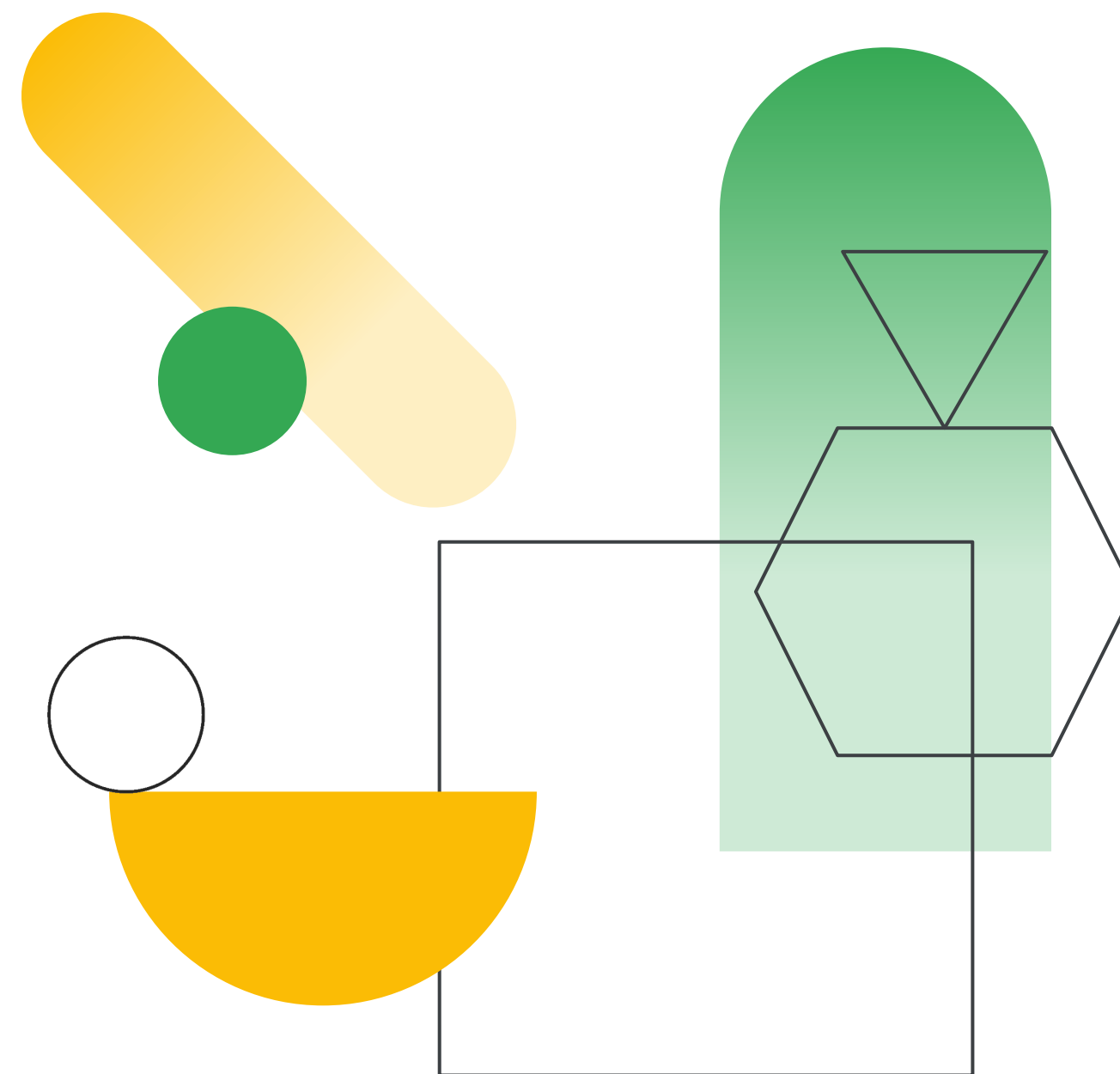Google Cloud

Google Cloud Architect Design and Process Workbook

1a. Defining your case study

Come up with a case study. Then fill in the next slide.

Examples:

- Online Banking Portal

- Ride sharing application (like Uber)

- Online shopping site

- Something else...

1b. [Unme Photo Sharing Application]

Brief description:

An application to create memories by sharing photos with our friends and it is intent to stay between you and your friend.

List a few main features:
- Create a wherabout between you and your friend and add posts in it with a sweet message about the experience with them.
- CRUD the posts.

List roles of typical users:
- Application user/poster
- admin

2a. Writing user personas

Create two user personas that describe typical users of your application.
Add a new slide for each persona.

Example persona:

Jocelyn is a busy working mom who wants to access MegaCorp Bank to check her account balances and make sure that there are enough funds to pay for her kids' music and sport lessons. She also uses the web site to automate payment of bills and see her credit account balances. Jocelyn wants to save time and money, and she wants a credit card that gives her cash back.

Google Cloud

User persona

Jake wants to create a memory and share with his best friend Jane. He clicks a picture and uploads into UnMe and writes something about it with date. Jane looks into her whereabout and adds her memory as well.

Jake can only have conversations with Jane. For making conversations with his other friends he has to pay a nominal fees to chat with others. This application in intent to keep as low as possible users as it is requires less data and there will be less clutter in ones life.

2b. Writing user stories

Create three user stories for the roles you defined earlier.
Create a new slide for each user story.

Example user story:

Balance Inquiry

As a *checking account holder,* ***I want to*** *check my available balance at any time of day,* ***so that*** *I am sure not to overdraw my account.*

User Story - 1 Post Management

- As a poster I want to create, delete, modify post as and share it on the whereabout so that other person who has access to it can view it.
- As a Poster's best friend I can view,update and delete with the posters concern,so that I accidentally do not delete any memories or edit them by removing any lines in the post.
- Both poster and poster's bestfriend can chat with each other, as it is important for users to communicate about their whereabout and what to add in them.
- As a poster, if he wants to chat with other friends other than his best friend he has to pay fees to make the conversations, to provide some income to the company.

User Story - 2 Admin Role

- As an admin I want recover images from archives if the pictures are accidentally deleted, so that there is no lost memories.
- As an admin, I want to delete un intended images from the system upon request form user with privacy concerns.
- As an admin, I want to be able to retrieve data analytical information to know usage statistics so that, I can equip myself with the necessary budget planned for the month.

User Story -User Management

- As a User I want to add personal details like profile picture, name,email,phone and payment details, so that I am identified in the system.
- As a User I want to verify my email address or phone number, so that user can be verified if it is he himself or not.
- As a User I can set up automatic payment in the portal, so that I do not have to stop my conversation in-between for any means.

3. Defining SLIs and SLOs

Based on the requirements of your case study, fill in the table on the next slide with SLOs and SLIs as shown in the example below.

| User story	SLO	SLI
Balance Inquiry	*Available 99.95%*	*Fraction of 200 vs 500 HTTP responses from API endpoint measured per day*
Balance Inquiry	*95% of requests complete in under 300 ms*	*Time to last byte GET requests measured every 10 seconds aggregated per minute*

Google Cloud

3. Defining SLIs and SLOs

Based on the requirements of your case study, fill in the table below with SLOs and SLIs.

| User story	SLO	SLI
Chat availability	*Availability 99.9 %*	*Servers are made available to send and receive chat measured everyday*
Chat information	*Sent data information given<500ms*	*Server should send the status within sent or not sent status measured every 1 min*
Photo upload	*Available 95% and update as well < 1000ms latency for upload*	*Photo count check made minute*
Photo archive	*Archive photos after 6 months and redirect the paths*	*Archiving takes place every month*
Personal details	*Available 95% and update as well < 200ms latency for update information error <= 0.1%*	*Personal details http check done every hour for any fault occurring.*

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4. Design microservices for your application

Draw a diagram on the next slide showing your application's microservices and their connections. Below is an example.
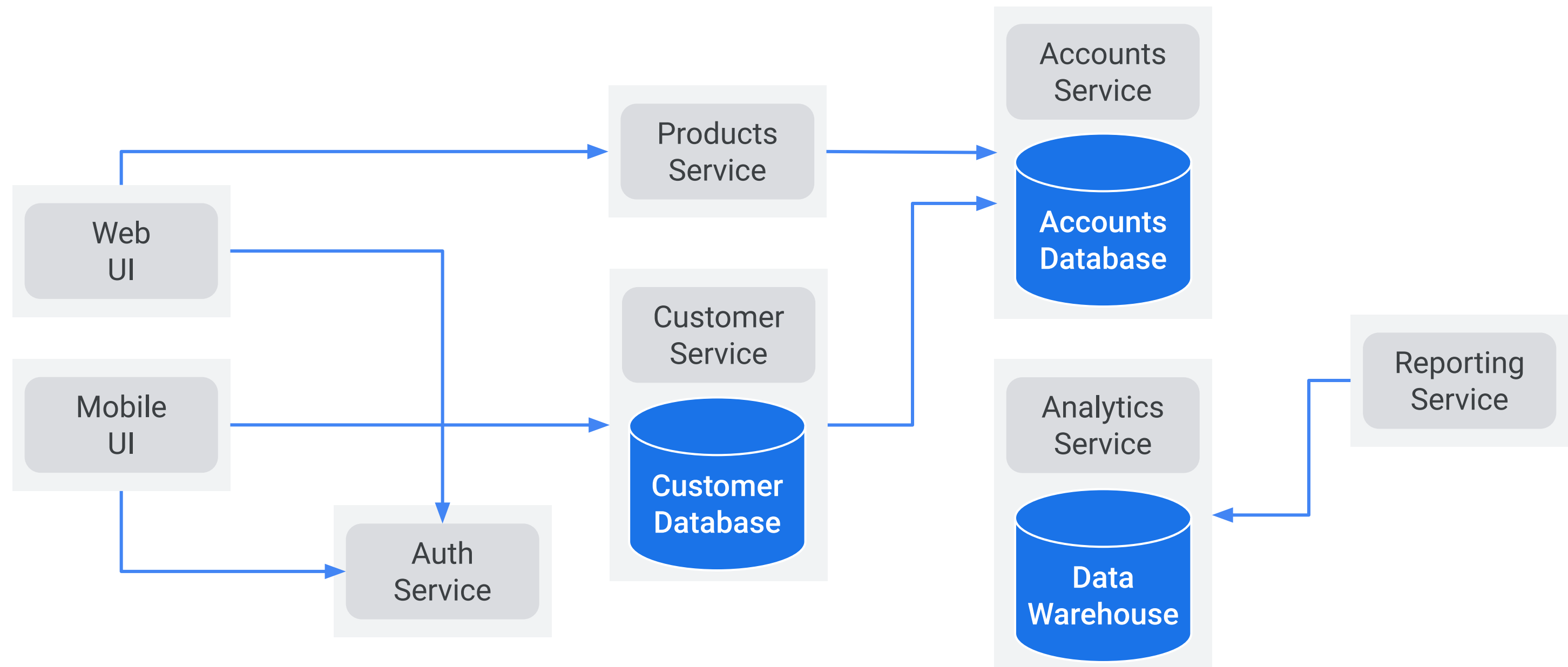
4. Design microservices for your application

Draw a diagram showing your application's microservices and their connections.
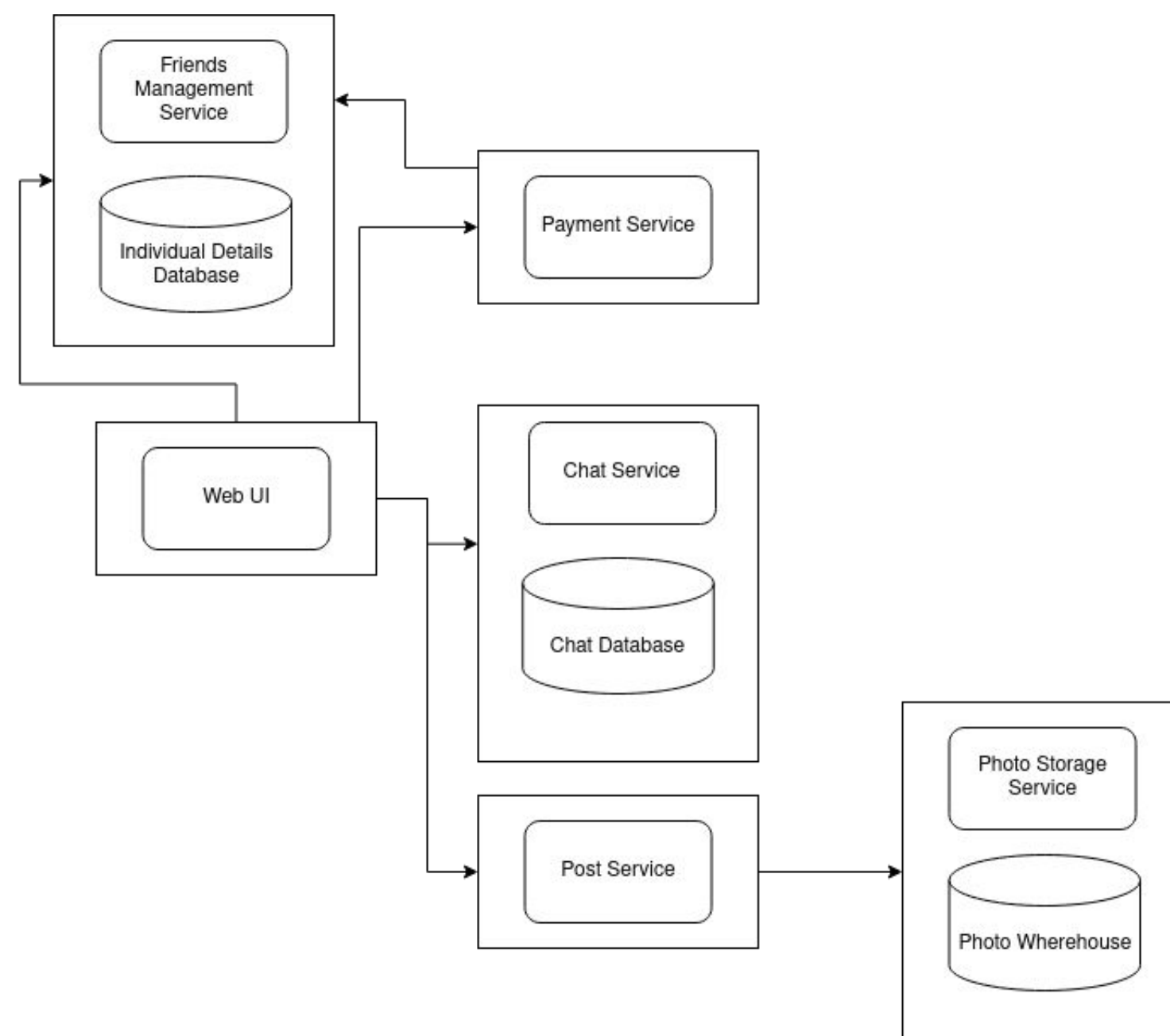
5. Designing REST APIs

Fill in the table on the next slide with your services and their resources and operations as shown in the example below.

Service name	Collections	Methods
Account Service	*transactions*	*list* *deposit* *withdraw* *transfer*

Google Cloud

5. Designing REST APIs

Fill in the table with your services and their resources and operations.

Service name	Collections	Methods
Friends Managemnet Service	user	*GET* *POST* *PUT*
Chat Service	*chat*	*GET* *POST* *DELETE*
Post Service	*memory*	*GET* *POST* *PUT* *DELETE*
Photo Management	*photos*	*GET* *POST* *PUT* *ARCHIVE*
Payment Service	*payment*	*GET* *POST*

6. Defining storage characteristics

On the next slide fill in the required storage features. Below is an example.

Service	Structured or Unstructured	SQL or NoSQL	Strong or Eventual Consistency	Amount of Data (MB, GB, TB, PB, ExB)	Read only or Read/Write
Account Service	*Structured*	*SQL*	*Strong*	*GB*	*Read/Write*

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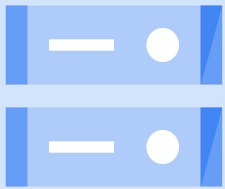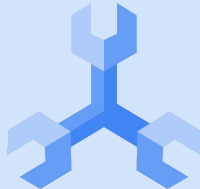
6. Defining storage characteristics

Fill in the required storage features.

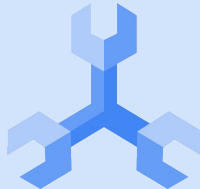| Service	Structured or Unstructured	SQL or NoSQL	Strong or Eventual Consistency	Amount of Data (MB, GB, TB, PB, ExB)	Read only or Read/Write
Chat Service	*unstructured*	*NoSQL*	*Strong*	*GB*	*Read/Write*
Post Service	*unstructured*	*NoSQL*	*Eventual Consistency*	*TB*	*Read/Write*
Photo Service	*unstructured*	*NoSQL*	*Eventual Consistency*	*TB*	*Read/Write*
Payment Service	*structured*	*SQL*	*Strong Consistency*	*GB*	*Read only*
Profile Management	*unstructured*	*NoSQL*	*Eventual Consistency*	*GB*	*Read only*
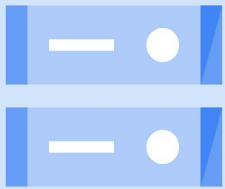
Google Cloud

7. Choosing Google Cloud Storage and Data Services

On the next slide choose the Google Cloud storage products for each service.
Below is an example.

Service	Persistent Disk	Cloud Storage	Cloud SQL	Firestore	Cloud Bigtable	Cloud Spanner	BigQuery
Account Service			X				

Google Cloud

7. Choosing Google Cloud Storage and Data Services

Choose the Google Cloud storage products for each service.

Service	Persistent Disk	Cloud Storage	Cloud SQL	Firestore	Cloud Bigtable	Cloud Spanner	BigQuery
Chat Service				X			
Profile Management			X				
Post Service				X			
Photo warehouse		X					
Payment Details			X				

8a. Defining network characteristics for your services

On the next slide fill in the required network features. Below is an example.

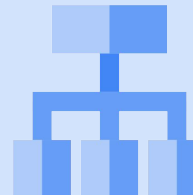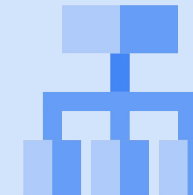| Service	Internet facing or Internal only	HTTP	TCP	UDP	Multiregional?
Account	Internal only		X		No

8a. Defining network characteristics for your services

Fill in the required network features.

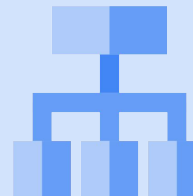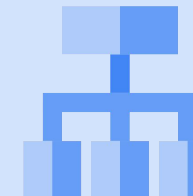| Service	Internet facing or Internal only	HTTP	TCP	UDP	Multi-Regional?
Chat Service	Internet facing	x	x		
Profile Management	Internet facing	x			
Post Service	Internet facing	x	x		
Photo warehouse	Internal only		x		x
Payment Details	Internet facing	x	x		

Google Cloud

8b. Select the load balancers for your services

On the next slide choose the Google Cloud load balancer product(s) for each service. Below is an example.

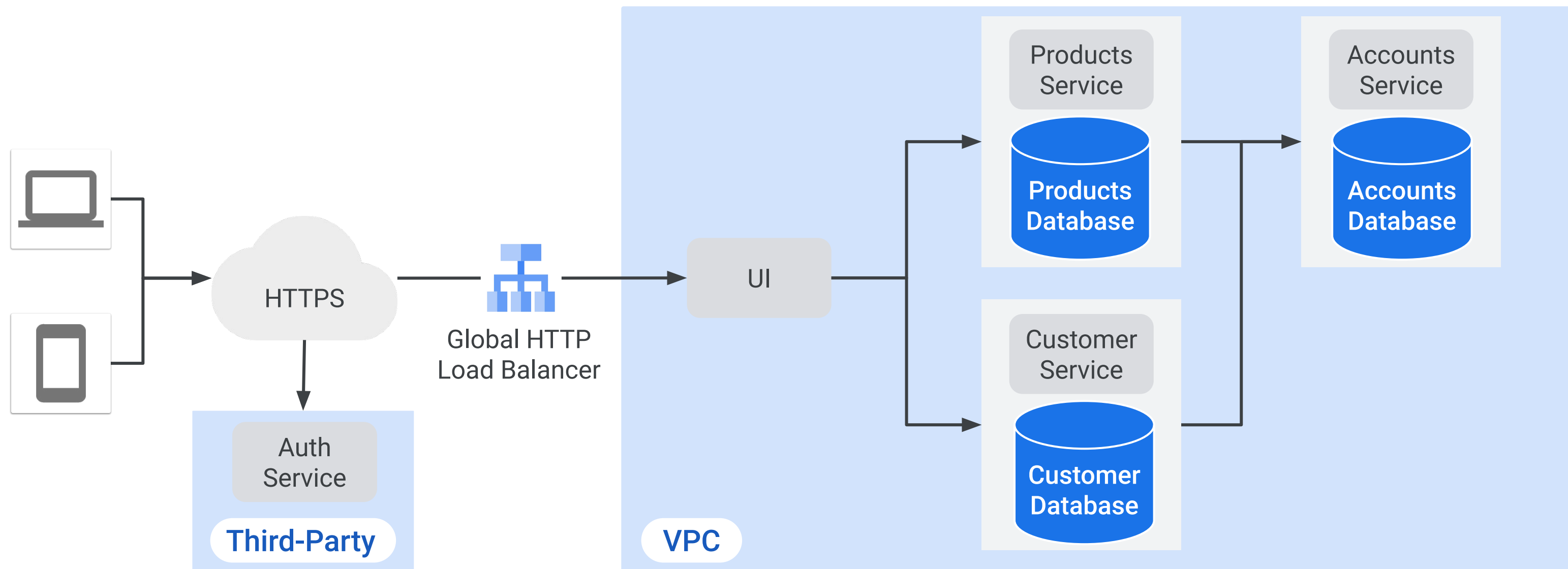| Service	HTTP	TCP	UDP
Account		X	

Google Cloud

8b. Select the load balancers for your services

Choose the Google Cloud load balancer product(s) for each service.

Service	HTTP	TCP	UDP
chat		x	
photo		x	
post	x		
profile	x		
payment		x	

Google Cloud

9. Diagramming your network

On the next slide draw a diagram that depicts how your services will communicate over the network. Include regions, zones, load balancers, CDN, and DNS if applicable. Below is an example.

HTTPS

Global HTTP
Load Balancer

UI

Third-Party

Auth
Service

VPC

Products
Service

Products
Database

Customer
Service

Customer
Database

Accounts
Service

Accounts
Database

Google Cloud

9. Diagramming your network

Draw a diagram that depicts how your services will communicate over the network. Include regions, zones, load balancers, CDN, and DNS if applicable.

Google Cloud
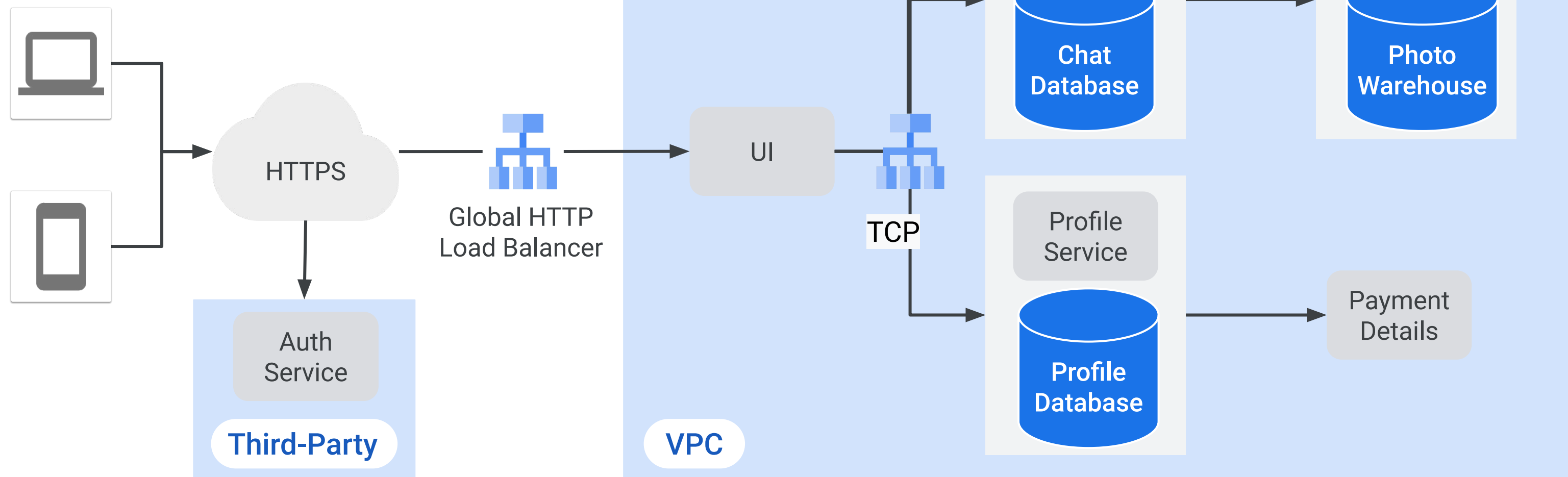
10. Designing reliable, scalable applications

Even if some service is down, we want the web frontend of our application to be available nearly all the time. We also want the website to be fast with very low latency to users all over the world. On the next slide, draw a diagram that depicts how we can achieve this using Google Cloud services. Below is an example.
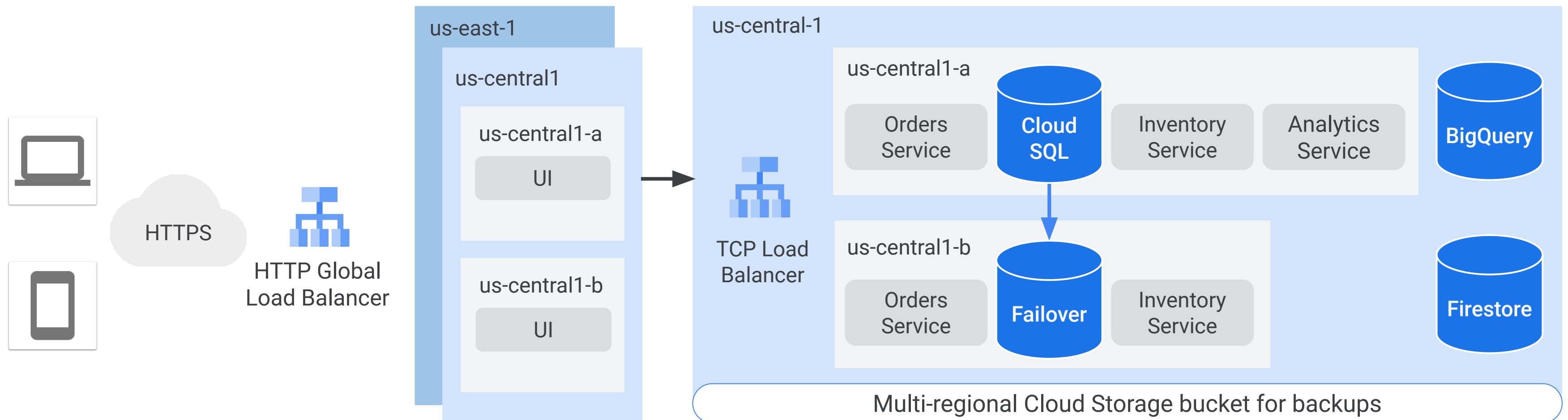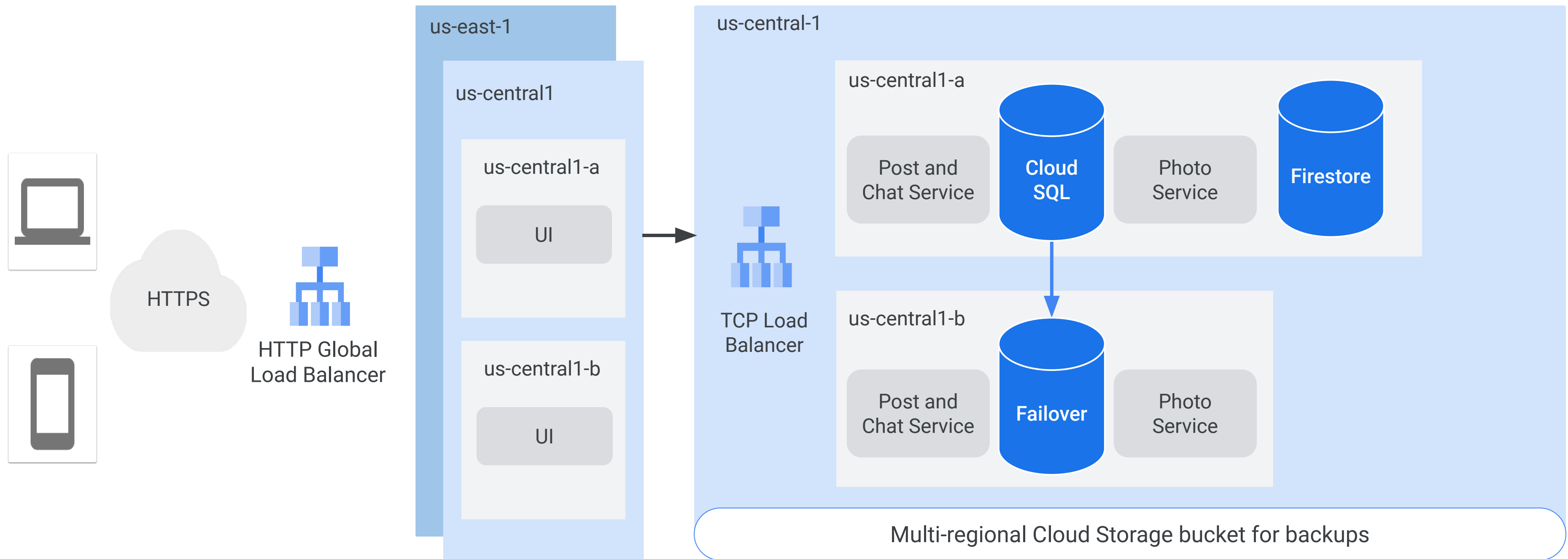
10. Designing reliable, scalable applications

Even if some service is down, we want the web frontend of our application to be available nearly all the time. We also want the website to be fast with very low latency to users all over the world. Draw a diagram that depicts how we can achieve this using Google Cloud services.

11a. Disaster recovery scenario

You've deployed for high availability by replicating resources in multiple zones. However, to meet regulatory requirements, you need a plan to recover from a disaster that brings down the entire region. The current architecture is depicted below. On the next slide, create a plan to bring up your application in another region if your main region is down. Below is an example.
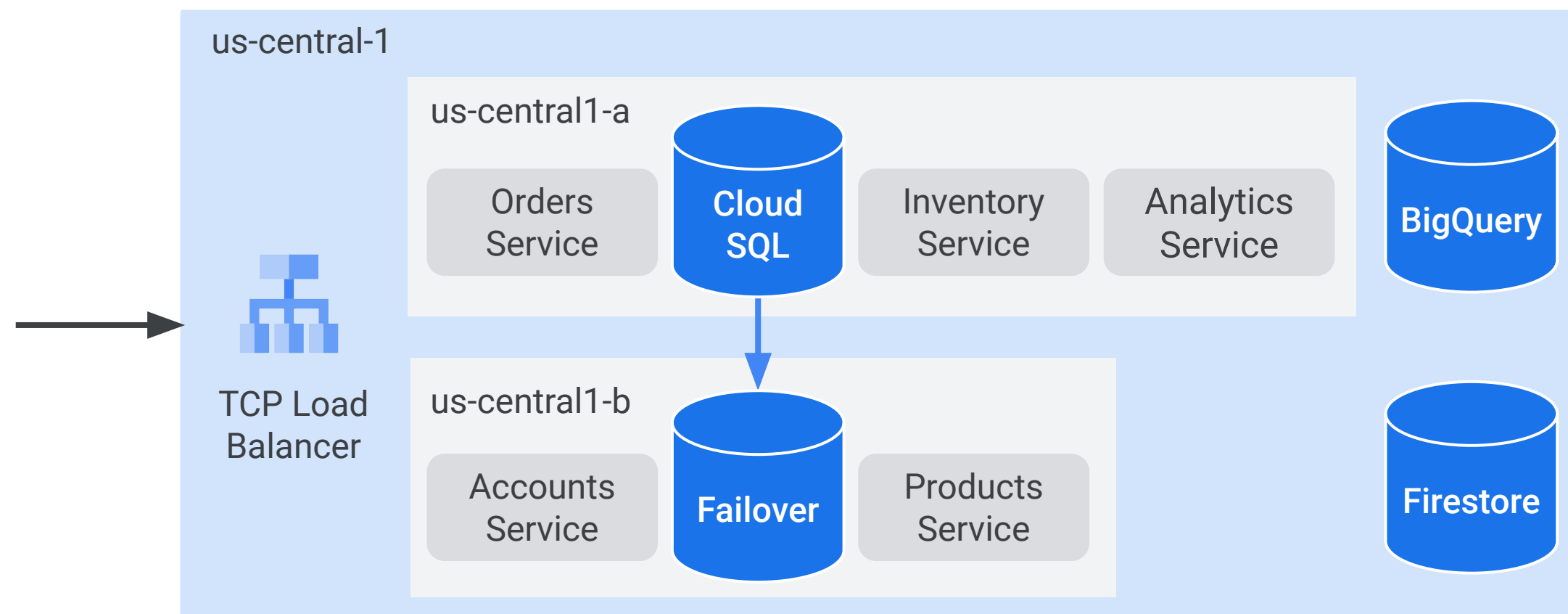
11a. Disaster recovery scenario

You've deployed for high availability by replicating resources in multiple zones. However, to meet regulatory requirements, you need a plan to recover from a disaster that brings down the entire region. The current architecture is depicted on the previous slide. Create a plan to bring up your application in another region if your main region is down.

11b. Service disaster recovery scenarios

Write a high-level list of possible scenarios on the next slide. Below is an example.

Service	Scenario	Recovery Point Objective	Recovery Time Objective	Priority
Ratings Service	*Programmer deleted all ratings accidentally*	*24 hours*	*1 hour*	*Med*
Orders Service	*Orders database crashes*	*0 (can't lose any data)*	*2 minutes*	*High*

Google Cloud

11b. Service disaster recovery scenarios

Write a high-level list of possible scenarios.

Service	Scenario	Recovery Point Objective	Recovery Time Objective	Priority
Chat,Post, and Profile Firestore	*Database Crash*	*0 min*	*5 min*	*High*
Photo Inventory Cloud Storage	*Accidental Deletion of Storage*	*1 hour*	*10 min*	*Medium*
Payment Details SQL database	*Accidental Deletion of the database or Crash*	*0 min*	*5 min*	*High*

Google Cloud

11c. Resource disaster recovery plans

For each scenario, fill in the table on the next slide. Below is an example.

| Resource	Backup Strategy	Backup Location	Recovery Procedure
Ratings Database	*Daily automated backups*	*Multi-Regional Cloud Storage Bucket*	*Run Restore Script*
Orders Database	*Failover replica plus daily backups*	*Multi-zone deployment*	*Automated*

Google Cloud

11c. Resource disaster recovery plans

For each scenario, fill in the table.

Resource	Backup Strategy	Backup Location	Recovery Procedure
chat , post, and profile details Firestore	*Regular Backup and +failover server*	*Multi-Regional Cloud Storage Bucket*	*Scheduled Cloud functions +Run script if needed*
Payment Information SQL Server	*Binary logging + backup + failover replica in another zone*	*NA*	*Automated Failover + run script if needd*
Photo Inventory Cloud Storage	*Regular Backup*	*Multi regional Cloud Storage Bucket*	*Scheduled Cloud Functions*

d

12. Modeling secure Google Cloud services

Draw a diagram on the next slide that depicts how you will secure your services. Include firewalls, IAM roles, service accounts and network resources as appropriate. Below is an example.
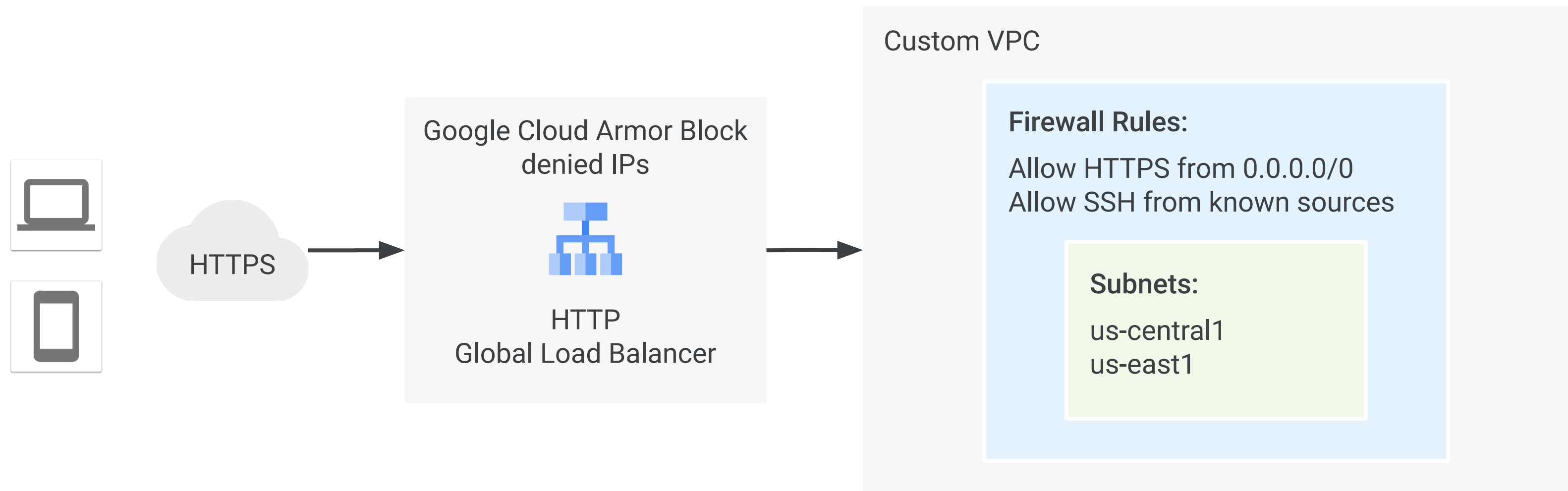
Google Cloud

12. Modeling secure Google Cloud services

Draw a diagram that depicts how you will secure your services. Include firewalls, IAM roles, service accounts and network resources as appropriate.

13. Cost estimating and planning

Use the **pricing calculator** to determine and record on the next slide the cost of your microservices. Below is an example.

Service name	Google Cloud Resource	Cost
Accounts	*Cloud SQL*	*$574.71/month*

Google Cloud

13. Cost estimating and planning

Use the **pricing calculator** to determine and record the cost of your microservices.

Service name	Google Cloud Resource	Cost
Chat,post, and profile Service	*Firestore*	*0*
Payment service	*Cloud SQL*	*3,285*
Photo inventory	*Cloud Storage*	*1,882*

Google Cloud