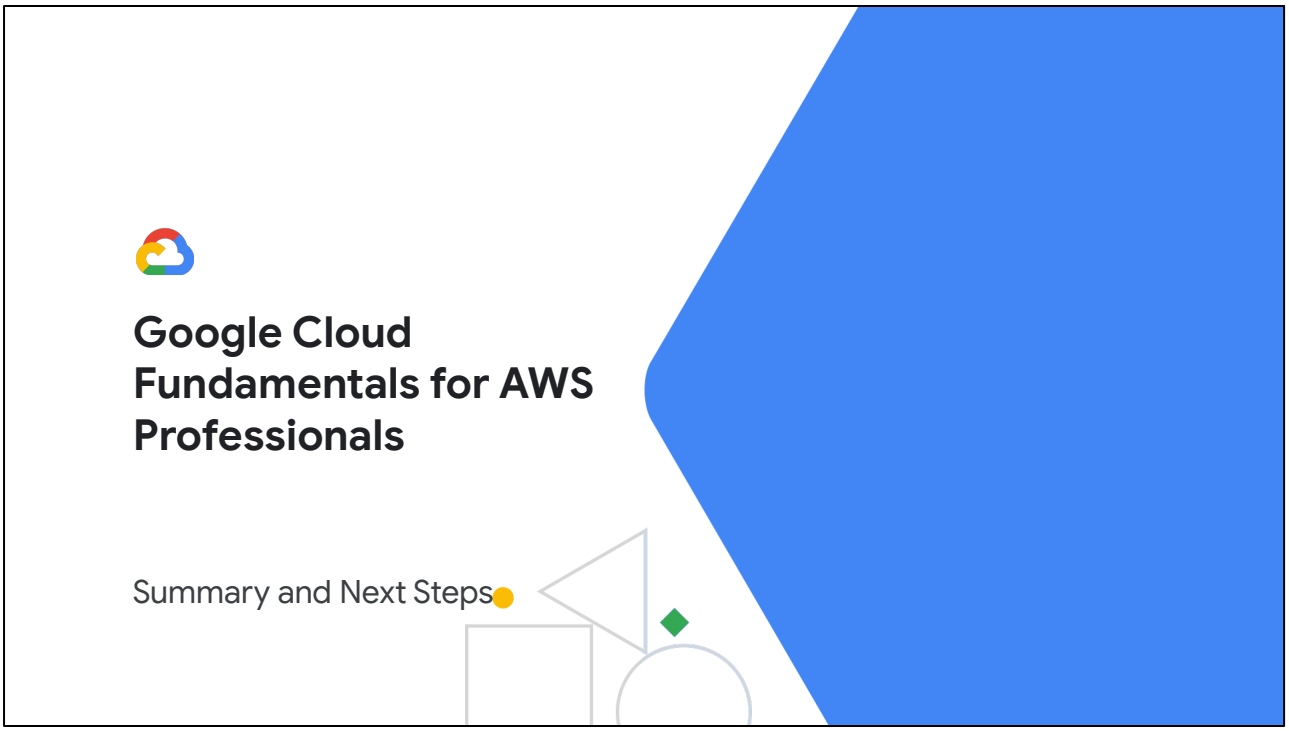


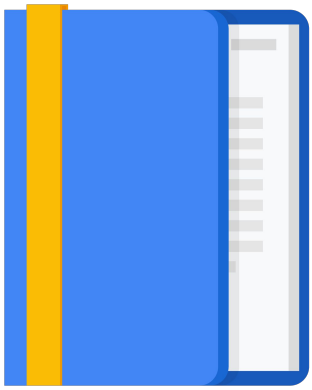
In this short module, I'll look back on what we covered in this course.

Agenda

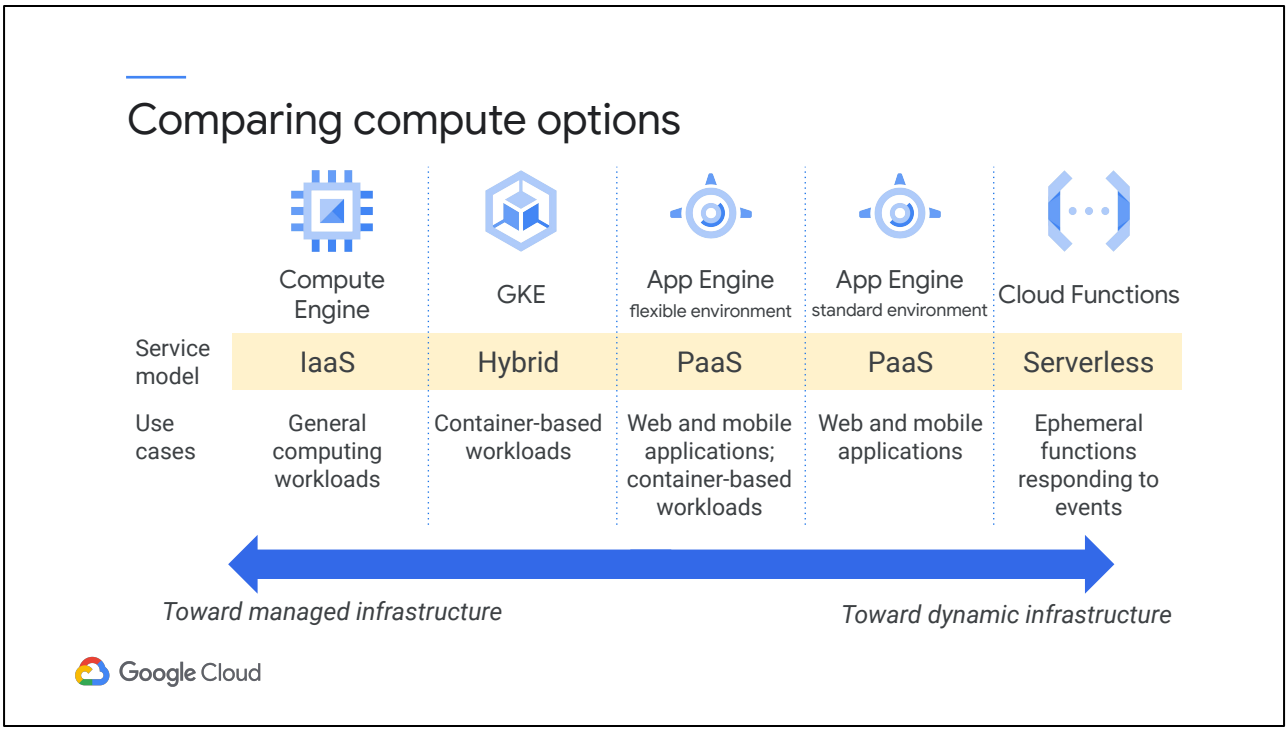
Course Review

Migrate for Compute Engine

Next Steps



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.

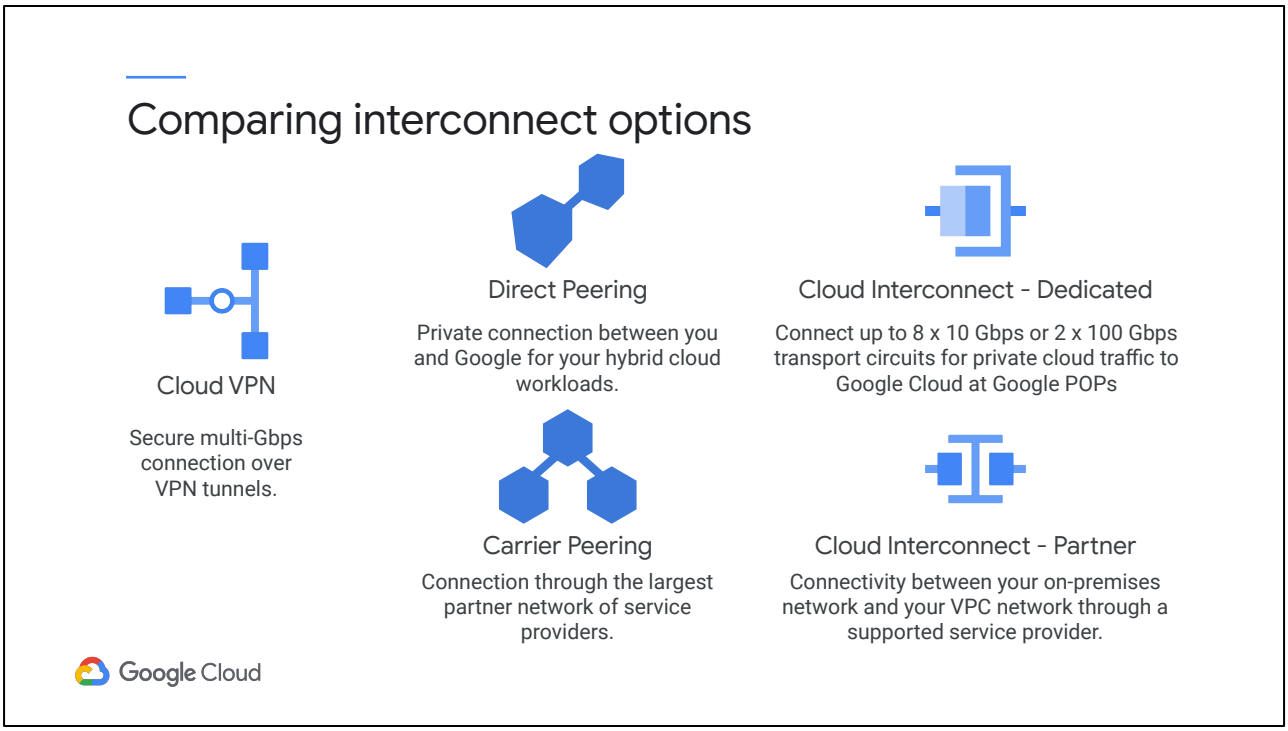
Comparing load-balancing options

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.

If your traffic isn't HTTP or HTTPS, you can use the Global TCP or SSL Proxy for traffic on many ports. For other ports or for UDP traffic, use the Regional Load Balancer. Finally, to load-balance the internal tiers of a multi-tier application, use the Internal Load Balancer.



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	Minimum duration	Availability SLA	Typical monthly availability	Use cases	Name for APIs and gsutil
Standard Storage	None	Multi-region 99.95% Dual-region 99.95% Region 99.9%	>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	STANDARD
Nearline Storage	30 days	Multi-region 99.9% Dual-region 99.9% Region 99.0%	99.95% availability in multi-regions and dual-regions; 99.9% in regions	Read/modify data ≤ once per month • Data backup • Serve long-tail multimedia content	NEARLINE
Coldline Storage	90 days			Read/modify data no more than once a quarter	COLDLINE
Archive Storage	365 days	None		Read/modify data < once a year • Cold data storage • Disaster recovery	ARCHIVE

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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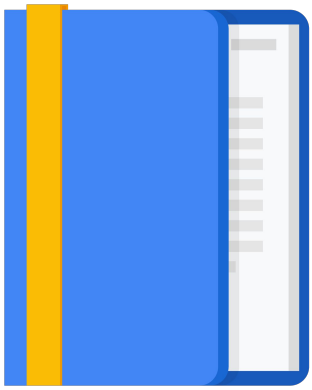

Google Cloud

High-level migration steps (1/2)

1. Define Google Cloud prerequisites.
2. Set up a VPN.
3. Set up AWS Networks.
4. Create AWS IAM credentials.
5. Set up the Migrate for Compute Engine Manager.

Google Cloud

Cloud migration creates a lot of questions. Migrate for Compute Engine (formerly Velostrata) by Google Cloud has the answers. Whether you're looking to migrate one application from on-premises or one thousand applications across multiple data centers and clouds, Migrate for Compute Engine gives IT teams the power to migrate these systems to Google Cloud. The Migrate for Compute Engine Manager provides a web UI and controls migration operations from Google Cloud:

Before beginning a migration to Google Cloud, you must create Cloud Identity and Access Management permissions.

Plan for and create a secure connection between AWS and Google Cloud. One way to do so is to use Terraform.

Set up AWS Networks and check Network Access Requirements for detailed information on firewall, routing, and network tag considerations for your

Migrate for Compute Engine deployment.

Create AWS IAM groups and credentials that will enable the Migrate for Compute Engine to connect to AWS.

The Migrate for Compute Engine Manager provides a web UI and controls migration operations from Google Cloud. Set it up to continue.

High-level migration steps (2/2)

6. Upload the AWS IAM credentials to Migrate for Compute Engine Manager.
7. Create Cloud Extensions.
8. Prepare your Linux VMs.
9. Migrate a wave of VMs.

Google Cloud

Upload the AWS IAM credentials to Migrate for Compute Engine Manager to create Cloud Details.

After configuring the Migrate for Compute Engine Manager, create Cloud Extensions for your migration.

If you are migrating Linux VMs, install the Migrate for Compute Engine package to reconfigure them for Google Cloud.

Migrate for Compute Engine organizes groups of VMs into waves. After understanding the dependencies of your applications, create runbooks that contain groups of VMs and begins your migration.

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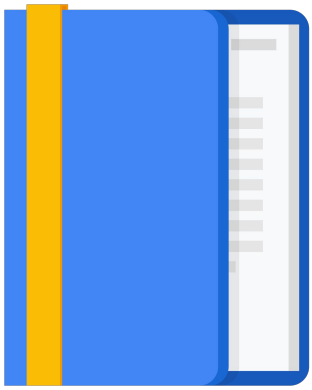
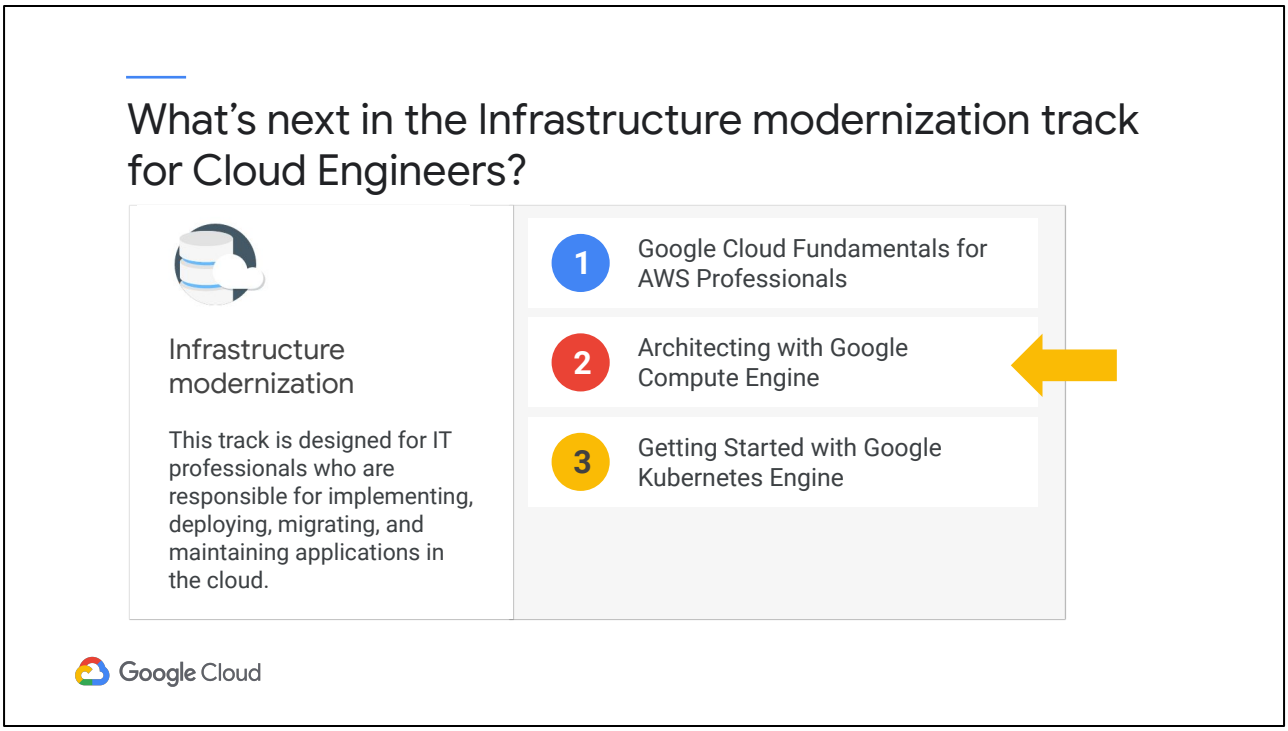
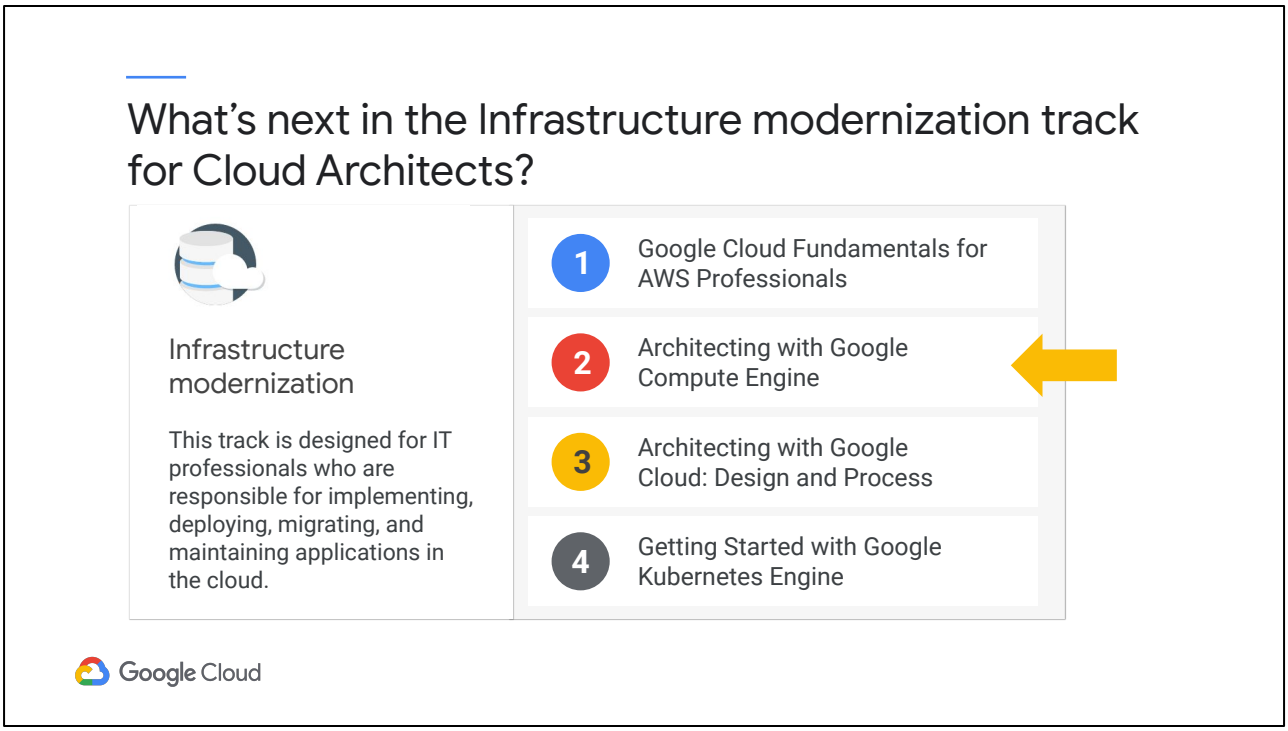


Google Cloud



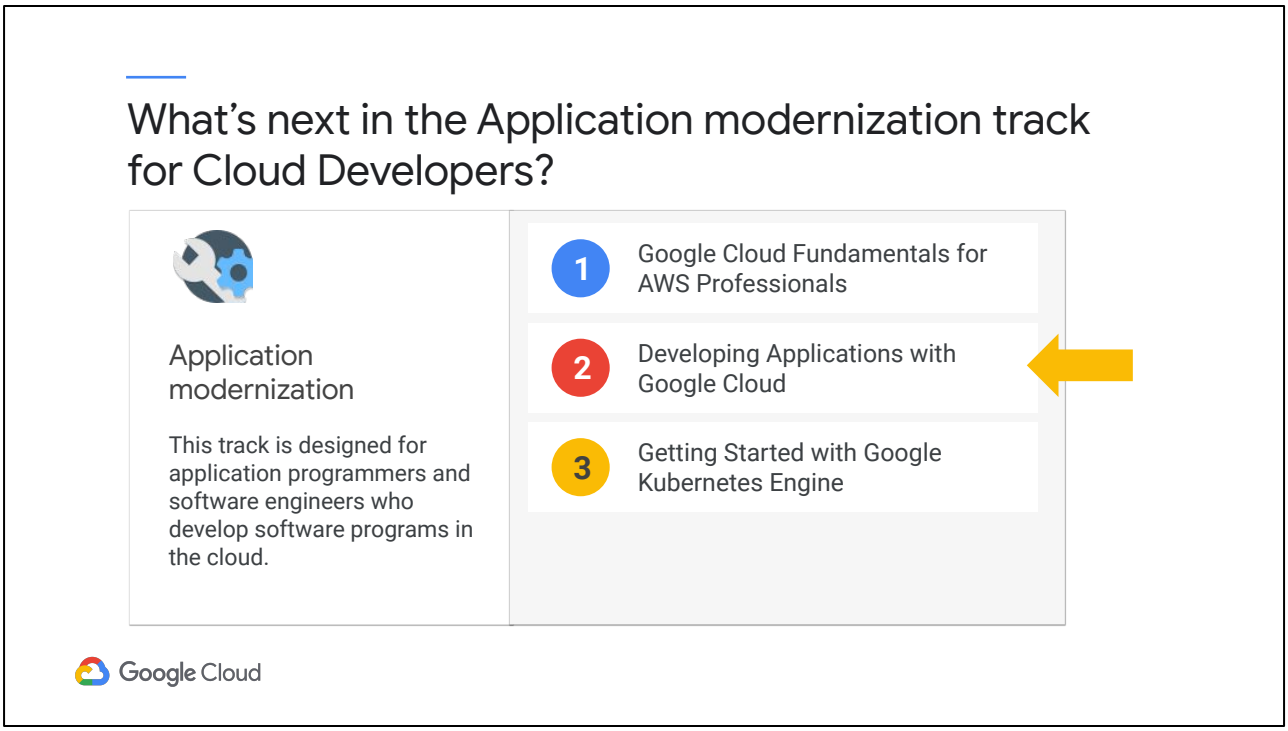
If you're a Cloud Engineer who does or will deploy applications, monitor operations, and manage enterprise solutions, continue with the course: Architecting with Google Compute Engine.

https://cloud.google.com/training/cloud-infrastructure#cloud-engineer-learning-path



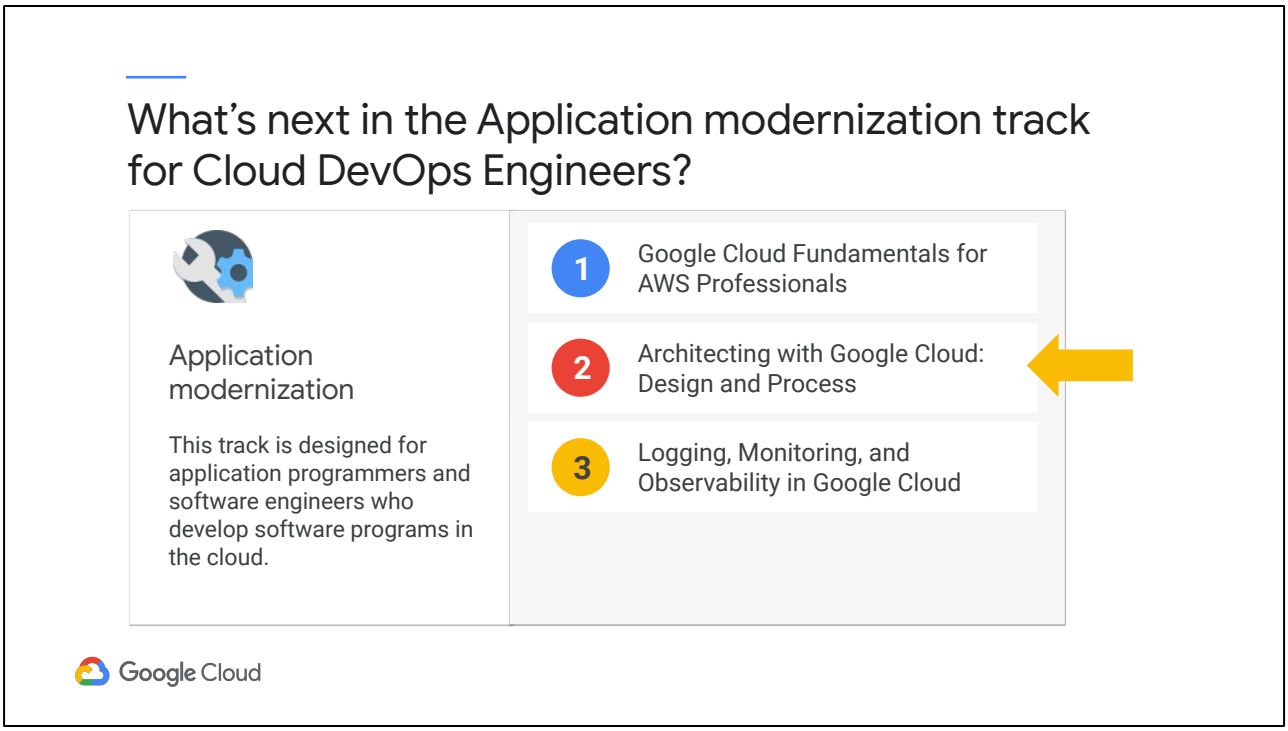
If you're a Cloud Engineer who does or will design, develop, and manage robust and scalable cloud architecture solutions, continue with the course: Architecting with Google Compute Engine.

https://cloud.google.com/training/cloud-infrastructure#cloud-architect-learning-path



If you're a Cloud Developer who does or will build scalable and highly available cloud applications using Google Cloud and tools that leverage fully managed services, continue to the course Developing Applications with Google Cloud.

https://cloud.google.com/training/application-development#cloud-developer-learning-path



If you're a Cloud DevOps Engineer who does or will maintain the efficient operations of the full software delivery pipeline, continue to the course Architecting with Google Cloud: Design and Process.

https://cloud.google.com/training/application-development#cloud-devOps-engineer-learning-path

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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.


Google Cloud