

A black and white photograph of a lighthouse perched on a rocky cliff. The lighthouse is white with a dark lantern room. To its left is a large, multi-story keeper's house with a prominent gabled roof. The foreground consists of light-colored, layered rock formations. The ocean is visible in the background, with small waves crashing against the rocks. The sky is filled with heavy, textured clouds.

# Glossary

# A

**A Record (DNS)** An A record is information stored in a DNS server that maps a domain name to an IPv4 address.

**AAAA Record (DNS)** An AAA record is information stored in a DNS server that maps a domain name to an IPv6 address.

**Action (Firewall Rule)** The action part of a firewall rule indicates if the rule allows or denies either incoming (ingress) or outgoing (egress) traffic.

**Alert Policy** An alert policy in Cloud Monitoring defines conditions that trigger a notification about the state of a monitored entity. For example, a policy could trigger an alert when CPU utilization exceeds 80 percent for three minutes.

**Apache Hadoop** An open source platform for processing large volumes of data over a cluster of servers. Available as a managed service in Google Cloud Dataproc.

**Apache Spark** An open source platform for performing analytic processing of large data over a cluster of servers. Available as a managed service in Google Cloud Dataproc.

**App Engine** A Google Cloud platform as a service (PaaS) for building and deploying web applications in a serverless environment. App Engine Standard has a limited number of runtimes. App Engine Flex lets you define custom runtimes. Cloud Run is another PaaS service in Google Cloud.

**Application Programming Interface (API)** A feature of an application that accepts programmatic requests or data. RESTful APIs use HTTP requests, such as GET, PUT, and POST.

**Archive Storage** A class of storage used in the Cloud Storage service. Archive storage is used for objects that are accessed no more than once per year.

**Audit Logs** A record of activity in an IT system, such as changes to access controls, configurations, or data.

**Authentication** The process of establishing the identity of a user or service. Authentication often requires proof of identity, which can be something that is known, such as a password; something one has, like a token; or some characteristic of a person, such as a fingerprint.

**Authorization** An authorization is a permission to perform some action. In Google Cloud, permissions are grouped into roles and assigned to users and service accounts.

**Autoscaling** The processes of adding or removing resources according to demand without human intervention.

## B

**Basic Role** Roles in Google Cloud that existed prior to IAM. The basic roles include owner, editor, and viewer.

**BigQuery** A petabyte scale data warehousing and analytics service managed by Google Cloud that uses relational tables to organize data and SQL as the query language.

**Billing Account** Information about how customers are billed for the use of Google Cloud services. One or more projects can be linked to a billing account. Billing accounts may be paid by credit card or may have invoices generated.

**Binding** An Identity and Access Management data structure linking a user account, Google group, Google domain, or a service account to a role.

**Block Storage** A storage model that builds on contiguous sets of bytes known as blocks. Read and write operations occur at the block level. Filesystems and databases often use block storage.

**Boot Disk** In Google Cloud, a boot disk is a persistent disk that stores the operating system and other software components needed to start a virtual machine.

**bq** The command-line tool for working with the BigQuery managed service.

**Bucket (Cloud Storage)** A container for holding objects in Cloud Storage. Bucket names are unique across Cloud Storage. Buckets have a geographic location and a storage class. Storage classes are standard, nearline, coldline, and archive.

## C

**Cache** High-speed random access memory for storing frequently used data. Google Cloud's Memorystore provides a managed caching service.

**cbt** The command-line tool for working with BigTable.

**CIDR** Classless Inter-Domain Routing is a standard for flexibly grouping IP addresses for use in subnets. CIDR address specifications include an IP address and a netmask prefix defining the number of bytes used for the subnet mask. For example, 10.0.0.0/8 indicates that 8 bytes are used for the subnet mask on the subnets that use addresses in the 10.0.0.0 block.

**Cloud Armor** A Google Cloud service that protects against distributed denial-of-service (DDoS) attacks. Works with HTTP(S) Load Balancing.

**Cloud AutoML** Google Cloud's managed machine learning service for training models starting with Google's vision, natural language processing, and machine translation pre-trained model.

**Cloud Bigtable** A wide column, NoSQL database for high-volume writes and low-latency reads (less than 10 ms). Scales to hundreds of petabytes and is used for applications that require millions of operations per second.

**Cloud Console** A web application used to manage Google Cloud Platform resources, including virtual machines, network services, storage, identity management, as well as project and billing information.

**Cloud Dataflow** A managed service for processing streaming and batch data sets using Java and Python APIs. Integrates Cloud Pub/Sub, BigQuery, Cloud Dataproc, and other Google Cloud services.

**Cloud Dataproc** A managed service providing Apache Hadoop and Apache Spark platforms. Existing ETL and other jobs in Apache Hadoop and Apache Spark are readily ported to the Google cloud using Cloud Dataproc.

**Cloud Deployment Manager** A Google Cloud service for specifying resources needed for an application. Requirements are specified in YAML configuration files. Deployment Manager also supports parameterized templates written in Python or Jinja2.

**Cloud Filestore** A serverless, managed filesystem in Google Cloud.

**Cloud Firestore** A NoSQL document database managed service that provides ACID transactions, indexes and a query language.

**Cloud Function** A serverless, event-driven computing service for executing functions in response to events within the cloud.

**Cloud Interconnect** Network connectivity between on-premises infrastructure and Google's infrastructure. Traffic can be routed over a dedicated interconnect that directly links on-premises infrastructure to Google's infrastructure or over a telecommunication partner interconnect.

**Cloud Key Management** A service for managing cryptographic keys, including storing, retrieving, and rotating keys.

**Cloud Marketplace** A service providing access to configured deployments for applications, data sets, and operating systems. Cloud Launcher was rebranded to Cloud Platform Marketplace.

**Cloud Memorystore** A managed service providing Redis memory caching that implements submillisecond data access.

**Cloud Natural Language** An AutoML service that extracts names of people, places, and things mentioned in texts and detects sentiment of texts.

**Cloud Operations** A set of services for monitoring, logging, tracing, debugging infrastructure and applications in Google Cloud and other platforms.

**Cloud Pub/Sub** A managed message queue for implementing stream and event processing applications, which can write messages to topics or subscribe to topics to receive messages.

**Cloud Router** A software-defined router that enables routing traffic between virtual private clouds (VPCs) and on-premises infrastructure using Border Gateway Protocol (BGP).

**Cloud SDK** A set of command-line tools for working with Google Cloud resources. Tools include `gcloud`, `gsutil`, and `bq`.

**Cloud Shell** A browser-based tool providing access to a virtual machine running in the Google Cloud. Used for administering Google Cloud resources.

**Cloud Spanner** A managed, horizontally scalable relational database designed for distributed applications requiring strong consistency.

**Cloud SQL** Managed service providing MySQL, SQL Server, and PostgreSQL databases. Google patches, backs up, and performs other required maintenance.

**Cloud Status Dashboard** A web page listing the status of Google Cloud services available at <https://status.cloud.google.com>.

**Cloud Storage** An object storage service providing web access to scalable storage. Objects can be stored in different storage classes providing different levels of durability and access charges.

**Cloud Vision** An AutoML component providing pretrained machine vision models for object recognition. Cloud Vision can also be used as the basis for custom vision models.

**Cluster** A group of virtual or physical servers working in conjunction as a distributed system. Members of the cluster may run the same software or have different roles, such as control plane and worker nodes.

**CNAME (DNS)** A canonical name record stored in DNS that maps an alias name to a canonical name.

**Coldline Storage** A class of storage used in the Cloud Storage service. Coldline storage is used for objects that are accessed no more than once per 90 days.

**Container** A package of application code, operating system, and dependencies that can run in a container runtime, such as Docker, and that may be orchestrated using the Kubernetes orchestration system.

**Custom Role** A role defined by Google Cloud users and assigned a set of permissions needed to enable entities with the role to perform tasks. Custom roles are created when pre-defined roles do not meet your needs.

## D

**Debugger** A Cloud Operations service for inspecting the state of an application in real time. Allows developers to create snapshots, which capture the context of the running program, and log points, which inject logging messages without altering source code.

**Deployment (Kubernetes)** A controller that keeps pods and ReplicaSets in the desired state.

**Distributed Tracing** Process of collecting data on calls made by a service to another service in an application. Collects information on latency of calls and potential bottlenecks in an application.

**DNSSEC** Domain Name Service Security Extensions, including authentication of DNS data and data integrity protections.

**Document Database** A type of NoSQL database for storing semi-structured data that does not require a fixed schema. Data store and Firebase are both document databases.

**Domain Name Service (DNS)** The Internet service that maps domain names to IP addresses.

## E

**Egress** Outgoing direction of traffic flow on a network.

**Enforcement Status (Firewall Rule)** An indication of whether or not a firewall rule is active. Used to debug firewall rules.

**Ephemeral IP** An IP address that does not exist past the life of the resource holding that address.

**Events (Cloud Functions)** An activity in the Google Cloud may trigger a Cloud Function. Example events are uploading a file to Cloud Storage or a message arriving on a Pub/Sub message queue.

**External IP** An IP address that is used to communicate over the Internet. External IP addresses are not drawn from the range of addresses that have been reserved for private networks.

## F

**Firewall** Software running on a network that controls the flow of traffic in or out of a network.

**Firewall Rule** A firewall configuration that allows or denies traffic. A firewall rule includes a priority, direction of traffic, action, target, source, protocol, and enforcement status.

## G

**gcloud** A Cloud SDK component for working with most Google Cloud services, including Compute Engine, Cloud SQL, and networking services.

**Graphics Processor Unit (GPU)** A processing unit with memory designed to offload computing operations from a CPU. GPUs are well suited for graphics, machine learning, and other math-intensive operations.

**gsutil** The Cloud SDK utility for working with Cloud Storage from the command line.

## H

**Hard Disk Drive (HDD)** A type of persistent storage offered in Google Cloud. HDDs are older technology than SSDs and are less expensive to use than SSDs but have poorer performance.

**HBase** A Hadoop database available in Cloud Dataproc as a managed service.

**Health Check** A mechanism used to determine if a virtual machine is available to respond to requests for services.

**HTTP/HTTPS Load Balancing** A global load balancer available in Google Cloud. Used to load-balance HTTP and HTTPS traffic. Includes target proxies, where client connections terminate; forwarding rules; and back-end services that receive requests from the load balancer.

## I

**ICMP** Internet Control Message Protocol is used for communicating operational information about network devices.

**Identity Access Management (IAM)** A Google Cloud service for implementing fine-grained access controls on resources. Implements predefined and custom roles.

**Image (Compute Engine)** A file containing an operating system and other software components. Used to boot virtual machines.

**Infrastructure as a Service (IaaS)** A type of cloud service that provides compute, storage, and networking services.

**Ingress** Incoming direction of traffic flow on a network.

**Input Output Operations per Second (IOPS)** A widely used measure of performance of SSDs and HDDs.

**Instance Group** A group of virtual machines that are managed as a unit. Managed instance groups have identical VMs whereas unmanaged instance groups can have instances configured differently.

**Instance Template** A file specifying the configuration of a managed instance group.

**Internal IP** A private IP address used for sending and receiving traffic from within the VPC, shared VPCs, or peered VPCs.

**Internal TCP/UDP (Load Balancing)** A TCP and UDP load balancer accessible only to internal virtual machines.

**IPv4** Internet Protocol version 4. This protocol uses 32 bits to represent an IP address. Addresses are usually written as four octets, each ranging from 0 to 255.

**IPv6** Internet Protocol version 6. This protocol uses 128 bits to represent an IP address. Addresses are usually written in eight groups of four hexadecimal digits.

## K

**Kernel Virtual Machine (KVM)** A virtualization system in Linux that allows the operating system kernel to function like a hypervisor.

**Kubectl** Command-line utility for configuring and managing Kubernetes clusters.

**Kubernetes** An open source platform developed initially by Google that provides container management services, including deployment and autoscaling functionality.

**Kubernetes Engine** A managed Kubernetes service offered by Google on Google Cloud.

## L

**Labels** Key-value pairs used to assign arbitrary tags to resources in Google Cloud.

**Latency** The time delay between sending data and receiving it. Sometimes refers to the round-trip time if a response is expected from the sent data.

**Least Privilege** A security practice of granting the minimal set of permissions a user or service needs to complete tasks they are responsible for.

**Load Balancing** The process of distributing workload across a set of servers.

**Log Sink** A storage source outside of Cloud Monitoring for retaining logs greater than Cloud Monitoring's retention period. Log Sinks can be Cloud Storage buckets, BigQuery data set, and Cloud Pub/Sub topics.

**Logging** The process of recording information about events that occur during processing. This includes changes to configuration and data. Logging also includes messages written by applications for later debugging, analysis, or compliance.

## M

**Machine Type** A configuration of a virtual machine that includes the number of vCPUs and memory. You can choose to use a predefined machine type or create a custom type.

**Managed Zone (DNS)** A container for all DNS records of a domain.

**Memcached** An open source caching system. Memorystore is a managed service providing Redis and memcached options.

**Messaging Queue** A service that provides interapplication or interprocess communication via messages, or an arbitrary string of bytes.

**Metric (Cloud Monitoring)** A measure of some aspect of performance of a compute, storage, or network resource. Examples include percent of CPU utilization and number of bytes written to a network interface.

**Microsecond** One millionth of a second.

**Millisecond** One thousandth of a second.

**Monitoring** The process of collecting metrics, events, and metadata from applications, virtual machines, and other Google Cloud resources.

**Multiregional Storage** A class of Cloud Storage that stores objects in at least two separate geographic places that are separated by at least 100 miles. This practice of storing in separate geographic areas is called geo-redundant storage.

## N

**Nanosecond** One billionth of a second.

**Nearline Storage** A class of Cloud Storage that stores objects for archival storage that is accessed less than once per month.

**Network TCP/UDP Load Balancing** A type of load balancer that provides regional, non-proxied load balancing. It is used to load-balance UDP traffic as well as TCP and SSL traffic on ports that are not supported by other load balancers.

**Node (Kubernetes)** A worker instance in a Kubernetes cluster.

**NoSQL** A group of several types of nonrelational databases, including document databases, such as Firestore and Firebase, and wide-column databases, like Bigtable.

**Notification Channel** A way to send information about a monitoring alert; options in Cloud Monitoring include email, PagerDuty, and the Google Cloud Mobile app.

## O

**Object Life Cycle Management** The practice of keeping objects in the appropriate storage class or deleting the object according to business rules. In Cloud Storage, objects can be moved to different storage classes based on age, creation date, or other conditions.

**Object Storage** A storage system that manages data as objects, such as files. Cloud Storage is an object storage system.

**Orchestration** The process of managing containers, including creating containers, scaling them, allocating resources to them, and checking their health. Kubernetes is a container orchestration system.

**Organization** The top level of a resource hierarchy in Google Cloud. Other items in the hierarchy include folders, projects, and resources in those projects.

## P

**Persistent Disk** A durable block storage system for Google Cloud. Available in SSD and hard disk drive types.

**Platform as a Service (PaaS)** A type of cloud service that provides runtime environments for applications. PaaS minimizes the need to manage servers.

**Pod (Kubernetes)** The smallest deployable unit in Kubernetes. Pods have one or more containers with shared storage.

**Predefined Role** A role defined in Identity and Access Management that has the minimal set of permissions required to carry out the task for which the role was created. For example, in App Engine the Deployer role has read-only access to application configuration and settings, but its write access is limited to creating a new version.

**Premium Tier Network Services** A service offered by Google that routes account traffic on the Google network instead of routing some traffic over the public Internet. Some load balancers require Premium Tier Network Services.

**Pricing Calculator** A utility provided by Google Cloud used to estimate the cost of almost 40 different services. Available at <https://cloud.google.com/products/calculator>.

**Profiler** A Cloud Operations service that continuously monitors CPU and heap utilization to provide developers with insight about the way their application performs.

**Project** A logical organizational unit in the Resource Hierarchy that contains resources such as VMs, persistent disks, and Cloud SQL databases.

## R

**Redis** An open source caching system. Memorystore is a managed service providing Redis and Memcached options.

**Reducer** Computation functions that aggregate data in a time period. Used by Cloud Monitoring to calculate max, min, mean, and other aggregate values over a period of time.

**Region** A geographic region that includes three or more zones. All zones in a region are located within a single geographic area, such as central U.S. or western Europe.

**Regional Storage** A Cloud Storage class with typically 99.99 percent monthly availability and 99.9 percent availability SLA. Objects are redundantly stored across zones in a region.

**Relational Database** A database using the relational model, for example, tables and columns, of data management. SQL is used for querying. Cloud SQL and Cloud Spanner are managed relational database services in Google Cloud.

**Remote Desktop Protocol (RDP)** A Microsoft protocol for remotely accessing Windows devices. Used in ways similar to how SSH is used with Linux devices.

**ReplicaSet** A Kubernetes controller that ensures a specified number of pods is running at any time.

**Resource Hierarchy** The set of organization, folders, and projects that are used to group and structure Google Cloud resources.

**Role** A set of permissions that allow users and service accounts with that role to perform the specified actions. In Google Cloud, permissions are granted to roles, not directly to users.

**Runtime Environment (Cloud Functions)** Language environments supported in Cloud Functions.

## S

**Schema** A definition of the organizational structure of a database. In relational databases a schema defines tables and columns, including datatypes. NoSQL databases often do not require fixed schemas.

**Scopes** An access control mechanism applied to virtual machines that specify privileges enabling access to services in Google Cloud.

**Secure Boot** A security mechanism that prevents unprotected code from executing before the operating system is available. Available in Shield VM.

**Separation of Duties** A security practice that assigns roles so that more than one person is required to perform a sensitive task. Google Cloud IAM roles support separation of duties

by defining predefined roles that have limited privileges based on the task that holders of that role will perform.

**Serverless Computing** The practice of using managed services that provide compute, storage, and network services without requiring users to manage virtual machines. Cloud Run, Cloud Functions, and BigQuery are examples of serverless computing services in Google Cloud.

**Service Account** In Google Cloud, a service account is a form of identity that is owned by an application or virtual machine. Service accounts can be assigned roles to enable the application or virtual machine to perform some task.

**Shared VPC** A VPC assigned to a host project that shares an IP address with service projects that are attached to the host project. This allows organizations to connect resources from multiple projects to a common VPC network.

**Shield VM** Hardened virtual machines available in Google Cloud that have protections against rootkits and bootkits.

**Snapshot** A copy of the contents of a persistent disk. Used for replicating data, backing up state of a disk, and creating boot images.

**Sole Tenancy** The practice of running virtual machines from one project on a physical server. This can be useful when security or compliance concerns require that VMs not run on the same machine as another project's or customer's VMs.

**Solid State Drive (SSD)** A type of persistent storage that uses solid state flash memory. SSDs are more performant than hard disk drives but cost more.

**Spot Virtual Machine** A Compute Engine virtual machine that may be shut down at any time and returned to a pool of Google Cloud resources. Costs up to 91 percent less than their standard VM counterparts.

**SSH** Secure Shell protocol, which is used for encrypted traffic between a client and a server. SSH is the default protocol used when connecting to Linux VMs in Google Cloud. RDP is the default protocol for connecting to Windows servers in Google Cloud.

**SSL** Secure Socket Layer is secure protocol that provides encryption and authentication of servers. Transport Layer Security (TLS) is a widely used successor to SSL, but TLS is often referred to as SSL.

**SSL Proxy (Load Balancer)** A load balancer that terminates SSL (TLS) connections and then routes traffic to VMs in the load-balanced cluster. The SSL Proxy can decrypt traffic before forwarding or forward SSL traffic to VMs in the load-balanced cluster.

**StatefulSet** In Kubernetes, StatefulSets manage the deployments and ensures a persistent identity for each pod.

**Static IP** An IP address allocated to a project that persists even after a VM that used the IP address shuts down. Static IPs are used when you need a fixed IP address over extended periods of time.

**Subnet** A subnet identifies a range of IP addresses available for host on a network. This IP address range is broken up into the network portion and the host portion. In Google Cloud subnets are regional.

**Subscription (Cloud Pub/Sub)** A subscription is a mechanism for receiving messages from a Pub/Sub topic. Subscriptions may be *pull*, in which case the subscriber reads messages, or *push*, in which case messages are sent to a subscriber's endpoint. Messages are guaranteed to be delivered at least once.

## T

**Target (Firewall Rule)** In a firewall rule, a target is either the internal destination of a packet or the external source system of a packet. The internal destination is the target for ingress traffic. The external source system is the target for egress traffic.

**TCP** Transmission Control Protocol is an Internet Protocol that provides reliable, ordered delivery of packets. TCP uses the Internet Protocol (IP), and the two together are often referred to as TCP/IP.

**TCP Proxy (Load Balancing)** A global load balancer that uses a single IP address and distributes traffic in a geographically aware manner so that traffic is sent to the VMs closest to the client. This load balancer requires Premium Tier network services in Google Cloud.

**Topic (Cloud Pub/Sub)** A topic is a mechanism for receiving and managing messages that will be read by or pushed to subscribers to the topic. Pub/Sub provides durable messaging.

**Tracing** The process of collecting latency data from infrastructure and applications, including App Engine; HTTP(S) Load Balancers; and in the case of Google Cloud, applications using the Cloud Trace SDK to generate latency data.

**Trigger (Cloud Function)** A function that executes in response to an event, such as a file uploaded to Cloud Storage or a message written to Cloud Pub/Sub.

## U

**UDP** User Datagram Protocol is an Internet protocol that provides connectionless communication. UDP does not have the same levels of reliability as TCP. It also does not guarantee the order of delivery of packets.

## V

**Virtual Machine** A software implementation of an emulated physical server. Virtual machines run operating systems and provide an isolated execution environment. Multiple virtual machines can run on one physical server.

**Virtual Private Cloud (VPC)** A logical organization of cloud resources isolated from other resources on the same cloud. In Google Cloud, VPCs are created for projects. Resources in different projects can communicate over shared VPCs or VPC Network peering.

**Virtual Private Network (VPN)** A virtual private network is a secure connection used to link Google Cloud networks to other clouds as well as on-premises networks.

**VPC Network Peering** A method of linking VPC networks that allow applications in one VPC to call services in another VPC.

## Y

**YAML** YAML Ain’t Markup Language, or Yet Another Markup Language, is a data format specification often used to define configuration files.

## Z

**Zone** A geographic area smaller than a region that contains Google Cloud infrastructure. Zones are organized into regions. Zones are isolated sets of infrastructures, roughly analogous to a data center.