 50 ? ⋮ S

Load balancing   + CREATE LOAD BALANCER   ↻ REFRESH   🗑 DELETE   💬 HELP ASSISTANT

LOAD BALANCERS   BACKENDS   FRONTENDS

≡ Filter   Enter property name or value   ❓ ▥

	Name	Load balancer type ↑	Protocols	Region	Backends	
☐	a3c6b7fdfd1cc419dbeebb847dda3c9b	Network (target pool-based)	TCP	us-east1	✅ 1 target pool (3 instances)	⋮

To view or delete load balancing resources like forwarding rules and target proxies, go to the load balancing components view.

Q5:

```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to salma-youssef-project.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
salmamyoussef99@cloudshell:~ (salma-youssef-project)$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
nginx-deployment                    1/1     Running   0          76m
nginx-deployment-7f99d59897-kp8kp   1/1     Running   0          83m
nginx-deployment-7f99d59897-mr725   1/1     Running   0          83m
nginx-deployment-7f99d59897-rb2dw   1/1     Running   0          83m
salmamyoussef99@cloudshell:~ (salma-youssef-project)$ kubectl logs nginx-deployment-7f99d59897-kp8kp
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2023/02/05 18:00:15 [notice] 1#1: using the "epoll" event method
2023/02/05 18:00:15 [notice] 1#1: nginx/1.23.3
2023/02/05 18:00:15 [notice] 1#1: built by gcc 10.2.1 20210110 (Debian 10.2.1-6)
2023/02/05 18:00:15 [notice] 1#1: OS: Linux 5.10.147+
2023/02/05 18:00:15 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/02/05 18:00:15 [notice] 1#1: start worker processes
2023/02/05 18:00:15 [notice] 1#1: start worker process 30
salmamyoussef99@cloudshell:~ (salma-youssef-project)$ ▯
```

Q6:

Q8:
auto pilot:

luster   ⋮⋮ SWITCH TO STANDARD CLUSTER   🖺 HELP ASSISTANT   ◈

you can deploy your workload through Kubernetes and we'll take care of the rest, including:

✓ **Nodes:** Automated node provisioning, scaling, and maintenance

✓ **Networking:** VPC-native traffic routing for public or private clusters

✓ **Security:** Shielded GKE Nodes and Workload Identity

✓ **Telemetry:** Cloud Operations logging and monitoring

Name

autopilot-cluster-nginx

Cluster names must start with a lowercase letter followed by up to 39 lowercase letters, numbers, or hyphens. They can't end with a hyphen. You cannot change the cluster's name once it's created.

Region

us-east1   ▼

The regional location in which your cluster's control plane and nodes are located. You cannot change the cluster's region once it's created.

NEXT: NETWORKING   ⟳ RESET TO DEFAULT

CREATE   CANCEL   Equivalent REST or COMMAND LINE

⋮⋮ SWITCH TO STANDARD CLUSTER   🖺 HELP ASSISTANT   ◈

Networking

Define how applications in this cluster communicate with each other and how clients can reach them.

Network *

custom-vpc-01   ▼   ❓

Node subnet *

subnet-1   ▼   ❓

IPv4 network access

Choose the type of network you want to allow to access your cluster's workloads. Learn more

🔘 **Public cluster**

Choose a public cluster to configure access from public networks to the cluster's workloads. Routes aren't created automatically. You cannot change this setting after the cluster is created.

⚪ **Private cluster**

Choose a private cluster to assign internal IP addresses to Pods and nodes. This isolates the cluster's workloads from public networks. You cannot change this setting after the cluster is created.

CREATE   CANCEL   Equivalent REST or COMMAND LINE

Q9:

endpoint. Learn more.

Authorized networks

New authorized network   ⌃

Name
my local machone

Example: Corporate Office

Network *
154.178.87.25/32

Use CIDR notation ↗. Example: 198.51.100.0/24

CANCEL   DONE

ADD AUTHORIZED NETWORK

CREATE   **CANCEL**   Equivalent   REST   or   COMMAND LINE