

# Comparative Analysis of Google Cloud Deployment Manager and Terraform

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## Introduction

This research project examined Terraform and Google Cloud Deployment Manager in modern IT orchestration. It was an evaluation mission, placing the two side-by-side to compare capabilities for organisations navigating cloud options. A research case study was completed where a simple but very effective cloud architecture was created using Terraform and Google Cloud Deployment Manager. The researcher created a survey to enhance the research, and a group of experts in the field answered it. The survey results were dissected and examined to further enlighten the research about the nuances of these IaC deployment tools.

## Research Question

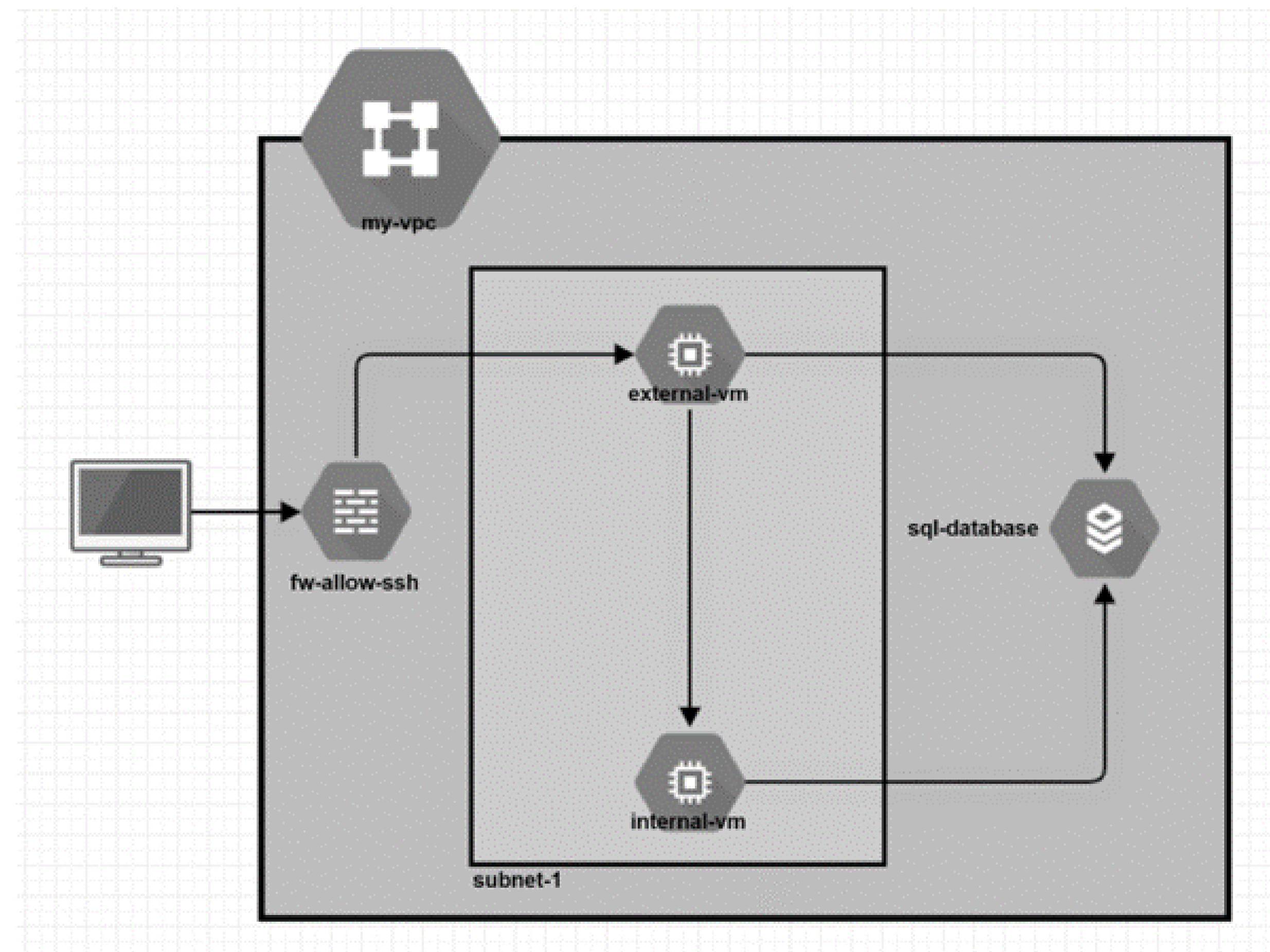
With the search for innovative ways to handle the infrastructure that software is built on, and due to cloud computing becoming the norm for delivering software, the research question arises:

*"How do Google Cloud Deployment Manager and Terraform differ in performance, features, and community support, and what insights can be obtained from a survey of developers to inform selecting either Google Cloud Deployment Manager or Terraform as the IaC tool of choice?"*

## IaC Tool Performance

Speed is everything when getting resources up and running in the cloud. The performance metrics for Google Cloud Deployment Manager and Terraform were tracked and analysed. The average build times are close, but Terraform destroys infrastructure more consistently every time - the range of times it takes is much smaller. With Deployment Manager, some deletes happen faster, and some take longer. We can see from the results that there is no considerable difference in build times. However, the time it takes to delete could make a difference when selecting a tool.

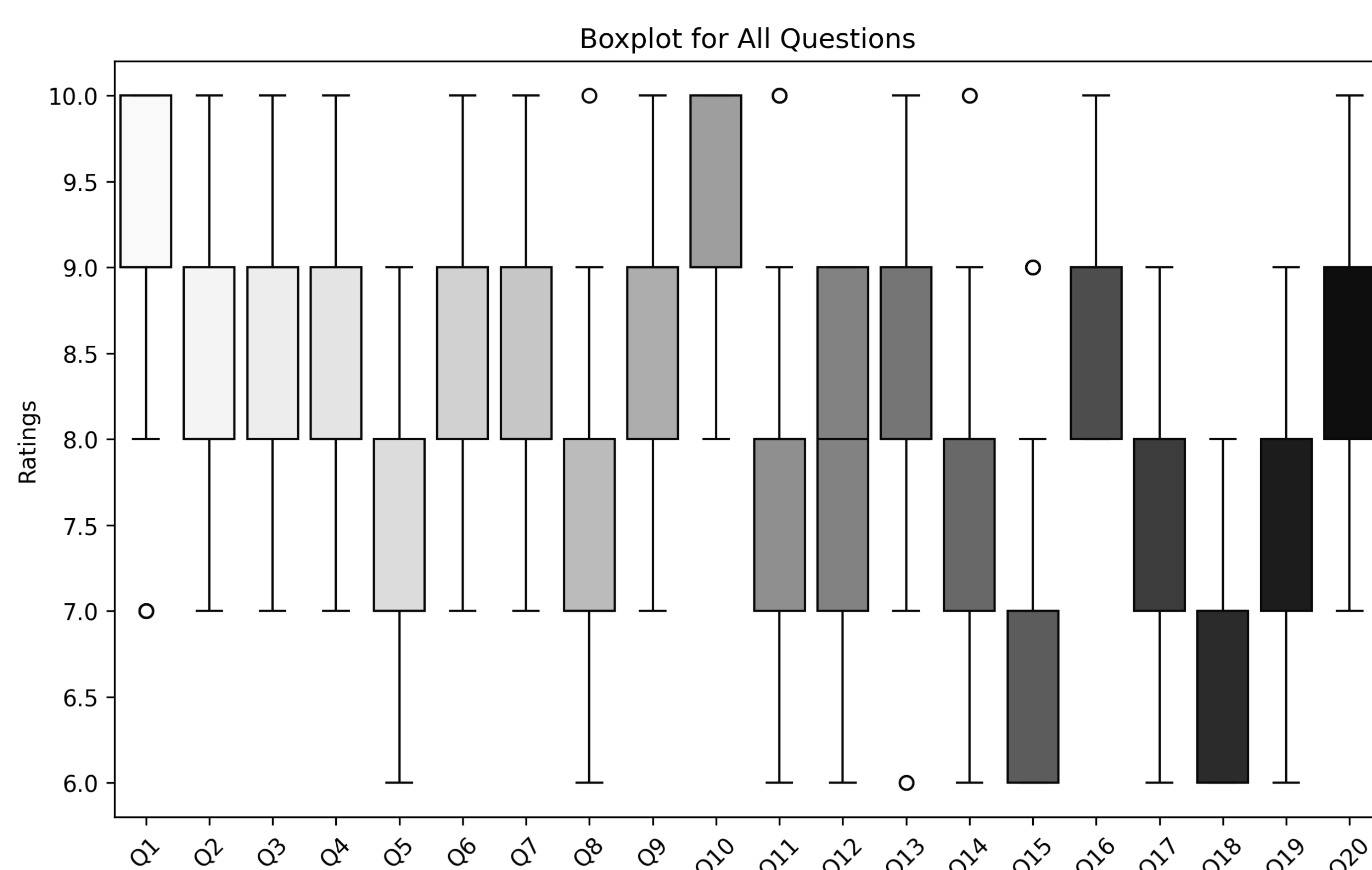
## Case Study



## Architecture Definition

The architecture is a baseline cloud architecture demonstrating some key IaC at play. The architecture, which includes a VPC, subnet, two compute instances, a database, a database instance, and a firewall rule to access the instances outside the VPC securely. These are the core resources in any cloud app or service, networking, compute, storage, and security. It is not complex, but it is enough to showcase some cloud capabilities in this research project. This architecture could also be extended based on many future complex use cases.

## Survey Responses



## Survey Results Comparative Analysis

Terraform has an edge over Google Cloud Deployment Manager in most critical areas, particularly infrastructure as code support and multi/hybrid cloud support. The broader responses for Deployment Manager could be due to users having more variation with cloud experience, which might mean different use cases or a project tailored for specific functionality. Fundamental concepts, such as handling large complex deployments and using templates and modules, are almost on par for both tools. Users responded very similarly to these questions. Terraform seems better for projects focused on solid IaC management and multi/hybrid cloud deployment support. Meanwhile, Google Cloud Deployment Manager is boosted through tight integration with GCP.

## Conclusions and Future Work

For organisations invested in GCP, unless a transformation to hybrid cloud is planned, there is no benefit of moving away from Deployment Manager. Terraform is the all-round utility king for managing cloud services. Its primary benefit, which ensures it stands out from the crowd, is the ability to work with all the major cloud platforms. The research shows that each tool differs slightly in each domain, and Terraform comes out on top in its performance, features, and the greater community support available. In the authors opinion the research has shown that Terraform has risen above Google Cloud Deployment Manager as the Infrastructure as Code tool of choice. Future research in Infrastructure as Code for Google Cloud Deployment Manager and Terraform could include studies on incorporating new features and investigating how each tool handles emerging technologies and integrates with the industry enhancements that will come.

## QR Code for Recording

