

Lee Brunovsky

**CSCI 6910** Cloud Computing and Security

Qwik\_labs Assignment

Qwiklabs\_Report

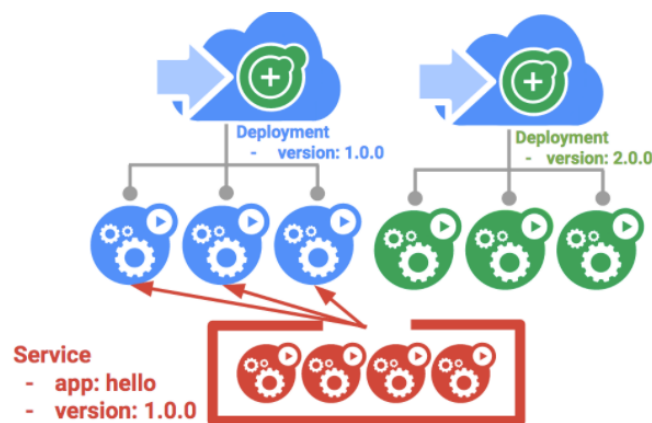
**Due:** Jun 30, 2021

**Submitted:** Jun 25, 2021

For the QWIKLABS assignment, badges for *Application Development – Python*, *Serverless Cloud Run Development*, *Build and Secure Networks*, and *Kubernetes in Google Cloud* were earned by completing Google Cloud Services (GCS) cloud environment advanced quests. While all of these selected quests were interesting, the latter two were the most so. The *Application Development – Python* quest included development environment setup, cloud based storing of applications data, images and videos, authentication, back-end development, and Kubernetes deployment all relative to a cloud hosted application. The predominant theme throughout the labs in this pursuit was a quiz application that leveraged Firebase integration. Overall, this lab was more infrastructure based and less application code development than I had hoped for. Similarly, while the completion of *Serverless Cloud Run Development* was a bit challenging, it did not capture my full enthusiasm; however, it did result in a skill badge, which required demonstration of Cloud Run, Pub/Sub, and REST API competencies in the final challenge lab in order to build and deploy an asynchronous and redundant service. The final two quests were much more interesting.

*Build and Secure Networks* was perhaps the most interesting quest of the four. This quest also resulted in a skill badge based on demonstrating the ability to scale and secure applications in the cloud via implementation of Identity-Aware Proxies (IAP), VPC networks, nginx, internal and external firewall controls, multi-regional stress testing, and load balancing. Specific lab concepts of interest were firewall tagging, IAM access, json credential storage, points of presence (POP), autoscaling based on CPU utilization, Cool-down period and min/max number of instances, and testing using a Siege-VM. Adding digital signature verification using Google public keys to avoid IAP being bypassed or disengaged, where the app leverages an additional cryptographically signed object in the IAP header portion of the web request (X-Goog-IAP-JWT-Assertion) to ensure unaltered identification credentials were received was a very exciting concept that is surely worthy of further exploration (Qwiklabs).

*Kubernetes in Google Cloud* was very interesting as well, and truly displayed the power offered by cloud services by sharing lessons on Docker image configuration, running and debugging pods and containers, scaling applications in multiple clusters using Kubernetes Engine deployments, deconstruction of monolithic applications into multiple heterogeneous microservices, and continuous integration/continuous delivery (CI/CD) pipeline workflow integration using Jenkins. Of particular interest in this set of labs where the use of Kubernetes deployment ReplicaSet image authorization tags, rolling updates, canary deployments with yaml versioning, and sessionAffinity set to client IP's; more specifically, **figure\_1** below illustrates deployment versioning and rollback, which although is convenient from a CI/CD perspective, requires double the cluster resources for hosting an application (Qwiklabs).



**figure\_1:** Rollback via version control

Finally, my public profile is accessible at [https://run.qwiklabs.com/public\\_profiles/09fca5d0-08e8-4073-910d-f88be62bec5b](https://run.qwiklabs.com/public_profiles/09fca5d0-08e8-4073-910d-f88be62bec5b), and the four badges are displayed below as well.

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Google Cloud

## Build and Secure Networks

SECURITY SKILL

Build and Secure Networks in Google Cloud  
Jun 21, 2021

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Google Cloud

## Serverless Cloud Run Development

APPLICATION MODERNIZATION SKILL

Serverless Cloud Run Development  
Jun 20, 2021

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Application Development - Python  
Jun 18, 2021

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Kubernetes in Google Cloud  
Jun 25, 2021

## References

Qwiklabs. (n.d.). *User Authentication: Identity-Aware Proxy*. Qwiklabs.

<https://run.qwiklabs.com/focuses/5562?parent=catalog>.

Qwiklabs. (n.d.). *Managing Deployments Using Kubernetes Engine*. Qwiklabs.

<https://run.qwiklabs.com/focuses/639?parent=catalog>.