# Architecting with Google Cloud Platform - Infrastructure

## Overview

This course introduces students to the comprehensive and flexible infrastructure and platform services provided by Google Cloud Platform. Through a combination of presentations, demos, and hands-on labs, participants explore and deploy solution elements, including infrastructure components such as networks, systems and applications services. This course also covers deploying practical solutions including securely interconnecting networks, customer-supplied encryption keys, security and access management, quotas and billing, and resource monitoring.

## Prerequisite Comments

To get the most out of this course, participants should have:
Completion of Google Cloud Platform Fundamentals or equivalent experience
Basic proficiency with command-line tools and Linux operating system environments
Systems Operations experience, including deploying and managing applications, either on-premises or in a public cloud environment

## Target Audience

This course is intended for the following participants:
Cloud Solutions Architects, DevOps Engineers.
Individuals using Google Cloud Platform to create new solutions or to integrate existing systems, application environments, and infrastructure with the Google Cloud Platform.

## Course Objectives

This course teaches participants the following skills:
Consider the entire range of Google Cloud Platform technologies in their plans.
Learn methods to develop, implement, and deploy solutions.
Distinguish between features of similar or related products and technologies.
Recognize a wide variety of solution domains, use cases, and applications.
Develop essential skills for managing and administering solutions.
Develop knowledge of solution patterns - methods, technologies, and designs that are used to implement security, scalability, high availability, and other desired qualities.

## Course Outline

### 1 - Introduction to Google Cloud Platform

Google Cloud Platform (GCP) Infrastructure
Using GCP
Lab: Console and Cloud Shell
Demo: Projects
Lab: Infrastructure Preview

### 2 - Virtual Networks

Virtual Private Cloud (VPC), Projects, Networks, Subnetworks, IP addresses, Routes, Firewall rules
Subnetworks for resource management instead of physical network topology
Lab: Virtual Networking
Lab: Bastion Host

### 3 - Virtual Machines

Compute Engine
Lab: Creating Virtual Machines
Compute options (vCPU and Memory)
Images
Common Compute Engine actions
Lab: Working with Virtual Machines

### 4 - Cloud IAM

Organizations, Roles, Members, Service accounts, Cloud IAM best practices
Lab: Cloud IAM

### 5 - Data Storage Services

Cloud Storage
Lab: Cloud Storage
Cloud SQL
Lab: Cloud SQL
Cloud Spanner, Cloud Datastore
Lab: Cloud Datastore
Cloud Bigtable

### 6 - Resource Management

Cloud Resource Manager, Quotas, Labels, Names, Billing
Demo: Billing Administration
Lab: Examining Billing Data with BigQuery

### 7 - Resource Monitoring

Stackdriver, Monitoring
Lab: Resource Monitoring (Stackdriver)
Logging, Error Reporting, Tracing, Debugging
Lab: Error Reporting and Debugging (Stackdriver)

### 8 - Interconnecting Networks

Cloud Virtual Private Network (VPN)
Lab: Virtual Private Networks (VPN)
Cloud Router, Cloud Interconnect, External Peering, Cloud DNS

### 9 - Load Balancing

Managed Instance Groups, HTTPS load balancing, Cross-region and content-based load balancing, SSL proxy/TCP proxy load balancing, Network load balancing
Lab: VM Automation and Load Balancing

### 10 - Autoscaling

Autoscaling, Policies, Configuration
Lab: Autoscaling

### 11 - Infrastructure Automation with Google Cloud Platform APIs

Infrastructure automation, Images, Metadata, Scripts, Google Cloud API
Lab: Google Cloud Platform API Infrastructure Automation

### 12 - Infrastructure Automation with Deployment Manager

Deployment Manager, Configuration, Cloud Launcher
Lab: Deployment Manager

### 13 - Managed Services

Cloud Dataproc, Cloud Dataflow, BigQuery, Cloud Datalab

### 14 - Application Infrastructure Services

Cloud Pub/Sub, API Management, Cloud Functions, Cloud Source Repositories, Specialty APIs

### 15 - Application Development Services

App Engine

### 16 - Containers

Containers, Kubernetes Engine, Container Registry
Lab: Kubernetes Load Balancing
Kubernetes Engine, App Engine, or Containers on Compute Engine?