Google Cloud
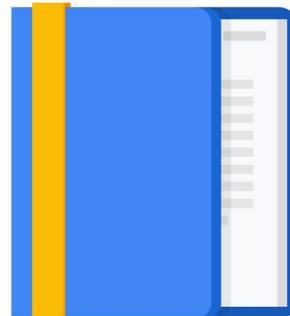
Google Cloud Fundamentals:
Core Infrastructure

Summary and Review
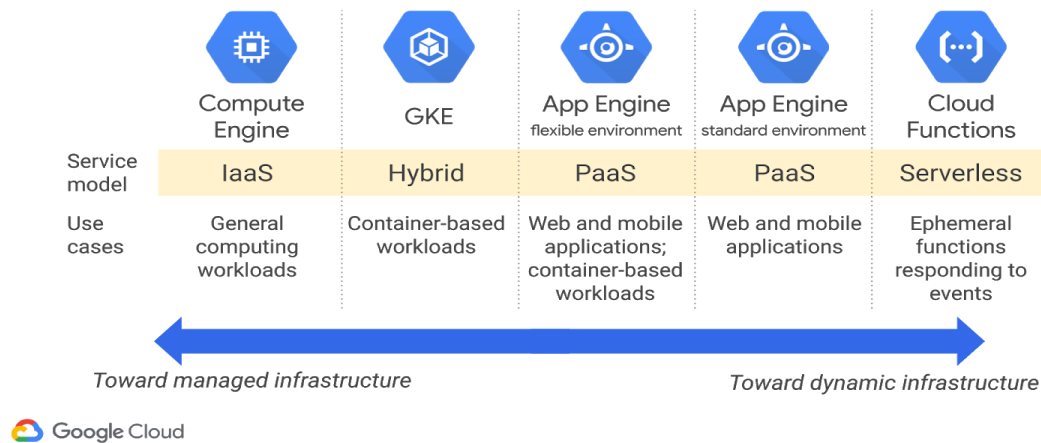
Agenda

Course Review

Next Steps

Google Cloud

Comparing compute options

	Compute Engine	GKE	App Engine flexible environment	App Engine standard environment	Cloud Functions
Service model	IaaS	Hybrid	PaaS	PaaS	Serverless
Use cases	General computing workloads	Container-based workloads	Web and mobile applications; container-based workloads	Web and mobile applications	Ephemeral functions responding to events

Toward managed infrastructure — *Toward dynamic infrastructure*

Google Cloud

Remember the continuum that this course discussed at the very beginning: the continuum between managed infrastructure and dynamic infrastructure. Google Cloud's compute services are arranged along this continuum, and you can choose where you want to be on it.

Choose Compute Engine if you want to deploy your application in virtual machines that run on Google's infrastructure. Choose Google Kubernetes Engine if you want instead to deploy your application in containers that run on Google's infrastructure, in a Kubernetes cluster you define and control.

Choose App Engine instead if you want to just focus on your code, leaving most infrastructure and provisioning to Google. App Engine flexible environment lets you use any runtime you want, and gives you full control of the environment in which your application run; App Engine standard environment lets you choose from a set of standard runtimes and offers finer-grained scaling and scale-to-zero.

To completely relieve yourself from the chore of managing infrastructure, build or extend your application using Cloud Functions. You supply chunks of code for business logic, and your code gets spun up on-demand in response to events.
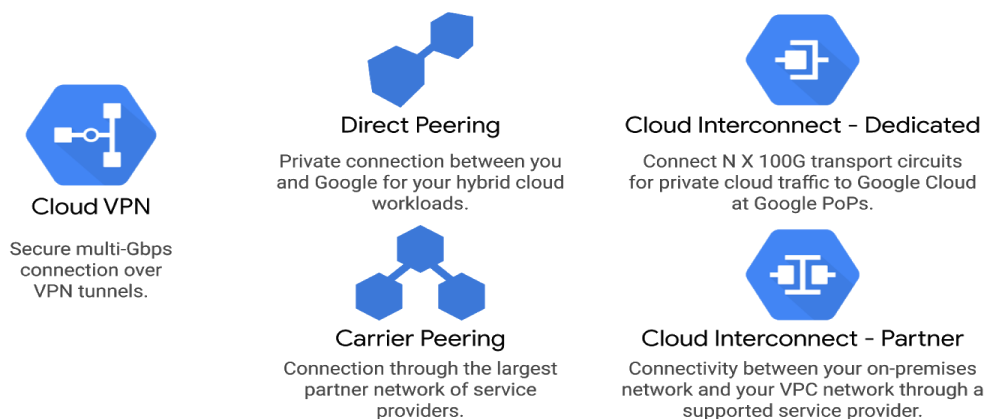
Comparing load-balancing options

Global HTTP(S)	Global SSL Proxy	Global TCP Proxy	Regional	Regional internal
Layer 7 load balancing based on load.	Layer 4 load balancing of non-HTTPS SSL traffic based on load.	Layer 4 load balancing of non-SSL TCP traffic.	Load balancing of any traffic (TCP, UDP).	Load balancing of traffic inside a VPC.
Can route different URLs to different back ends.	Supported on specific port numbers.	Supported on specific port numbers.	Supported on any port number.	Use for the internal tiers of multi-tier applications.

Google Cloud

Google Cloud offers a variety of ways to load-balance inbound traffic. Use Global HTTP(S) Load Balancing to put your web application behind a single anycast IP to the entire Internet; it load-balances traffic among all your backend instances in regions around the world, and it's integrated with Google Cloud's Content Delivery Network.

Comparing interconnect options

Cloud VPN
Secure multi-Gbps connection over VPN tunnels.

Direct Peering
Private connection between you and Google for your hybrid cloud workloads.

Carrier Peering
Connection through the largest partner network of service providers.

Cloud Interconnect - Dedicated
Connect N X 100G transport circuits for private cloud traffic to Google Cloud at Google PoPs.

Cloud Interconnect - Partner
Connectivity between your on-premises network and your VPC network through a supported service provider.

Google Cloud

Google Cloud also offers a variety of ways for you to interconnect your on-premises or other-cloud networks with your Google VPC. It's simple to set up a VPN, and you can use Cloud Router to make it dynamic. You can peer with Google at its many worldwide points of presence, either directly or through a carrier partner. Or, if you need a Service Level Agreement and can adopt one of the required network topologies, use Dedicated Interconnect. A Partner

Interconnect connection is useful if your data center is in a physical location that can't reach a Dedicated Interconnect colocation facility or if your data needs don't warrant an entire 100 Gbps connection.

Comparing storage options

	Firestore	Cloud Bigtable	Cloud Storage	Cloud SQL	Cloud Spanner	BigQuery
Type	NoSQL document	NoSQL wide column	Blobstore	Relational SQL for OLTP	Relational SQL for OLTP	Relational SQL for OLAP
Best for	Storing, syncing, and querying data	"Flat" data, Heavy read/write, events, analytical data	Structured and unstructured binary or object data	Web frameworks, existing applications	Large-scale database applications (> ~2 TB)	Interactive querying, offline analytics
Use cases	Mobile, web, and server development	AdTech, Financial and IoT data	Images, large media files, backups	User credentials, customer orders	Whenever high I/O, global consistency is needed	Data warehousing

Google Cloud

Consider using Firestore if you need to store, sync, and query data for mobile and web applications, and server development.

Consider using Cloud Bigtable if you need to store a large amount of single-keyed data, especially structured objects.

Consider using Cloud Storage if you need to store immutable binary objects.

Consider using Cloud SQL or Cloud Spanner if you need full SQL support for an online transaction processing system. Cloud SQL provides terabytes of capacity, while Cloud Spanner provides petabytes and horizontal scalability.

Consider BigQuery if you need interactive querying in an online analytical processing system with petabytes of scale.

Choosing among Google Cloud Storage classes

Storage Class	Characteristics	Availability	Use Cases
Standard Storage	• Optimized performance when co-located with resources • No minimum storage duration	>99.99% availability in multi-regions and dual-regions; 99.99% in regions	Access data frequently ("hot" data) and/or store for brief periods • Serve website content • Stream videos • Interactive workloads • Mobile and gaming apps
Nearline Storage	• Lower at-rest storage costs • Low-cost data retrieval cost • 30-day min storage duration	99.95% availability in multi-regions and dual-regions; 99.9% in regions	Read/modify data once per month or less • Data backup • Serve long-tail multimedia content
Coldline Storage	• Lower storage cost than Nearline • Higher data retrieval cost • 90-day min storage duration		Read/modify data no more than once a quarter
Archive Storage	• Lowest storage cost • Highest cost for access/operations • 365-day min storage duration		Access data less than once a year • Cold data storage • Disaster recovery

Google Cloud

I'd like to zoom into one of those services we just discussed, Cloud Storage, and remind you of its four storage classes. Use Standard Storage for 'hot data'. Use a region location and co-locate your resources to maximize the performance for data-intensive computations and potentially reduce network charges. Use a dual-region location to get optimized performance when accessing Google Cloud products that are located in one of the associated regions, while still getting the improved availability that comes from storing data in geographically separate locations. When serving content to a global audience, such as website content, streaming videos, executing interactive workloads, or serving data supporting mobile and gaming applications, use a multi-region location.

Nearline and Coldline are the classes for, as you'd guess, cooler data. Use Nearline for data read or modified once a month or less, and Coldline for data read or modified no more than once a quarter. Use Archive Storage for data that's accessed less than once a year, such as data held for legal or regulatory reasons, and disaster recovery. While these three classes benefit from lower storage costs, remember that the costs for access are higher and minimum storage durations apply.

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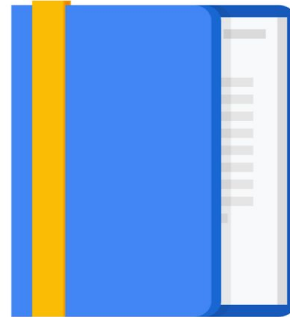
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What's next in the Cloud Infrastructure track?

Cloud Infrastructure

This track is designed for IT professionals who are responsible for implementing, deploying, migrating, and maintaining applications in the cloud.

1 Google Cloud Fundamentals: Core Infrastructure

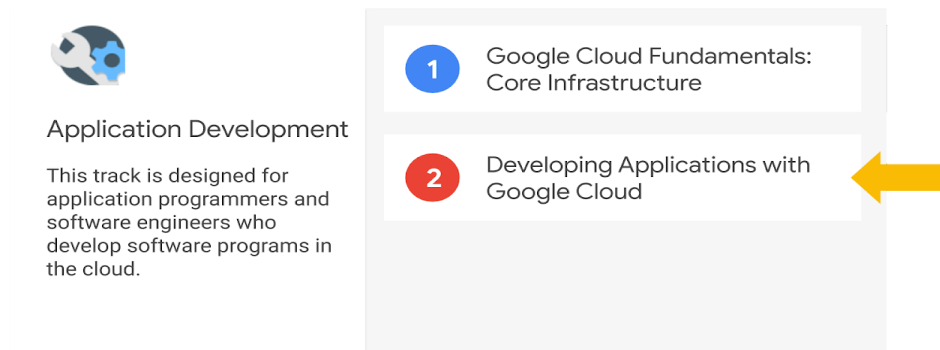**2** Architecting with Google Compute Engine

3 Architecting with Google Kubernetes Engine
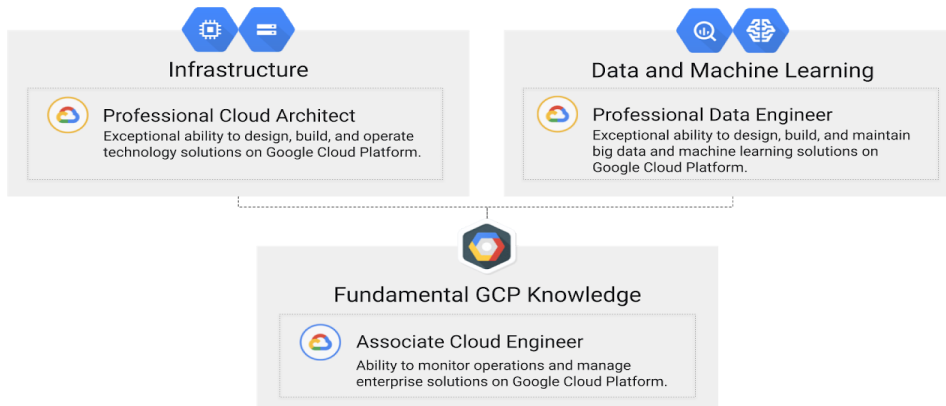
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If you're a cloud architect, a DevOps person, or any other kind of IT professional who deploys, migrates and maintains applications in the cloud, continue with the course: Architecting with Google Compute Engine.

What's next in the Application Development track?

Application Development

This track is designed for application programmers and software engineers who develop software programs in the cloud.

1. Google Cloud Fundamentals: Core Infrastructure
2. Developing Applications with Google Cloud

Google Cloud

If you're an application programmer or any other kind of software engineer who writes code for the cloud, continue to the course Developing Applications with Google Cloud Platform.

Certification Tracks

Infrastructure

Professional Cloud Architect
Exceptional ability to design, build, and operate technology solutions on Google Cloud Platform.

Data and Machine Learning

Professional Data Engineer
Exceptional ability to design, build, and maintain big data and machine learning solutions on Google Cloud Platform.

Fundamental GCP Knowledge

Associate Cloud Engineer
Ability to monitor operations and manage enterprise solutions on Google Cloud Platform.

Google Cloud

Become Google Cloud Certified and show the world that you can design, develop, manage and administer application infrastructure and data solutions on Google Cloud technology. The Google Cloud Certified designation means you've demonstrated the necessary skills to leverage Google Cloud technology in a way that transforms businesses and meaningfully impacts the people and customers they serve.

Please take 5 minutes to give us feedback

1. Login to the Qwiklabs deployment (site) where you had the lab session in the class.
2. Click "My Learning" on the left side menu to open class list page.
3. a) If the class is not over yet, you will see the "In Progress" class card, click it.

   b) If the class is over, you will see the class under "Completed Courses and Quests", click it.
4. Click the link under "Survey" in "Overview" panel on the right hand side to open the survey form.
5. Complete all the questions and submit.

   You can fill out the survey during or after class. You will be able to revise your answers if you do so prior to completing all of the questions.

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