

Google Cloud

# Next '24

Make your app  
super with  
Google Cloud  
Firebase





# Esther Lloyd

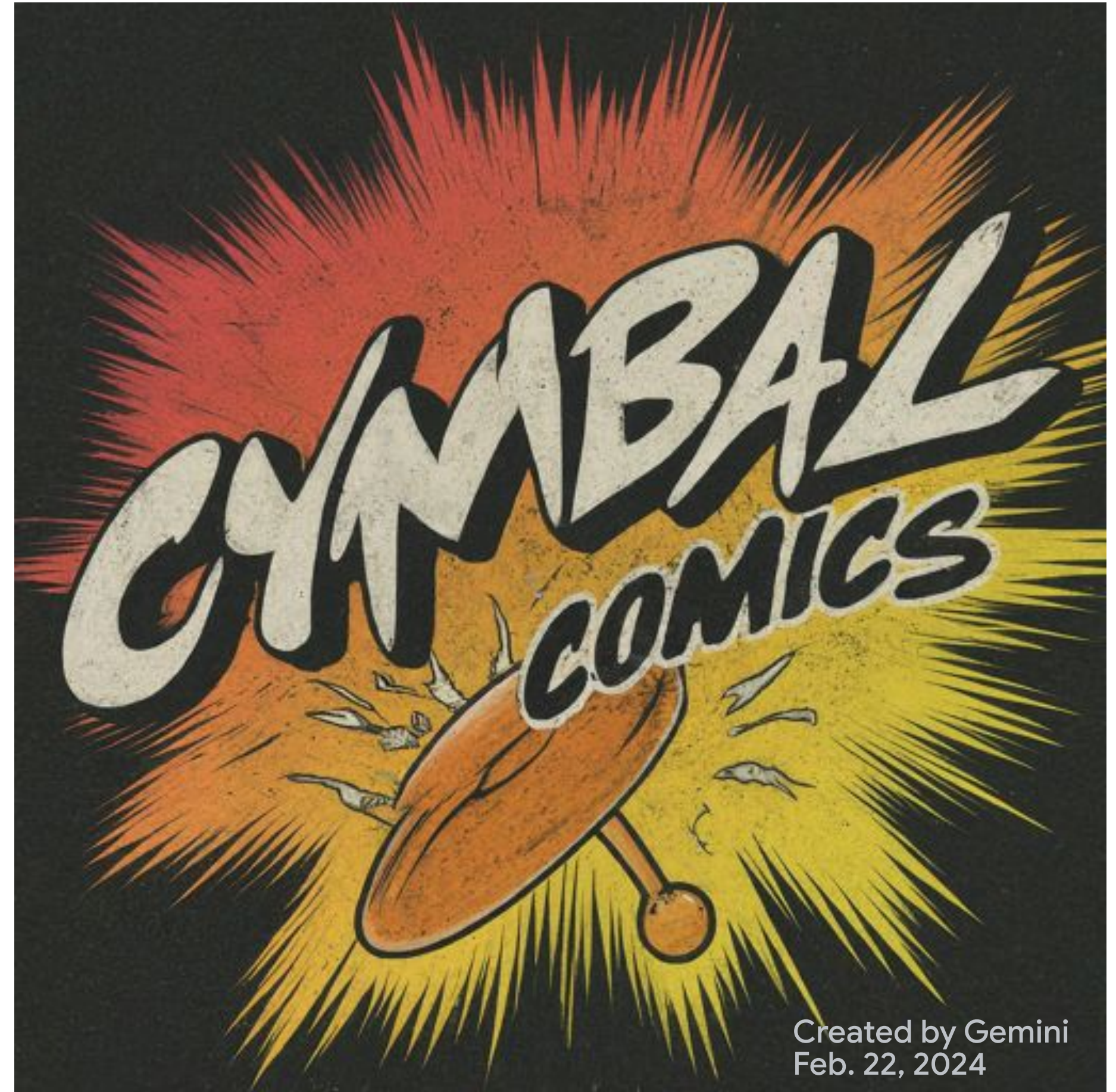
Customer Engineer,  
Google Cloud UK



# Yvonne Monterroso

Product Manager,  
Google Cloud

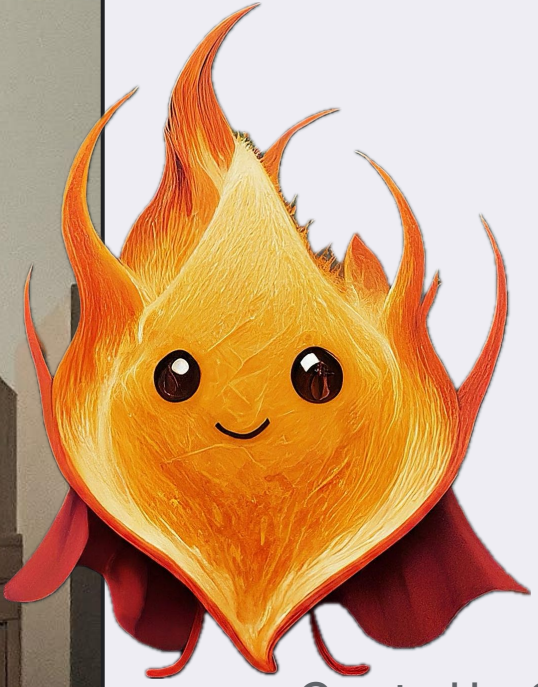
# Cymbal Comics



# Agenda

- 01 Firebase and Google Cloud
- 02 Getting started with AI
- 03 Deployment
- 04 Data management
- 05 Performance
- 06 API security
- 07 AI assistance





Created by Gemini  
Feb. 22, 2024

15 unattended projects could be deleted or reclaimed to mitigate security issues, save money, and reduce your carbon footprint. [Learn more about the unattended project recommender](#)

[GO TO RECOMMENDATION HUB](#)

### Resources

Filter Filter

Name	ID	Last accessed	Status	Charges	Carbon emissions	Unattended projects	Labels
2064896474474.altostrat.com	694643552517	March 16, 2024				15	
No organization		March 16, 2024				-	
ai-dev-preview-external	ai-dev-previe...	-			-	-	
athos-test	athos-test	-		\$65.98	-	-	test : t1 migration-center-store-region : us-central1 firebase : enabled
customer-connections	customer-co...	-			-	-	
no-org-firebase-project	no-org-fireba...	-			-	-	firebase : enabled
wcz-experimental2	wcz-experim...	-			-	-	
wcz-experimental3	wcz-experim...	-			-	-	

### no-org-firebase-project

PERMISSIONS LABELS

Edit or delete permissions below, or select "Add Principal" to grant new access [ADD PRINCIPAL](#)

Show inherited permissions

Filter Enter property name or value

#### Role / Principal

- Cloud Pub/Sub Service Agent (1)
- Firebase Admin SDK Administrator Service Agent (1)
- Firebase Rules System (1)
- Firebase Service Management Service Agent (2)
- Owner (2)
- Project Billing Manager (2)

- Migrate
- Delete
- Billing
- Settings

You need permissions for this action. Required permission(s):

no-org-firebase-project  
resourcemanager.projects.delete

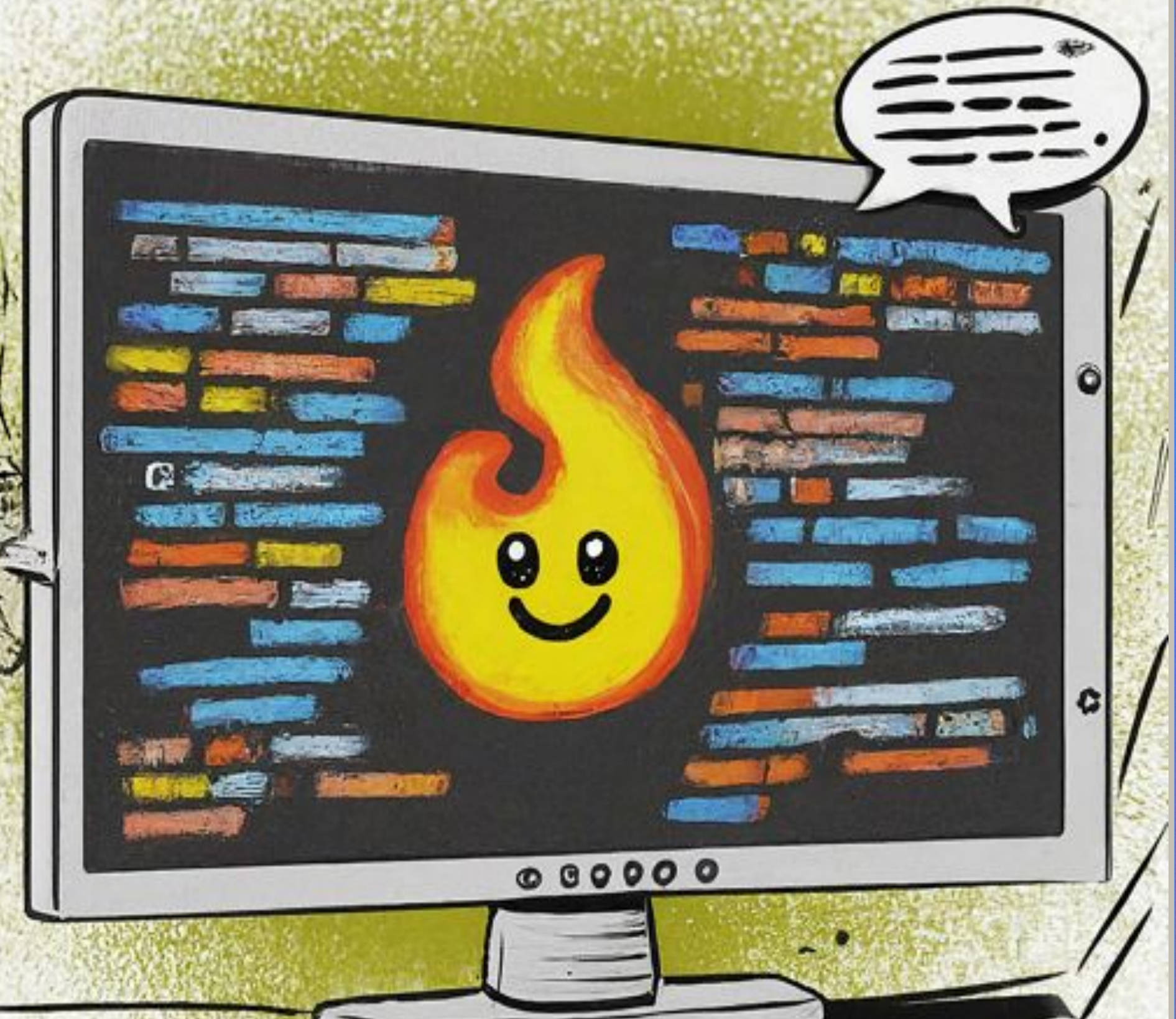
[LEARN MORE](#)

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Argh! I've never implemented an AI feature before - where do I even start?

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With a wave, a mysterious little flame sparks light onto an easy to use **client side Vertex AI SDK!!!**

## ✦ Cymbal comics



Provide a comic book style story about this image

Generating...





EXPLORER



CYMBAL-COMICS

- > .firebase
- > .idx
- > dist
- > node\_modules
- > public
  - .firebaserc
  - .gitignore
  - firebase.json
  - gemini-api-banner.js
  - index.html
  - main.js
- package-lock.json
- package.json
- style.css

&gt; OUTLINE

&gt; TIMELINE

main.js

main.js &gt; onsubmit

```
23 let imageBase64 = await fetch(imageUrl)
24   .then(r => r.arrayBuffer())
25   .then(a => Base64.fromByteArray(new Uint8Array(a)));
26
27 // Assemble the prompt by combining the text with the chosen image
28 let contents = [
29   {
30     role: 'user',
31     parts: [
32       { inline_data: { mime_type: 'image/jpeg', data: imageBase64, } },
33       { text: promptInput.value }
34     ]
35   }
36 ];
37 const result = await model.generateContentStream({ contents });
38
39 // Read from the stream and interpret the output as markdown
40 let buffer = [];
41 let md = new MarkdownIt();
42 for await (let response of result.stream) {
43   buffer.push(response.text());
44   output.innerHTML = md.render(buffer.join(''));
45 }
46 } catch (e) {
47   output.innerHTML += '<hr>' + e;
48 }
49
50 // Get vertex instance
51 const vertex = getVertex(app);
52 // Get a gemini model
53 const model = getGenerativeModel(vertex, { model: 'gemini-1.5-pro' });
54 // Call generateContent with a string or Content(s)
55 const generateContentResult = await model.generateContent({content});
56 console.log(generateContentResult.response.text());
57
58
```

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Ouch! Operations keeps complaining about these manual processes and my prod and test environments keep getting out of sync.

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Feb. 22, 2024



Ouch! Operations keeps complaining about these manual processes and my prod and test environments keep getting out of sync.

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Feb. 22, 2024



Fear not, Sarah! Your deployment woes are no match for...**Infrastructure as Code!**

Browser: cymbal-comics

EXPLORER

- OPEN EDITORS
  - package.json service
  - Settings
  - settings.json ~/Library/Application S... 4
  - firebase.tf terraform
  - index.js service M
  - next.md 5, M
- CYMBAL-COMICS
  - service
    - package.json
  - terraform
    - export
    - firebase.tf
  - .firebaserc
  - .gitignore
  - components.json
  - firebase.json
  - gcp\_resources.tf
  - jest.config.js
  - next-env.d.ts
  - next.config.mjs
  - next.md 5, M
  - package-lock.json
  - package.json
  - postcss.config.js

terminal

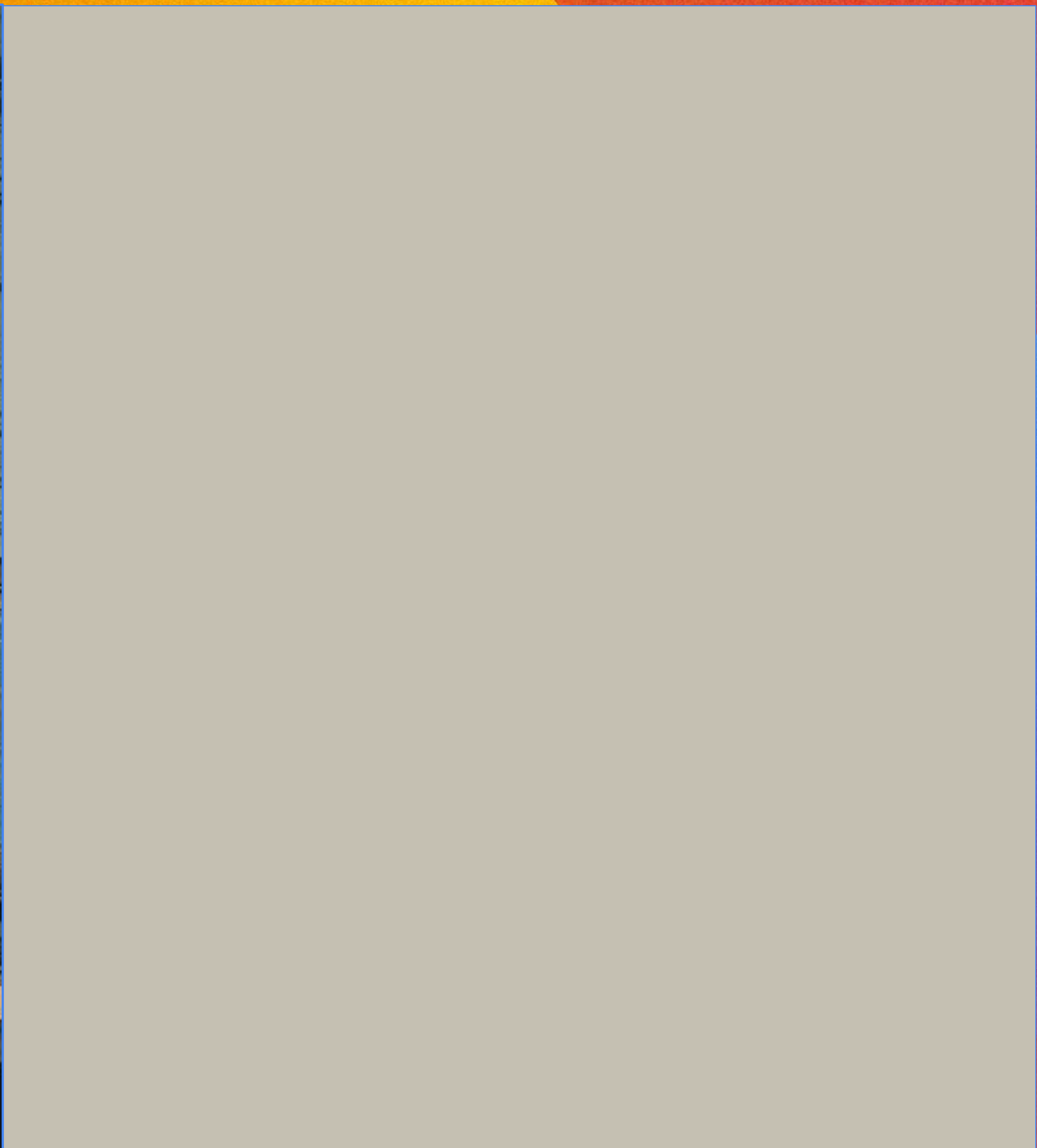
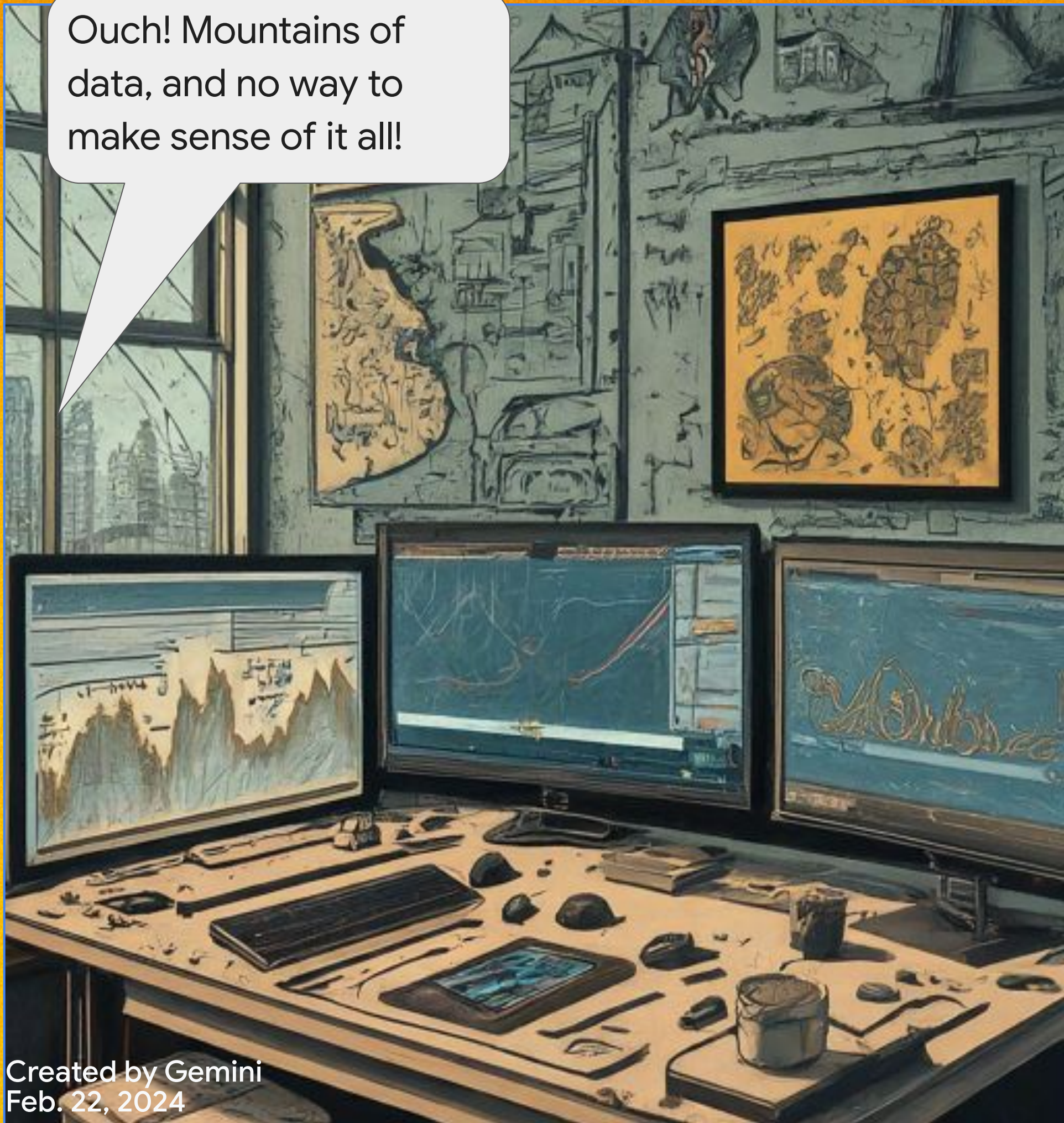
```
terraform > firebase.tf > resource "google_project" "fs"
22
23 # Creates a new Google Cloud project.
24 resource "google_project" "fs" { # fs = Firestore + Storage
25     provider = google-beta.no_user_project_override
26     folder_id = "458600283940"
27     name = "Cymbal Comics Test Environment"
28     project_id = "cymbal-comics-test-env"
29
30     # Required for the project to display in a list of Firebase projects.
31     labels = {
32         "firebase" = "enabled"
33     }
34 }
35
36 # Enables required APIs.
37 resource "google_project_service" "fs" {
38     provider = google-beta.no_user_project_override
```

PROBLEMS 32 OUTPUT DEBUG CONSOLE TERMINAL PORTS

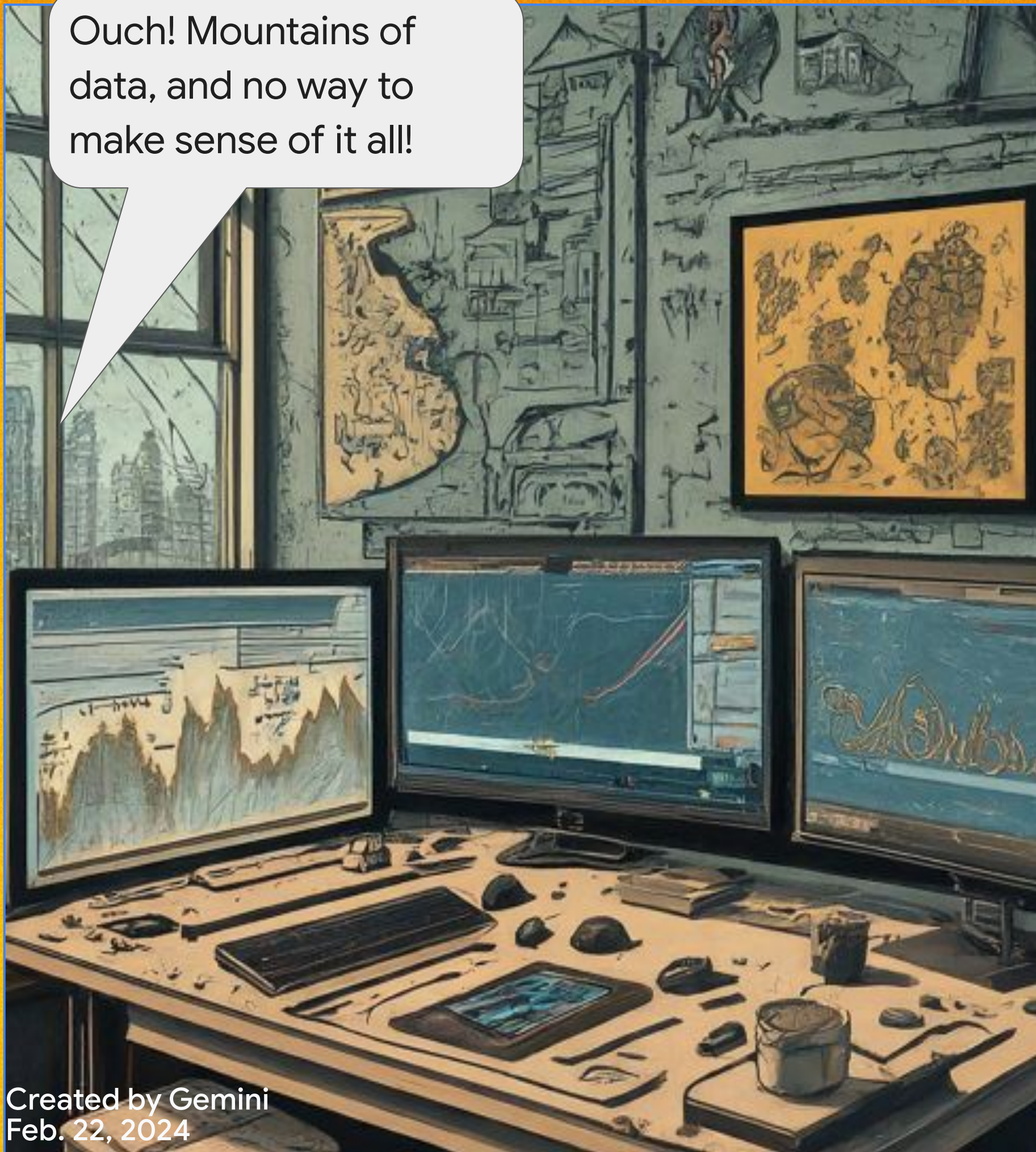
```
o estherlloyd-macbookpro1:cymbal-comics estherlloyd$ cd terraform/
o estherlloyd-macbookpro1:terraform estherlloyd$
```

Terminal tabs: bash servi..., bash, bash terra...

Ouch! Mountains of data, and no way to make sense of it all!

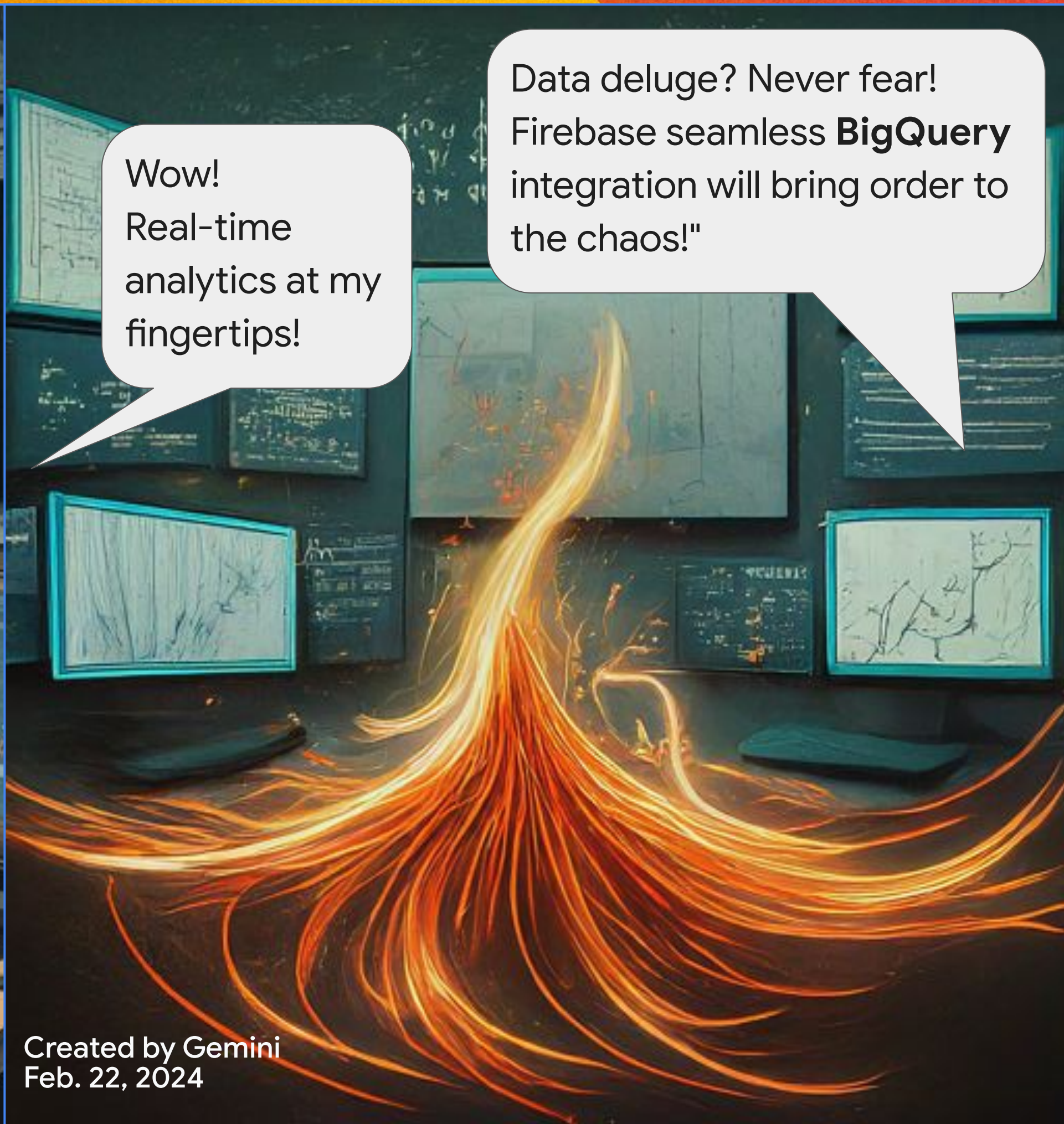


Ouch! Mountains of data, and no way to make sense of it all!



Wow!  
Real-time analytics at my fingertips!


Data deluge? Never fear!  
Firebase seamless **BigQuery** integration will bring order to the chaos!"



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**Firestore**

Project Overview 

Project shortcuts


- App Check
- App Hosting
- Firestore Database
- Storage

Product categories

- Build
- Release & Monitor
- Analytics
- Engage


All products

Blaze  
Pay as you go Modify

cymbal-comics-prod 

# Project settings


General Cloud Messaging **Integrations** Service accounts Data privacy Users and permissions

 **Google Analytics**

Free, unlimited reporting on up to 500 distinct events

✓ Enabled


[Manage](#) →

 **AdMob**

Show ads from millions of Google advertisers

[Learn more](#) ↗


Required permissions missing ⓘ

 **Google Ads**

Drive installs, gain insights, run targeted campaigns

[Learn more](#) ↗


Required permissions missing ⓘ

 **BigQuery**

Analyze your project's data at scale


[Learn more](#) ↗

[Link](#) →

 **Display & Video 360**

Understand the impact of display and search marketing


[Learn more](#) →

 **Google Play**

Enable integrations that unlock features in Firebase, Google Analytics, and Google Play

[Learn more](#) ↗

No matching Play apps found ⓘ

 **Slack**


Send your team important alerts detected by Firebase

[Install](#) →

 **Jira**


Automatically create issues in Jira

[Install](#) →

 **PagerDuty**

Send your team important alerts detected by Firebase

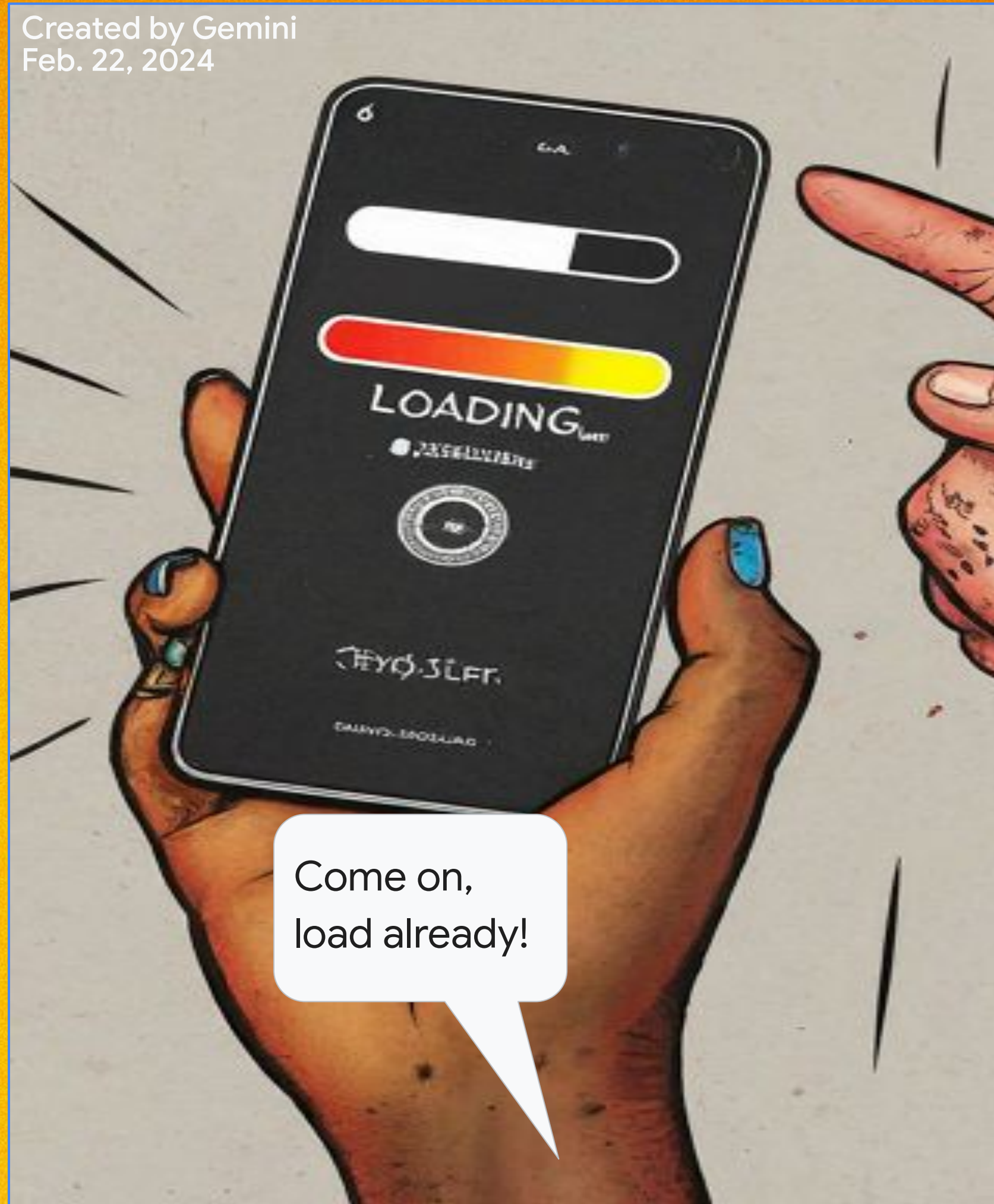
[Install](#) →

 **Cloud Logging**

View, filter, and search logs from your projects in real-time

[Learn more](#) ↗

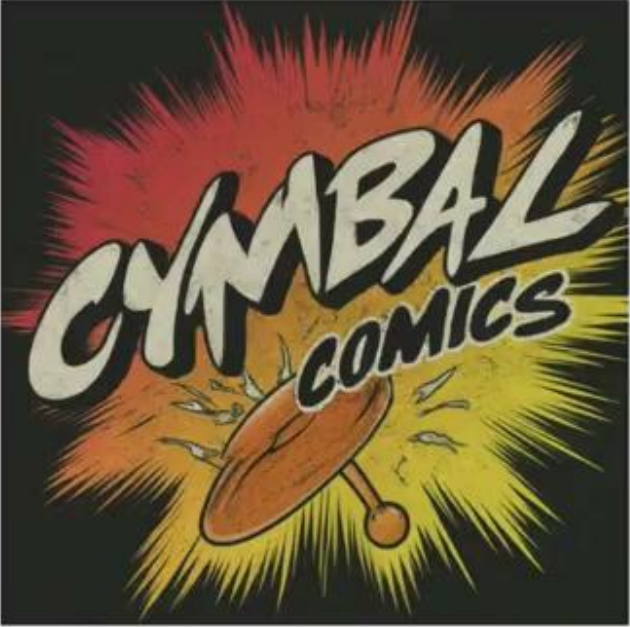
[Link](#) →





# Hello Hero!


Create your own unique Comic Book adventure with Cymbal Comics.



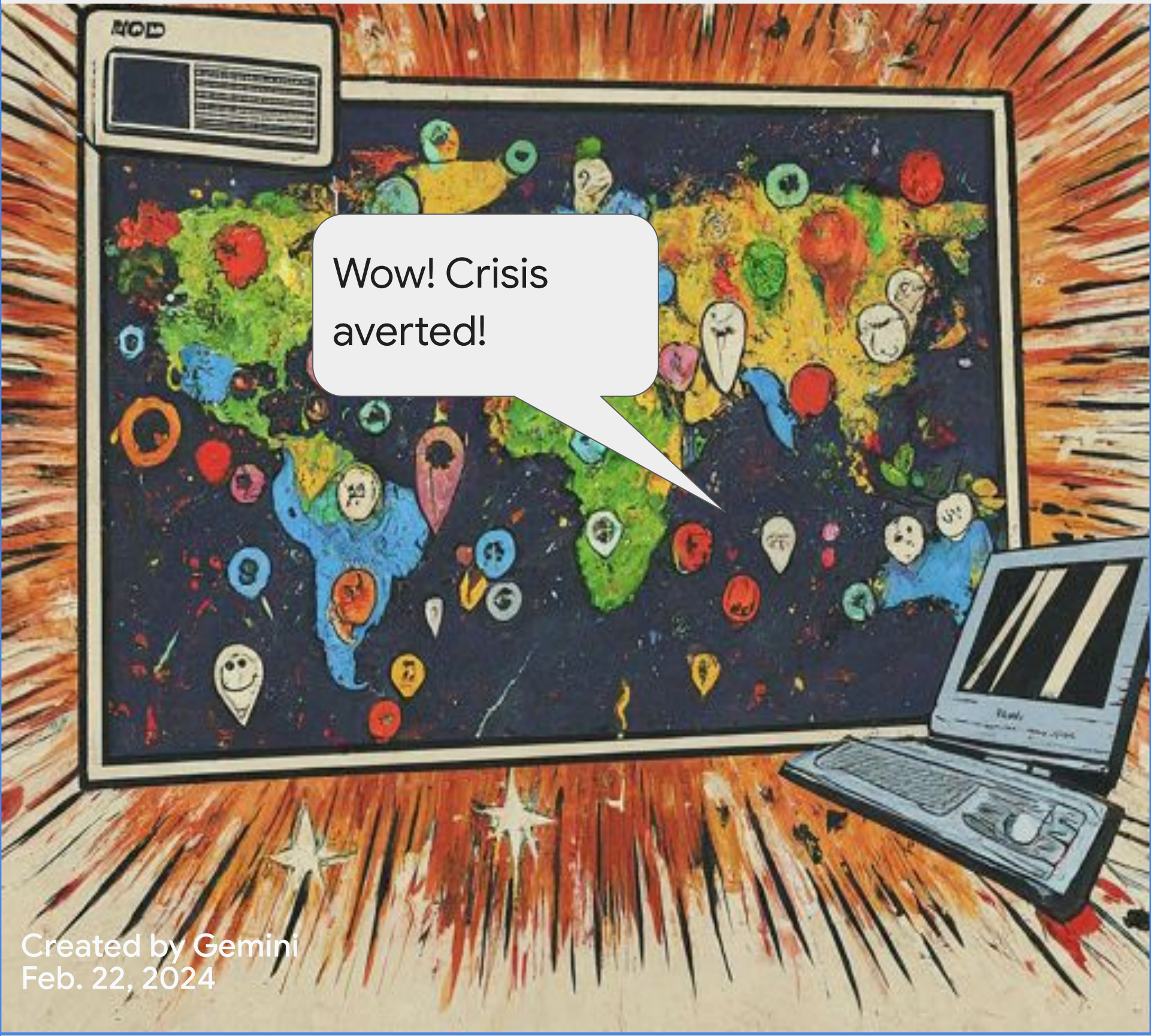
To start your adventure, tell us about yourself...

Create Comic

The **Terraform** provider weaves its magic once more!  
Witness the swift provisioning of a new **Firestore** region.

A world map is pinned to a corkboard. The continents are cut out and colored: North America is pink, South America is purple, Africa is yellow, Europe is blue, and Australia is red. Numerous colorful pushpins (blue, green, red, yellow) are scattered across the map, representing various locations. A speech bubble points to a location in Europe.

Ouch! We need a  
Firestore region  
here...and fast!

A comic book style illustration. A computer monitor displays a world map with a dark background and many colorful pushpins. The map is surrounded by a dynamic, radiating background of orange and red lines. A speech bubble points to a location on the map. In the foreground, a laptop is open on a desk.

Wow! Crisis  
averted!

SOUR... ✓ ↻ ⌂ ...

firebase.tf M firebase.tf (Working Tree) M X

🔍 ✨ ⌂ ↻ ⌂ ⬆ ⬇ 🔍 ⌂ ...

Message (⌘Enter to commit...)

✓ Commit

Changes 3

- firebase.tf t... M
- terraform.tfstate terrafo... M
- terraform.tfstate.backu... M

```

terraform > firebase.tf > resource "google_project" "fs"
37 resource "google_project_service" "fs" {
48
49   # Don't disable the service if the resource block is removed
50   disable_on_destroy = false
51 }
52
53 # Enable Firebase services for the new project created above
54 resource "google_firestore_instance" "default" {
55   provider = google-beta
56   project = google_project.fs.project_id
57
58   # Wait until the required APIs are enabled.
59   depends_on = [
60     google_project_service.fs
61   ]
62 }
63
64 ##### Set up Firestore before default Cloud Storage bucket #####

```

```

38 resource "google_project_service" "fs" {
49
50   # Don't disable the service if the resource block is removed
51   disable_on_destroy = false
52 }
53
54 # Enable Firebase services for the new project created above
55 resource "google_firestore_instance" "default" {
56   provider = google-beta
57   project = google_project.fs.project_id
58
59   # Wait until the required APIs are enabled.
60   depends_on = [
61     google_project_service.fs
62   ]
63 }
64
65 ##### Set up Firestore before default Cloud Storage bucket #####

```

PROBLEMS 25 OUTPUT DEBUG CONSOLE TERMINAL PORTS

o estherlloyd-macbookpro1:terraform estherlloyd\$

- bash ser...
- bash ser...
- bash terraf...
- bash terraf...

Yes! Time to sneak into this service and have some fun



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App Check stands sentinel! Your malicious intents are thwarted!



Foiled again!

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EXPLORER

OPEN EDITORS

- TS firebase.ts lib 3
- X JS index.js service

CYMBAL-COMICS

- app
  - components
  - demo-assets
  - lib
    - TS firebase.ts 3
    - TS utils.ts
  - node\_modules
  - public
- service
  - node\_modules
  - Dockerfile
  - JS firebase-config.js
  - JS index.js
  - package-lock.json
  - package.json
- terraform
  - .terraform
  - export
  - .terraform.lock.hcl
  - firebase.tf
  - resources.txt

OUTLINE

TIMELINE

TS firebase.ts 3 JS index.js X

```
service > JS index.js > ...
1 import express from 'express';
2 import cors from 'cors';
3 import { initializeApp } from "firebase-admin/app";
4 import { getAppCheck } from "firebase-admin/app-check";
5
6 const app = express();
7 app.use(cors());
8
9 initializeApp();
10
11 const appCheckVerification = async (req, res, next) => {
12   const appCheckToken = req.header("X-Firebase-AppCheck");
13
14   if (!appCheckToken) {
15     console.log('Info: %s', "No App Check token sent in header.");
16     res.status(401);
17     return next("Ouch! Unauthorized.");
18   }
19
20   try {
21     const appCheckClaims = await getAppCheck().verifyToken(appCheckToken);
22     console.log(appCheckClaims);
23     console.log('Info: %s', "Verified App Check token.");
24     return next();
25   } catch (err) {
26     console.log('Error: %s - %s', err.errorInfo.code, err.errorInfo.message);
27     res.status(401);
28     return next("Ouch! You are not an attested client. Unauthorized.");
29   }
30 }
31
```

Stumped and confused, our developer is trying to decipher the error message.



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**Gemini** deciphers the noise! Clarity emerges from confusion!

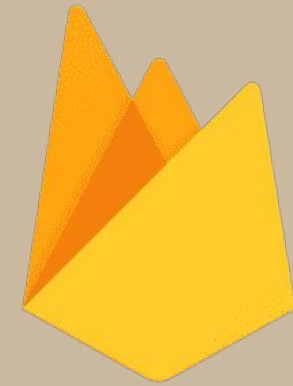
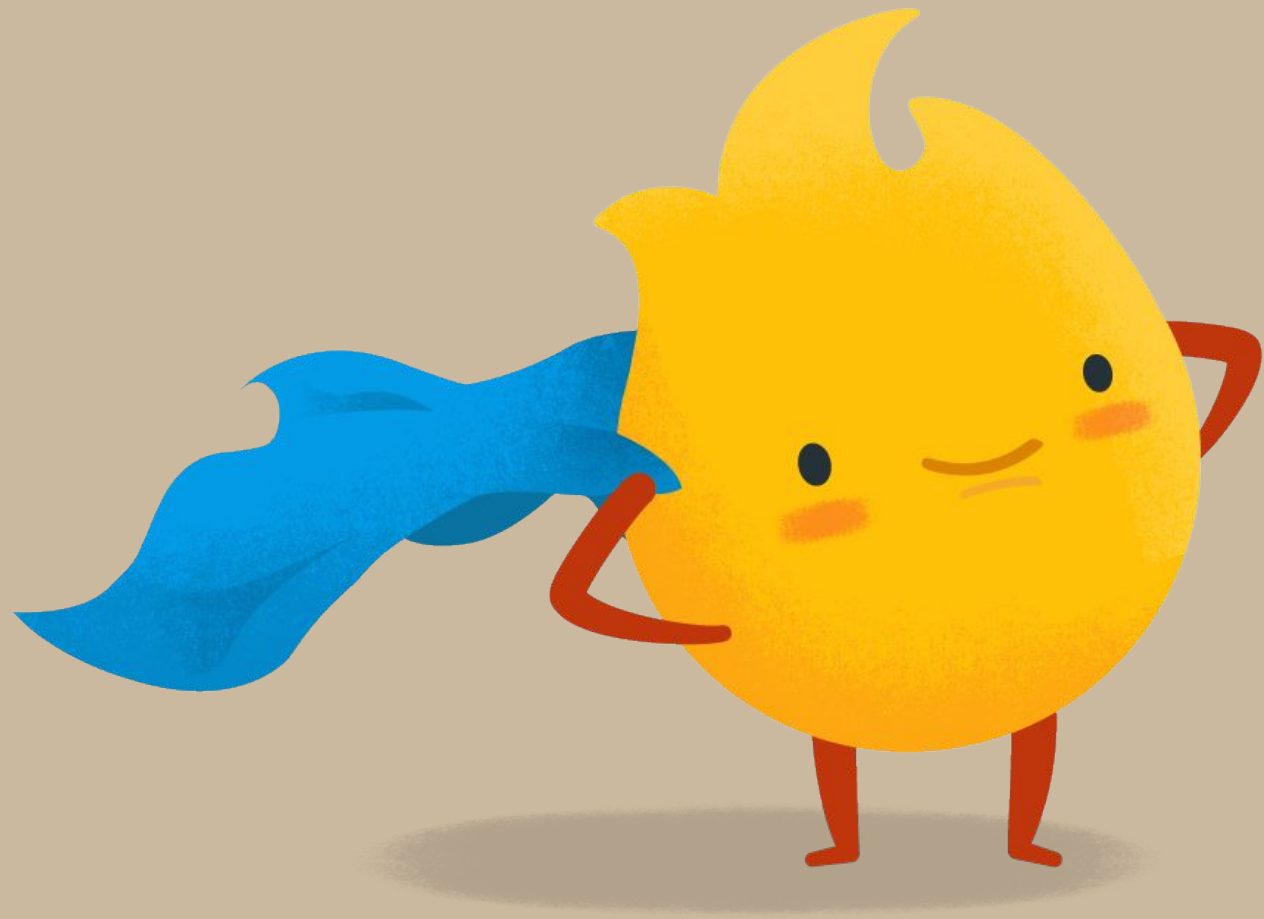


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Feb. 22, 2024

### Services

Filter Filter services

<input type="checkbox"/>	Name ↑	Req/sec ?	Region	Authentication ?	Ingress ?	Recommendation	Last deployed	Deployed by
<input type="checkbox"/>	<a href="#">cymbal-comics-app</a>	0	us-central1	Allow unauthenticated	All	SECURITY	17 hours ago	674804645031-compute@developer.gserviceaccount.com
<input type="checkbox"/>	<a href="#">cymbal-comics-service</a>	0	us-east1	Allow unauthenticated	All		3 minutes ago	esther@2064896474474.altostrat.com
<input type="checkbox"/>	<a href="#">cymbal-comics-service-buildpacks</a>	0.36	us-east1	Allow unauthenticated	All	SECURITY	22 hours ago	esther@2064896474474.altostrat.com



Firebase



Google Cloud

With Firebase and Google Cloud, our heroes, Sarah and Alex prevailed!



Thank you

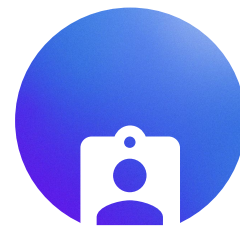
# Continue your learning journey!



## Sessions

**DEV219** - Built for planetary scale. Extending your Firebase apps with Google Cloud AI

**DEV245** - Build real-world apps with Flutter, Firebase, and Gemini: A live coding exploration



## Sessions

**DEV244** - What's next for Google AI and Vertex AI software development kits and the Gemini API

**DEV220** - How Locket Labs scales their workloads: Leveraging generative AI apps with Firebase and Firestore



## Sessions

**IHLT100** - Adding AI Capabilities to your mobile apps with Firestore Vector Search

**IHWS112** - Accelerate Firebase & Flutter app development with Gemini: A developer's productivity powerhouse

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