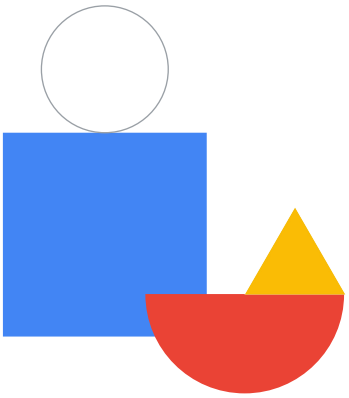
Google Cloud

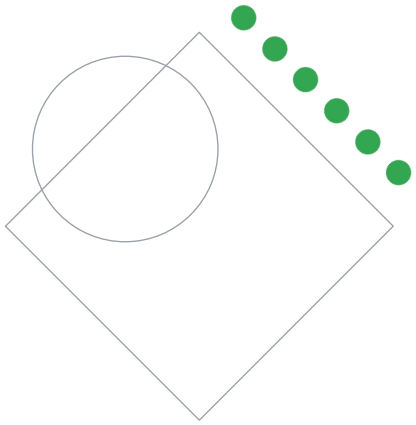


Preparing for your Professional Cloud Security Engineer Journey

Module 5: Supporting Compliance Requirements

Welcome to Module 5: Supporting Compliance Requirements

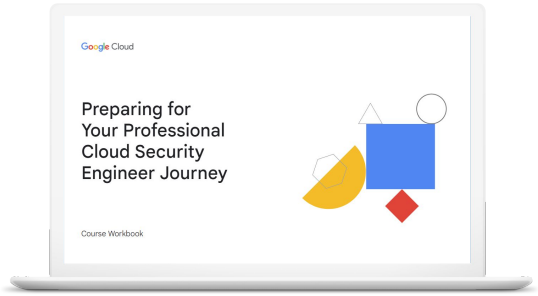
Review and study planning



Now let’s review how to use these diagnostic questions to help you identify what to include in your study plan.

Your study plan:

Ensuring compliance



5.1 | Determining regulatory requirements for the cloud

Google Cloud

We'll approach this review by looking at the key areas of this exam section and the questions you just answered about each one. We'll talk about where you can find out more about each area in the learning path for this certification and/or where to find the information in Google Cloud documentation. As we go through each one, take notes on the specific courses (and modules!), quests, and documentation pages you'll want to emphasize in your study plan.

5.1 Determining regulatory requirements for the cloud

Considerations include:

- Determining concerns relative to compute, data, and network
- Evaluating the security shared responsibility model (Access Transparency)
- Configuring security controls within cloud environments (regionalization of data and services)
- Limiting compute and data for regulatory compliance
- Determining the Google Cloud environment in scope for regulatory compliance

Google Cloud

As Professional Cloud Security Engineer, you are expected to help your organization follow regulatory requirements for its cloud environment.

Question 1 tested your knowledge of using encryption key management considerations to satisfy compliance requirements. Question 2 tested your ability to apply DLP to satisfy privacy requirements. Question 3 explored using VPC service controls to prevent data exfiltration in accordance with requirements for regulatory compliance. Question 4 tested your knowledge of using IAM policies to fulfil requirements for regulatory compliance. Question 5 asked you to design VPC network usage in line regulatory compliance.

5.1 Diagnostic Question 01 Discussion

Cymbal Bank's lending department stores sensitive information, such as your customers' credit history, address and phone number, in parquet files. You need to upload this personally identifiable information (PII) to Cloud Storage so that it's secure and compliant with ISO 27018.

How should you protect this sensitive information using Cymbal Bank's encryption keys and using the least amount of computational resources?

A. Generate an AES-256 key as a 32-byte bytestring. Decode it as a base-64 string. Upload the blob to the bucket using this key.

B. Generate an RSA key as a 32-byte bytestring. Decode it as a base-64 string. Upload the blob to the bucket using this key.

C. Generate a customer-managed encryption key (CMEK) using RSA or AES256 encryption. Decode it as a base-64 string. Upload the blob to the bucket using this key.

D. Generate a customer-managed encryption key (CMEK) using Cloud KMS. Decode it as a base-64 string. Upload the blob to the bucket using this key.

Feedback:
A. Correct! You should use a customer-supplied encryption key (CSEK) to protect sensitive information. AES-256 encryption returns a 32-byte bytestring that needs to be decoded.

B. Incorrect. Although CSEK is the correct choice for encryption, RSA is computationally more resource-intensive. RSA is used to encrypt small amounts of data.

C. Incorrect. CMEK will enable key rotation, but data will still be encrypted using Google-generated keys. RSA is not a useful option to encrypt large chunks of data, such as blobs.

D. Incorrect. CMEK will bring key rotation under the customer's control but will still use Google-generated keys. Our requirement is to use Cymbal bank's encryption keys. Therefore, use CSEK to store sensitive information.

Where to look:

- https://cloud.google.com/storage/docs/samples/storage-upload-encrypted-file#storage_upload_encrypted_file-python
- https://cloud.google.com/kms/docs/cmek
- https://cloud.google.com/storage/docs/encryption/customer-supplied-keys
- https://cloud.google.com/storage/docs/encryption
- https://cloud.google.com/security/compliance/iso-27018

Content mapping:

- ILT course: **Security in Google Cloud**
  - M6 Securing Cloud Data: Techniques and Best Practices

- On-demand course: **Security Best Practices in Google Cloud**
  - M6 Securing Cloud Data: Techniques and Best Practices

Summary:
A customer-supplied encryption key (CSEK) adds an additional layer of security on top of Google-managed encryption keys. CSEK lets you provide your own encryption key. Google Cloud uses CSEK to generate and protect Google's encryption keys. The newly generated keys are then used to encrypt the customer's data. A CSEK is different from a customer-managed encryption key (CMEK), which allows only the user to manage key rotation.

5.1 Diagnostic Question 02 Discussion

You are designing a web application for Cymbal Bank so that customers who have credit card issues can contact dedicated support agents. Customers may enter their complete credit card number when chatting with or emailing support agents. You want to ensure compliance with PCI-DSS and prevent support agents from viewing this information in the most cost-effective way.

What should you do?

A. Use customer-supplied encryption keys (CSEK) and Cloud Key Management Service (KMS) to detect and encrypt sensitive information.

B. Detect sensitive information with Cloud Natural Language API.

C. Use customer-managed encryption keys (CMEK) and Cloud Key Management Service (KMS) to detect and encrypt sensitive information.

D. Implement Cloud Data Loss Prevention using its REST API.

Google Cloud

Feedback:
A. Incorrect. CSEK and Cloud KMS are used for ensuring customer control over Google-generated encryption keys.

B. Incorrect. Cloud Natural Language API can help with text segmentation and named-entity recognition, but not with hiding or masking sensitive information.

C. Incorrect. You will still need some service to detect credit card numbers if BigQuery stores them and does not show them.

D. Correct! Cloud DLP helps with identifying sensitive information along with its INFOTYPE. Cloud DLP can then mask sensitive information programmatically.

Where to look:
- https://cloud.google.com/architecture/automating-classification-of-data-uploaded-to-cloud-storage
- https://cloud.google.com/dlp/docs/libraries
- https://cloud.google.com/dlp/demo/#!/

Content mapping:
- ILT course: **Security in Google Cloud**
  - M10 Content-related Vulnerabilities

- On-demand course: **Mitigating Security Vulnerabilities in Google Cloud**

- M2 Content-related Vulnerabilities

Summary:
DLP API helps you programmatically identify the sensitive blocks in information with 150+ infoTypes. These infoTypes recognize and classify private information blocks such as credit card, date of birth, and PAN. After identification, data can be masked with predefined rules.

5.1 Diagnostic Question 03 Discussion

You are a cloud engineer at Cymbal Bank. You need to share the auditing and compliance standards with your CTO that cover controls over financial reporting and both public and private controls over security, availability, and confidentiality.

Which compliance standard covers this?

A. FIPs 140-2

B. GDPR

C. PCI-DSS

D. SOX

Google Cloud

Feedback:
A. Incorrect. FIPs 140-2 is a security standard that sets requirements for cryptographic modules, including hardware, software, and/or firmware, for U.S. federal agencies.

B. Incorrect. GDPR lays out specific requirements for businesses and organizations who are established in Europe or who serve users in Europe.

C. Incorrect. PCI DSS is a set of network security and business best practices guidelines adopted by the PCI Security Standards Council to establish a “minimum security standard” to protect customers’ payment card information.

D. Correct! SOX covers controls over financial reporting and both public and private controls over security, availability, and confidentiality.

Where to look:
https://cloud.google.com/security/compliance/

Content mapping:
No coverage in training materials

Summary:
SOX obligations include establishing and monitoring internal controls, including those maintained by a third party, such as a cloud service provider. Any organization that

processes accounting or financial information on Google Cloud must make its own judgment regarding whether specific Google Cloud services are in scope for meeting its SOX obligations.

5.1 Diagnostic Question 04 Discussion

Cymbal Bank's Insurance Analyst needs to collect and store anonymous protected health information of patients from various hospitals. The information is currently stored in Cloud Storage, where each hospital has a folder that contains its own bucket. You have been tasked with collecting and storing the healthcare data from these buckets into Cymbal Bank's Cloud Storage bucket while maintaining HIPAA compliance.

What should you do?

A. Create a new folder. Create a new Cloud Storage bucket in this folder. Give the Insurance Analyst the 'Editor' role on the new folder. Collect all hospital data in this bucket. Use the Google Cloud Healthcare Data Protection Toolkit to monitor this bucket.

B. Create a new Project. Create a new Cloud Storage bucket in this Project with customer-supplied encryption keys (CSEK). Give the Insurance Analyst the 'Reader' role on the Project that contains the Cloud Storage bucket. Use the Cloud DLP API to find and mask personally identifiable information (PII) data to comply with HIPAA.

C. Create a new Project. Use the Google Cloud Healthcare Data Protection Toolkit to set up a collection bucket, monitoring alerts, audit log sinks, and Forseti monitoring resources. Use Dataflow to read the data from source buckets and write to the new collection buckets. Give the Insurance Analyst the 'Editor' role on the collection bucket.

D. Use the Cloud Healthcare API to read the data from the hospital buckets and use de-identification to redact the sensitive information. Use Dataflow to ingest the Cloud Healthcare API feed and write data in a new Project that contains the Cloud Storage bucket. Give the Insurance Analyst the 'Editor' role on this Project.

Google Cloud

Feedback:
A. Incorrect. If you collect hospital data in a new bucket directly, you will store the sensitive information, which you need to avoid. The Google Cloud Healthcare Data Protection Toolkit needs to run before the data collection begins to set up the HIPAA-compliant infrastructure and monitoring.

B. Incorrect. Customer-supplied encryption keys will use your encryption keys instead of Google's to encrypt the data. Users will still be able to view sensitive information. Using the DLP API after the data is stored defeats the purpose.

C. Incorrect. Although this solution is suitable for HIPAA-compliant architecture and the storage requirements, it does not anonymize hospital data.

D. Correct! The Cloud Healthcare API has a de-identification module to redact patient information and is already HIPAA-compliant. You can then use Dataflow to read the information from source and write into a target bucket with anonymization for further analysis.

Where to look:
- https://cloud.google.com/blog/topics/healthcare-life-sciences/getting-to-know-the-google-cloud-healthcare-api-part-1
- https://cloud.google.com/storage/docs/collaboration#top_of_page
- https://cloud.google.com/files/gcp-hipaa-overview-guide.pdf
- https://cloud.google.com/architecture/setting-up-a-hipaa-aligned-project#stora

- ge_browser

Content mapping:
No coverage in training materials

Summary:
The Cloud Healthcare API and the Google Cloud Healthcare Data Protection Toolkit can be used to maintain HIPAA compliance for data storage, application development, data analysis, and machine learning. The Google Cloud Healthcare Data Protection Toolkit helps you set up HIPAA-compliant architecture using an infrastructure-as-a-code script (IaaS). The Cloud Healthcare API is a fully managed HIPAA-compliant service that contains a de-identification module, along with security built around location and privacy.

5.1 Diagnostic Question 05 Discussion

Cymbal Bank plans to launch a new public website where customers can pay their equated monthly installments (EMI) using credit cards. You need to build a secure payment processing solution using Google Cloud which should follow the PCI-DSS isolation requirements. How would you architect a secure payment processing environment with Google Cloud services to follow PCI-DSS?

Select the two correct choices

A. Create a new Google Cloud project with restricted access (separate from production environment) for the payment processing solution. Create a new Compute Engine instance and configure firewall rules, a VPN tunnel, and an internal load balancer.

B. Create a new Google Cloud project with restricted access (separate from production environment) for the payment processing solution. Configure firewall rules, a VPN tunnel, and an SSL proxy load balancer for a new App Engine flexible environment.

C. Create a new Google Cloud project with restricted access (separate from production environment) for the payment processing solution. Configure firewall rules, a VPN tunnel, and an HTTP(S) load balancer for a new Compute Engine instance.

D. Deploy an Ubuntu Compute Engine instance. Install the libraries needed for payment solutions and encryption/decryption. Deploy using Terraform.

E. Deploy a Linux base image from preconfigured operating system images. Install only the libraries you need. Deploy using Terraform.

Google Cloud

Feedback:
A. Incorrect. An internal load balancer will not communicate with the public internet, which will render this system unusable.

B. Incorrect. Firewall rules and load balancer settings do not apply to the App Engine flexible environment.

C. Correct! You need an isolated Linux base (Compute Engine) environment that is separate from your production environment as per PCI-DSS isolation requirements for payment solutions.

D. Incorrect. If you choose an Ubuntu base image, it will contain many libraries your payment interface does not need. That violates PCI-DSS and exposes Compute Engine to vulnerability.

E. Correct! Having a minimalist operating system with only the libraries required for your application limits the attack surface. Use Terraform to ensure that only the current deployment happens, without interruption.

Where to look:
https://cloud.google.com/architecture/pci-dss-compliance-in-gcp#cloud_storage

Content mapping:
- ILT course: **Security in Google Cloud**

    - M1 Foundations of Google Cloud Security

- On-demand course: **Managing Security in Google Cloud**
    - M1 Foundations of Google Cloud Security

Summary:
Payment processing requires your system to be compliant with PCI-DSS. As a part of this compliance, you need to ensure that the payment collection environment is separate from your production environment. You need to follow the PCI-DSS guidelines and best practices. Security is a shared responsibility: Google Cloud provides tools and configuration options to implement compliance procedures, and you need to apply the configurations and procedures.

5.1 Determining regulatory requirements for the cloud

Documentation

Upload an object by using CSEK | Cloud Storage
Customer-managed encryption keys (CMEK) | Cloud KMS Documentation
Customer-supplied encryption keys | Cloud Storage
Data encryption options | Cloud Storage
ISO/IEC 27018 Certified Compliant | Google Cloud
Automating the Classification of Data Uploaded to Cloud Storage | Cloud Architecture Center | Google Cloud
Cloud DLP client libraries | Data Loss Prevention Documentation
Data Loss Prevention Demo
Overview of VPC Service Controls | Google Cloud
Getting to know the Google Cloud Healthcare API: Part 1
Sharing and collaboration | Cloud Storage
Google Cloud Platform HIPAA overview guide
Setting up a HIPAA-aligned project | Cloud Architecture Center
PCI Data Security Standard compliance | Cloud Architecture Center

Let's consider resources that can help you build your knowledge and skills in this area.

The concepts in the diagnostic questions we just reviewed are covered in this documentation. You'll find this list in your workbook so you can take a note of what you want to include later when you build your study plan. Based on your experience with the diagnostic questions, you may want to include some or all of these links.

- https://cloud.google.com/storage/docs/samples/storage-upload-encrypted-file#storage_upload_encrypted_file-python
- https://cloud.google.com/kms/docs/cmek
- https://cloud.google.com/storage/docs/encryption/customer-supplied-keys
- https://cloud.google.com/storage/docs/encryption
- https://cloud.google.com/security/compliance/iso-27018
- https://cloud.google.com/architecture/automating-classification-of-data-uploaded-to-cloud-storage
- https://cloud.google.com/dlp/docs/libraries
- https://cloud.google.com/dlp/demo/#!/
- https://cloud.google.com/vpc-service-controls/docs/overview
- https://cloud.google.com/blog/topics/healthcare-life-sciences/getting-to-know-the-google-cloud-healthcare-api-part-1
- https://cloud.google.com/storage/docs/collaboration#top_of_page
- https://cloud.google.com/files/gcp-hipaa-overview-guide.pdf
- https://cloud.google.com/architecture/setting-up-a-hipaa-aligned-project#stora

- ge_browser
- https://cloud.google.com/architecture/pci-dss-compliance-in-gcp#cloud_storage