



Enter Sandmold!

Create a  Sandboxed Playground to run GCP labs in a fire-and-forget Folder

 Readme

 Apache-2.0 license

 Contributing



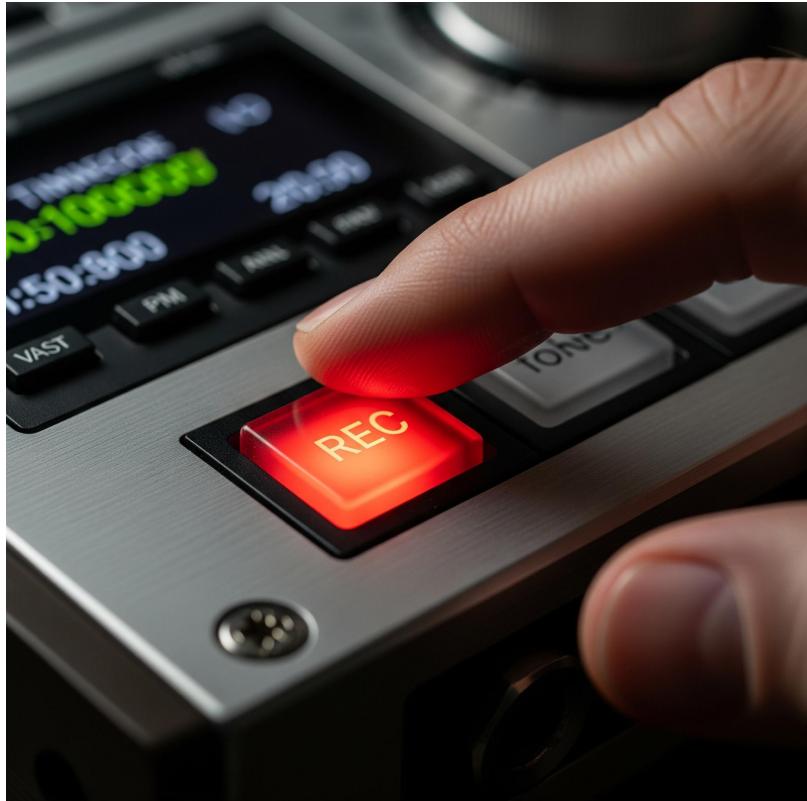
Riccardo Carlesso
Developer Advocate

Google Cloud

15 October 2025



Riccardo,
hit REC



Contents



- 01 Why Sandmold?**
- 02 What is it?**
- 03 Implementation**
- 04 Lesson Learnt**

01

Why Sandmold?

... And why this horrible name?



Why the **awkward** name?



I was googling for those nice **shapes** the **kids** use in the **sand**.

But I found only images related to **German** words, so I translated german to english and... **Sandmold** seemed the word.

Then they told me it was wrong, but I had already **go/linked** the hell out of it, and the  **GitHub** repo was done...



Then people told me “sandmold is off-putting”



What problem am I trying to solve?



- **Hackathon at customer site.** Customer pays. Customer provides a list of emails, and makes you folder owner (possibly through a customer GAIA)
- **Onramp-based hackathon.** With *GMail preregistration*, we can “overprovision” 1 project per person (knowing that only ~40% of people will come -> empty project) [go/cloud-onramp](#)
- **Google-paid workshop.** We can tear up the **lab** for N people, ask for emails in a spreadsheet and associate one project per person (or 1 every N people if it's a team). We can then tear down easily after the event, containing the costs! (*)
- **Customer-paid lab.** As above, paid by customer.





Wait - aren't we doing this already?

Multiple systems to provision hackathon / labs / workshops at the moment:

- [go/demos](#)
- **Qwiklabs** CloudSkillsboost [Classrooms](#) -> [go/lfs](#)
- [Frictionless accounts](#) - Trix batch identity/project provisioning
- **Argolis** / Other Orgs

I'm trying to **OSS** and **democratize the code** to create a Lab setup with N projects for M users.

What's in it for you?

- Make it easy to install Demos with a click. *Heapster shop? Click. Bank of Anthos? Click.*
- Create interesting Ops scenarios on top of it.



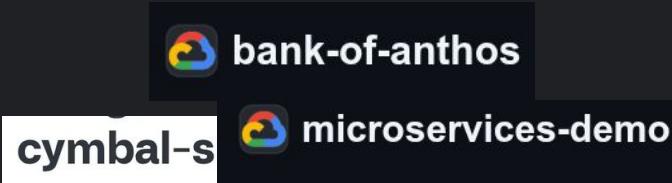
02

What is it?

What's the **vision** ?



A **GCP** teacher/student
Classroom tool to support
hackathons, labs, workshops..
using **Terraform** modules to
easily support **Ops** and
famous GCP Apps (BoA,
Boutique, ..)



The architecture

Sandmold	GCP
Classroom	GCP Folder
Class Bench	GCP Project
Seat	User / email
Application	N per project, Cardinality <= 1



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Sandmold	GCP
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(*)

Google Cloud



The architecture

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Google Cloud



The architecture

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The architecture

Sandmold	GCP
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The architecture (vision)

Sandmold	GCP
Classroom	GCP Folder
Class Bench	GCP Project
Seat	User / email
Application	N per project, <i>Cardinality <= 1</i>

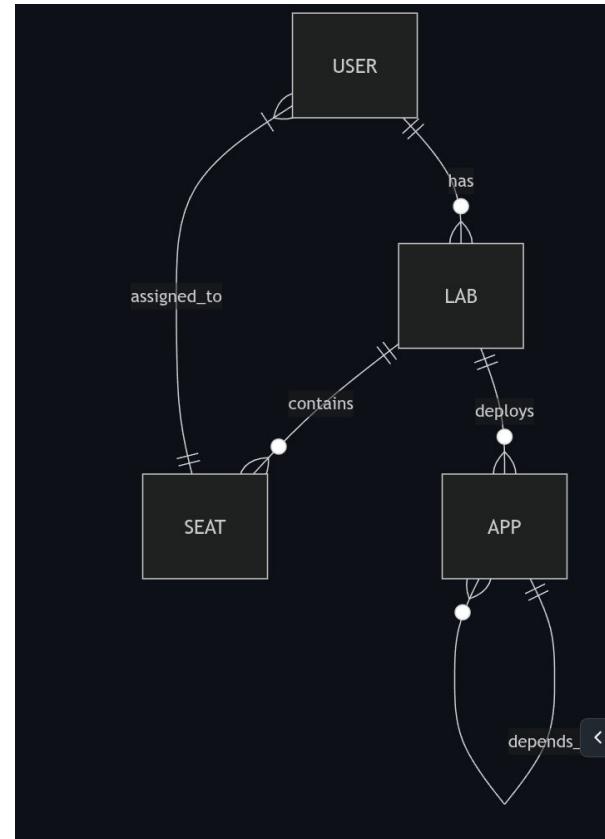
*“Break HS by bringing the PaymentService to 0 Replicas”,
“Break BoA by injecting this malicious while loop in line 42”*

Google Cloud



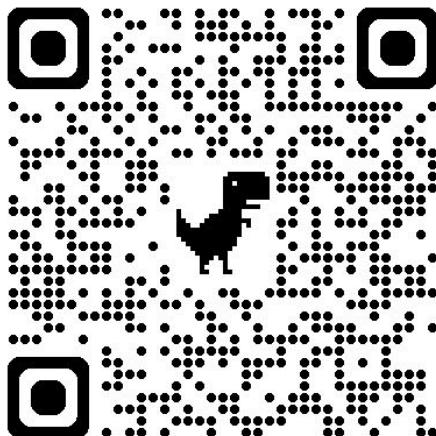
The architecture

Sandmold	GCP
Classroom	GCP Folder
ClassBench	GCP Project
Seat	User / email
Application (eg BoA)	One per project



The code

<https://github.com/Friends-of-Ricc/sandmold>



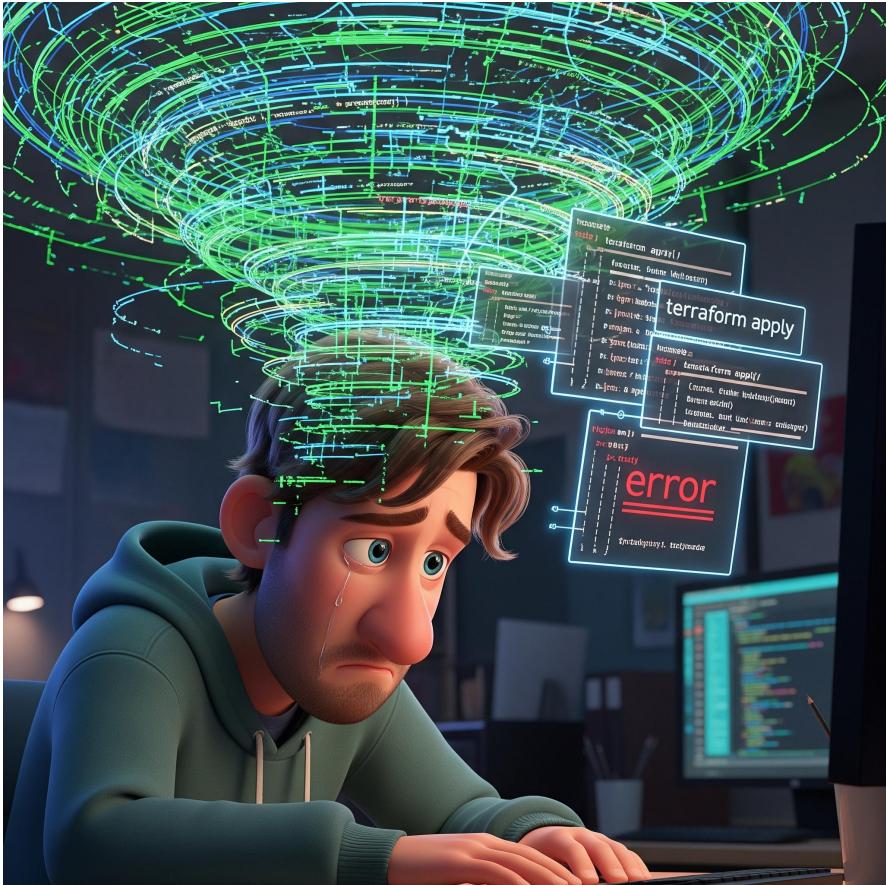
Screenshot of the GitHub repository page for `sandmold`. The repository is public and has 25 issues.

The repository structure includes:

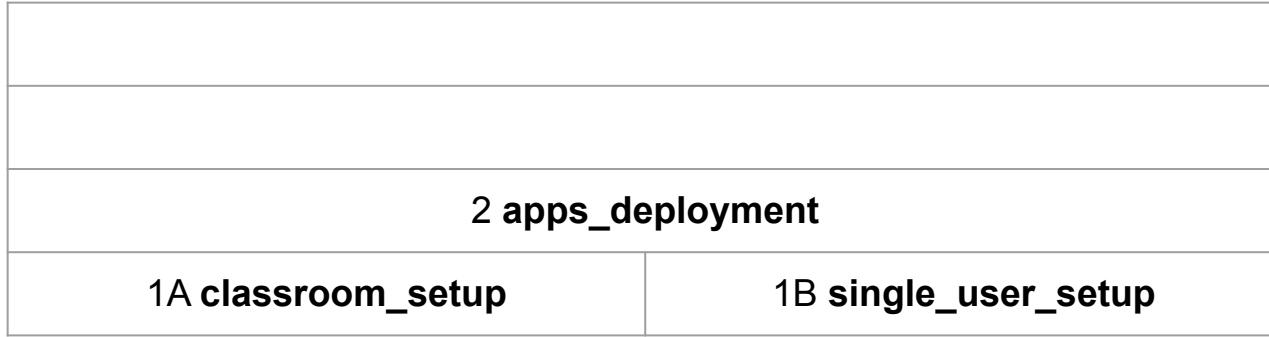
- `.gemini`: 0.5.2 cleanup github, changed ... (3 months ago)
- `applications`: 0.5.5 push pre work (3 months ago)
- `bin`: 0.5.7 taking Leonid FB onboard... (last month)
- `doc`: 0.5.7 removing Leonid from G... (22 minutes ago)
- `etc`: 0.5.7 this is the vision for the f... (last month)
- `iac`: 0.5.7 added org id (last month)
- `tests`: Fix(app-deploy): Decouple app... (3 months ago)
- `tmp`: trying #23 (3 months ago)
- `tools`: refactor(terraform): move featu... (3 months ago)
- `vendor`: added some local deps, for co... (3 months ago)

03 Implementation

Why yet another project?



TF Architecture



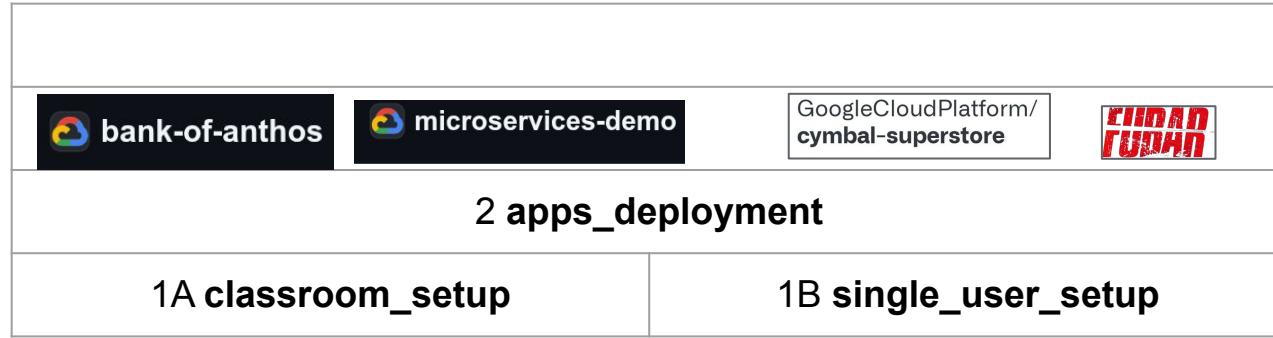
Google Cloud

```
└─ terraform
    ├─ 1a_classroom_setup
    ├─ 1b_single_user_setup
    └─ 2_apps_deployment
```

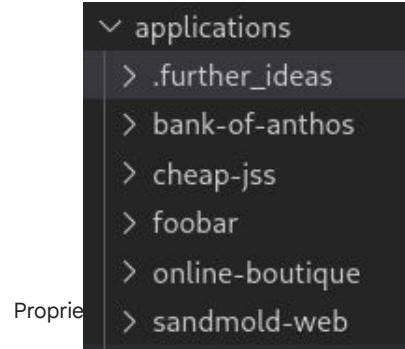
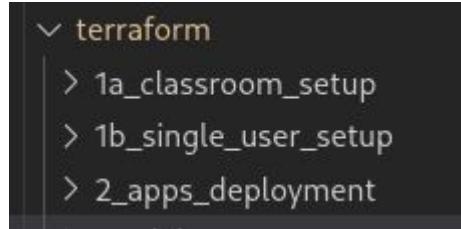
```
└─ applications
    ├─ .further_ideas
    ├─ bank-of-anthos
    ├─ cheap-jss
    ├─ foobar
    ├─ online-boutique
    └─ sandmold-web
```

Proprie

TF Architecture



Google Cloud



Proprie

TF Architecture

```
✓ terraform
  > 1a_classroom_setup
  > 1b_single_user_setup
  > 2_apps_deployment
```

Breakage scenarios? `kubectl scale --replicas=0 ...`



bank-of-anthos

microservices-demo

GoogleCloudPlatform/
cymbal-superstore

RUBIN
RUBIN

2 apps_deployment

1A classroom_setup

1B single_user_setup

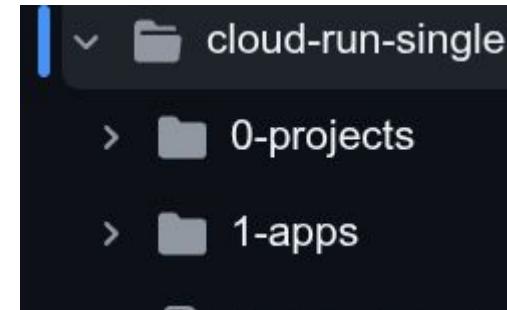
WORK IN
PROGRESS

```
✓ applications
  > .further_ideas
  > bank-of-anthos
  > cheap-jss
  > foobar
  > online-boutique
  > sandmold-web
```

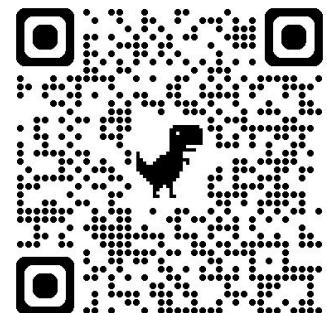
.. inspired by:



A screenshot of a GitHub repository page. The repository name is "genai-factory/cloud-run-single". The file tree shows several folders: ".github", "ai-apps-conversational", "ai-apps-search", "cloud-run-rag-search", "cloud-run-rag", and two subfolders under "cloud-run-single": "0-projects" and "1-apps". A yellow arrow points from this repository to the right-hand file tree.



<https://github.com/GoogleCloudPlatform/genai-factory>



Easy setup

(vibecoded)

```
Untitled-1

ricc@derek:~/git/sandmold$ ⚡ bin/check-setup.sh

🔍 Checking gcloud identity...
Your active configuration is: [adk10-travel-concierge-fl]
✓ gcloud user is correct (ricc@google.com)

🔍 Checking billing account...
✓ Billing account '019CB2-93215D-952A7F' is open.

🔍 Checking organization...
✓ Organization '337847326365' found: latchkey1-ephemeral-generic-sandmold-tmp-337847326365

🔍 Checking parent folder...
✓ Parent folder '665877171749' found: sandmold-tests

⚠ Skipping project creation test. To enable it, set CREATE_AND_DELETE_TEST_PROJECT=true
in your .env file.

🔍 Checking for GOOGLE_CLOUD_PROJECT...
✓ GOOGLE_CLOUD_PROJECT 'sandmold-base-project-6204' exists and is accessible.

🎉 All checks passed! Your setup seems correct.
```

Default over Configuration..



```
module.project["sep25-std-foobar03-fail"].random_string.suffix: Destroying... [id=51yj]
module.project["sep25-std-foobar01-good"].random_string.suffix: Destroying... [id=6885]
module.project["sep25-tch-cattedra"].random_string.suffix: Destroying... [id=pxbu]
module.project["sep25-std-foobar01-good"].random_string.suffix: Destruction complete after 0s
module.project["sep25-tch-cattedra"].random_string.suffix: Destruction complete after 0s
module.project["sep25-std-foobar03-fail"].random_string.suffix: Destruction complete after 0s
google_folder.classroom: Modifying... [id=folders/388362520240]
google_folder.classroom: Modifications complete after 2s [id=folders/388362520240]
module.project["oct25-std-foobar03-fail"].random_string.suffix: Creating...
module.project["oct25-tch-cattedra"].random_string.suffix: Creating...
module.project["oct25-std-foobar01-good"].random_string.suffix: Creating...
module.project["oct25-tch-cattedra"].random_string.suffix: Creation complete after 0s [id=t0y5]
module.project["oct25-std-foobar03-fail"].random_string.suffix: Creation complete after 0s [id=u666]
module.project["oct25-std-foobar01-good"].random_string.suffix: Creation complete after 0s [id=x048]
module.project["oct25-std-foobar03-fail"].google_project.new[0]: Creating...
module.project["oct25-tch-cattedra"].google_project.new[0]: Creating...
module.project["oct25-std-foobar01-good"].google_project.new[0]: Creating...
module.project["oct25-std-foobar03-fail"].google_project.new[0]: Still creating... [10s elapsed]
module.project["oct25-std-foobar01-good"].google_project.new[0]: Still creating... [10s elapsed]
module.project["oct25-tch-cattedra"].google_project.new[0]: Still creating... [10s elapsed]
```

Teacher config

- [current] Teacher is **Project owner** of students projects
 - (*if this doesn't make you wanna contribute to the repo, I don't know what does!*)
- [future] Teacher has a bunch of reasonable IAM permissions on student projects (*Network Admin, Ops Admin, Project Reader, ..*).
- [future] Students activities report important actions (eg App Installation/Deletion) via Pub/Sub to the Teacher main project.
- [future] A special **sandmold-web** app will track
 - (easy) which student project has installed app X
 - (hard) which student has done step 1,2,3 of the hackathon (configurable).

BOO!

A comprehensive test suite

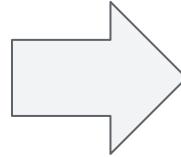
(vibecoded)

```
CREATE_AND_DELETE_TEST_PROJECT=true bin/check-setup.sh  
Allow execution of: 'CREATE_AND_DELETE_TEST_PROJECT=true'?  
• 1. Yes, allow once  
  2. Yes, allow always ...  
  3. No, suggest changes (esc)
```

```
just classroom-inspect etc/samples/classroom/with_apps.yaml  
warning: No `requires-python` value found in the workspace. Defaulting to Python 3.8  
👤 Checking gcloud Identity...  
Your active configuration is: [sandmold-ricc-google]  
- User: admin@sredemo.dev  
- Target Org: sredemo.dev (791852209422)  
- Domain match confirmed.  
⌚ Checking Billing Account: 018C68-C51FDE-8581DE  
- Name: TryGcp HighRep from Val to test b432463553  
- Status: Open  
- Currency: USD  
- Link: https://console.cloud.google.com/billing/018C68-C51FDE-8581DE  
- Parent: organizations/426276118631 (palladius.joonix.net)  
🌳 Exploring parent folder (145148235846) in Org: 791852209422  
- Link to Org Resource Manager: https://console.cloud.google.com/organizations/791852209422/resourceManager  
└─ h9oct25-class-with-apps-v2-k3 (682089598943)  
   └─ ✘ std-h9oct25-foobar01-good-4mwq (std-h9oct25-foobar01-good-4mwq)  
   └─ ✘ std-h9oct25-foobar03-fail-h34x (std-h9oct25-foobar03-fail-h34x)  
   └─ ✘ tch-h9oct25-cattedra-uto3 (tch-h9oct25-cattedra-uto3)  
└─ ✘ tmp-deleteme-1757334904 (tmp-deleteme-1757334904)
```

From YAML to Cloud Console..

```
etc/samples/classroom/with_apps.yaml
1 apiVersion: sandmold.io/v1alpha1
2 kind: Classroom
3 metadata:
4   name: class-with-apps-v2
5   labels:
6     classroom: class-with-apps
7   author: ricc
8   env: test
9 spec:
10   folder:
11     resource_prefix: "oct25"
12     description: |
13       Class generated by Gemini to test the app
14   teachers:
15     - leoy@google.com
16     - ricc@google.com
17   env:
18     - name: GOOGLE_CLOUD_REGION
19     value: europe-west1
20 schoolbenches:
21   - project: cattedra
22     desk-type: teacher
23     apps:
24       - name: bank-of-anthos
25       - name: sandmold-web
26     seats:
27       - rice@google.com
28   - project: foobar01-good
29     seats:
30       - student01@gmail.com
31       - student02@gmail.com
32     apps:
33       - name: foobar
34       - name: online-boutique
35   - project: foobar03-fail
36     seats:
37       - admin@sredemo.dev
38     env:
39       - name: AUTO_FAIL
40       value: "true"
41 common:
42   schoolbenches:
43     foreach_project:
44       applies_to: ALL_STUDENTS
45     apps:
46       - name: foobar
```



```
20 schoolbenches:
21   - project: cattedra
22     desk-type: teacher
23     apps:
24       - name: bank-of-anthos
25       - name: sandmold-web
26     seats:
27       - ricc@google.com
28   - project: foobar01-good
29     seats:
30       - student01@gmail.com
31       - student02@gmail.com
32     apps:
33       - name: foobar
34       - name: online-boutique
35   - project: foobar03-fail
```

oct25-class-with-apps-v2-jwxq	oct25-tch-cattedra-t0y5	oct25-std-foobar01-good-x048	oct25-std-foobar03-fail-u666
665877171749	388362520240	oct25-tch-catt...	oct25-std-foob...
8 October 2023	8 October 2023	—	—

[future] setup from Trix

(COPY ME) [Sandmold] sample class -- from pbt@

File Edit View Insert Format Data Tools Extensions Help

100% | Default... | - 10

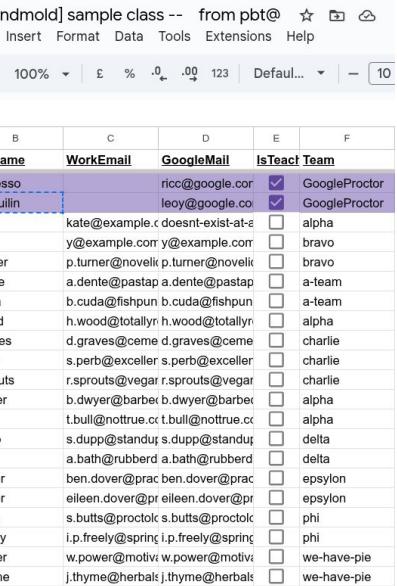
	A	B	C	D	E	F
1	Name	Surname	WorkEmail	GoogleMail	IsTeach	Team
2	Riccardo	Calresso		ricc@google.cor	<input checked="" type="checkbox"/>	GoogleProctor
3	Leonid	Jankuilin		leoy@google.co	<input checked="" type="checkbox"/>	GoogleProctor
4	Kate	K	kate@example.c	doesn't-exist-at-a	<input type="checkbox"/>	alpha
5	Leonid	Leo	y@example.corr	y@example.cor	<input type="checkbox"/>	bravo
6	Paige	Turner	p.turner@novelic	p.turner@novelic	<input type="checkbox"/>	bravo
7	Al	Dente	a.dente@pastap	a.dente@pastap	<input type="checkbox"/>	a-team
8	Barry	Cuda	b.cuda@fishpun	b.cuda@fishpun	<input type="checkbox"/>	a-team
9	Holly	Wood	h.wood@totallyr	h.wood@totallyr	<input type="checkbox"/>	alpha
10	Doug	Graves	d.graves@ceme	d.graves@ceme	<input type="checkbox"/>	charlie
11	Sue	Perb	s.perb@exceller	s.perb@exceller	<input type="checkbox"/>	charlie

(WIP)

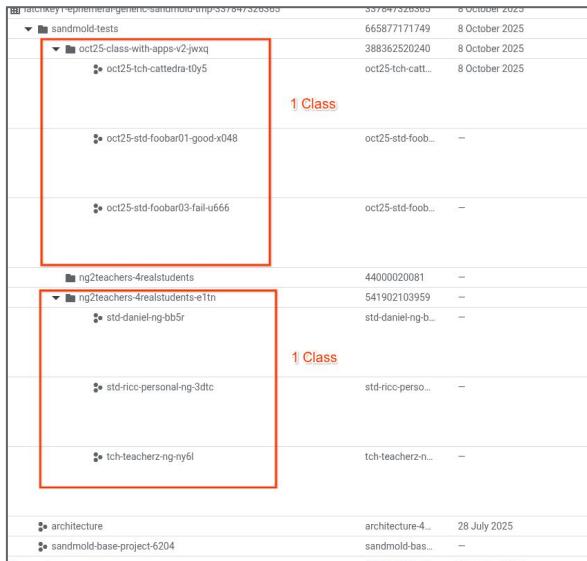
1	Name	Surname	WorkEmail	GoogleMail	IsTeach	Team
2	Riccardo	Calresso		ricc@google.cor	<input checked="" type="checkbox"/>	GoogleProctor
3	Leonid	Jankuilin		leoy@google.co	<input checked="" type="checkbox"/>	GoogleProctor
4	Kate	K	kate@example.c	doesn't-exist-at-a	<input type="checkbox"/>	alpha

[future] setup from Trix

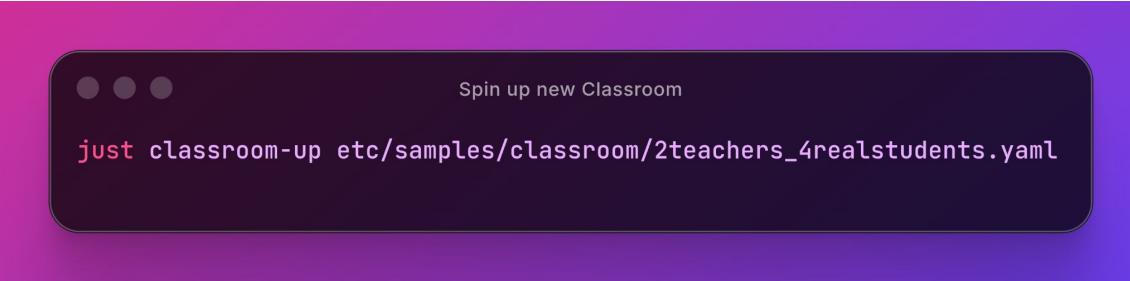
ndmold] sample class -- from pbt@



B	C	D	E	F
Name	WorkEmail	GoogleMail	IsTeach Team	Team
jill	ricc@google.com leoy@google.co	ricc@google.com leoy@google.co	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	GoogleProctor GoogleProctor
kate@example.com	dneesn@totallyn!y@example.com	alpha	<input type="checkbox"/>	
y@example.com	y@example.com	bravo	<input type="checkbox"/>	
p.turner@novelli	p.turner@novelli	bravo	<input type="checkbox"/>	
a.dente@pastap	a.dente@pastap	a-team	<input type="checkbox"/>	
b.cuda@fishpun	b.cuda@fishpun	a-team	<input type="checkbox"/>	
h.wood@totallyn!	h.wood@totallyn!	alpha	<input type="checkbox"/>	
d.graves@ceme	d.graves@ceme	charlie	<input type="checkbox"/>	
s.perb@exceller	s.perb@exceller	charlie	<input type="checkbox"/>	
r.sprouts@vegar	r.sprouts@vegar	charlie	<input type="checkbox"/>	
b.dwyer@barber	b.dwyer@barber	alpha	<input type="checkbox"/>	
t.bull@nottrue	t.bull@nottrue	alpha	<input type="checkbox"/>	
s.dupp@standu	s.dupp@standu	delta	<input type="checkbox"/>	
a.bath@rubberd	a.bath@rubberd	delta	<input type="checkbox"/>	
ben.dover@prac	ben.dover@prac	epsilon	<input type="checkbox"/>	
eilleen.dover@pr	eilleen.dover@pr	epsilon	<input type="checkbox"/>	
s.butts@proctok	s.butts@proctok	phi	<input type="checkbox"/>	
i.p.freely@spri	i.p.freely@spri	phi	<input type="checkbox"/>	
w.power@motiv	w.power@motiv	we-have-pie	<input type="checkbox"/>	
j.thyme@herbal	j.thyme@herbal	we-have-pie	<input type="checkbox"/>	



Create a Classroom



Classroom Provisioning Successful

Class Details

- **Workspace Name:** class-with-apps-fixed
- **Folder Name:** class-with-apps-fixed
- **Folder ID:** 234956482195
- **Description:** Class generated by Gemini to test the apps in the common section.
- **Teachers:** leoy@google.com, ricc@google.com
- **Student Count:** 5
- **Project Count:** 4

⚡ Handy Commands

```
# To tear down this specific classroom:  
just teardown-classroom etc/samples/class_with_apps.yaml  
  
# To re-provision this specific classroom:  
just setup-classroom etc/samples/class_with_apps.yaml  
  
# To run a preflight check on this classroom:  
just preflight-check etc/samples/class_with_apps.yaml
```

Google

Student & Project Assignments

Student & Project Assignments

Student Email	Project ID
student01@gmail.com	N/A
student02@gmail.com	N/A
ricc@google.com	N/A
leoy@google.com	N/A
admin@srdemo.dev	N/A

Project Details

Project Name	Project ID	Users	Applications (Planned)
val-std-foobar01-good	val-std-foobar01-good-dkqj	N/A	-
val-std-foobar02-good	val-std-foobar02-good-x6x4	N/A	-
val-std-foobar03-fail	val-std-foobar03-fail-aiup	N/A	-
val-tch-cattedra	val-tch-cattedra-urh5	N/A	-

TODO: Next Steps

The core infrastructure for your classroom is now ready. The next step is to deploy the applications to the student projects.

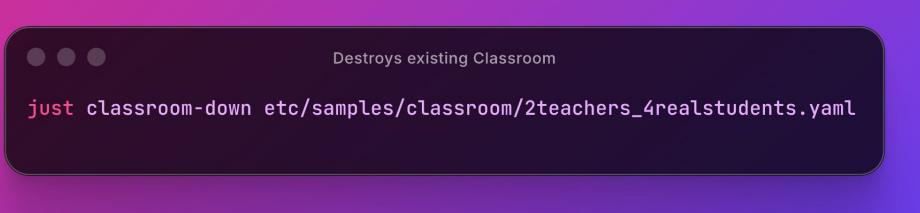
1. Review the application blueprints in the `applications/` directory.
2. Run the application deployment stage (currently under development).

REPORT.md

Proprietary & Confidential

30

Nuke a Classroom



Google Cloud

Classroom Destroyed

Timestamp: 2025-10-08 16:35:46

Class Details

- Workspace Name:** ng2teachers-4realstudents
- Original Folder Name:** None
- Original Folder ID:** None
- Description:** Class with 3 teachers and 4 real students

⚡ Handy Commands

```
# To re-provision this specific classroom:  
just classroom-up etc/samples/classroom/2teachers_4realstudents.yaml
```

对学生 & 项目分配

All projects and resources for this classroom have been destroyed.

Create a SingleUser classroom



Create single user setup

```
just user-up 'etc/samples/single_user/light.yaml'
```

04

Lesson learnt

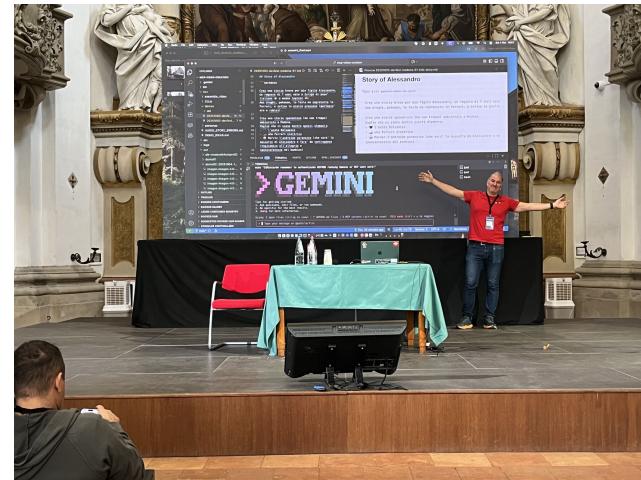
What worked? What didn't?



Gemini CLI is good at TF!

GCLI is amazing for Feedback Loop TF coding:

- GC: I wrote this TF code for you, of course it will run!
 - Ricc: run it then
 - GC: of course!
 - Syntax error at line 42: ...
 - Woops.. Fixing code...
 - Rerunning code ...
 - Syntax error at line 142: ...
 - Fixing code...
 - Terraform applied correctly!
 - Ricc: told ya!





Org policies ~~suck~~ are hard

You can't add non-Googlers to a Google org, highly **restricting** this setup.

[BLOCKER] Can't add a GMail or Other-Org user to your projects.

If your org is “**well configured**”, Classroom creator and Classroom consumer tend to be co-located in same org.





Folders are hard

It's easy to ask people for a `PROJECT_ID`.

It's hard to ask people for a `FOLDER_ID`: they need an `ORGANIZATION_ID` and all the 🚓 Org Policy shenanigans kick in.





Ricc likes his scripts, others don't



I tend to assume people's setup to be similar to mine.

So I get caught in "why does the setup need `justfile/jq/yq/lolcat...`"?

Note to self: if a script is not on *Cloud Shell*, do without or document it as an explicit dependency.



Terraform in google.com is hard!

I have no access to **Argolis**.

Filing a **CL/** for every ephemeral project I spin up and down?

Countless Billing limitations, limit to # projects. Destroyed after 30d -> but still counting towards quota.

If your org is “**w90 days ephemeral Org**” worked best for me:

[go/multiorg-create-ephemeral-90](#)

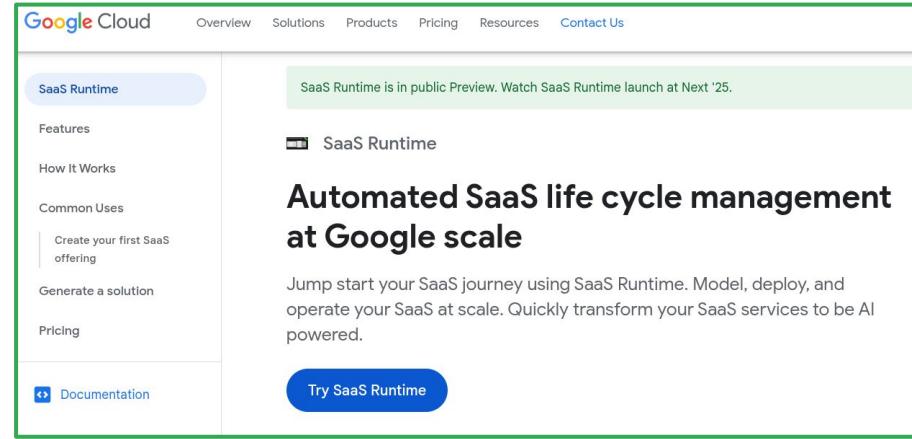
My Latchkey ephemeral Org...

 latchkey1-ephemeral-generic-sandmold-tmp-337847326365	 sandmold-base-project-6204	337847326365
	 std-d9oct25-foobar03-fail-ovo	std-d9oct25-fo...
	 tch-d9oct25-cattedra-sd9	tch-d9oct25-c...
	 ng2teachers-4realstudents	44000020081
	 ng2teachers-4realstudents-e1tn	541902103959
	 sredemo.dev	791852209422
	 google.com	433637338589
	 nallidius.iconix.net	426276119621

SaaS Runtimes are cool!

An *opinionated Infra Manager* offering for BIG partners

- Create a **SaaS offering**
- Create a **UnitKind** for every matrioska of your infra.
 Define Inputs/Outputs/Deps
- Instantiate **UK** into **Units**
- And now ship!
 - Create **releases** (*multi version*)
 - Create *muti-regional*, **rollouts**
 - Organize in *rollout kinds*
- Add **Tenants** ftw
- ChangeManagement + Terraform at scale!



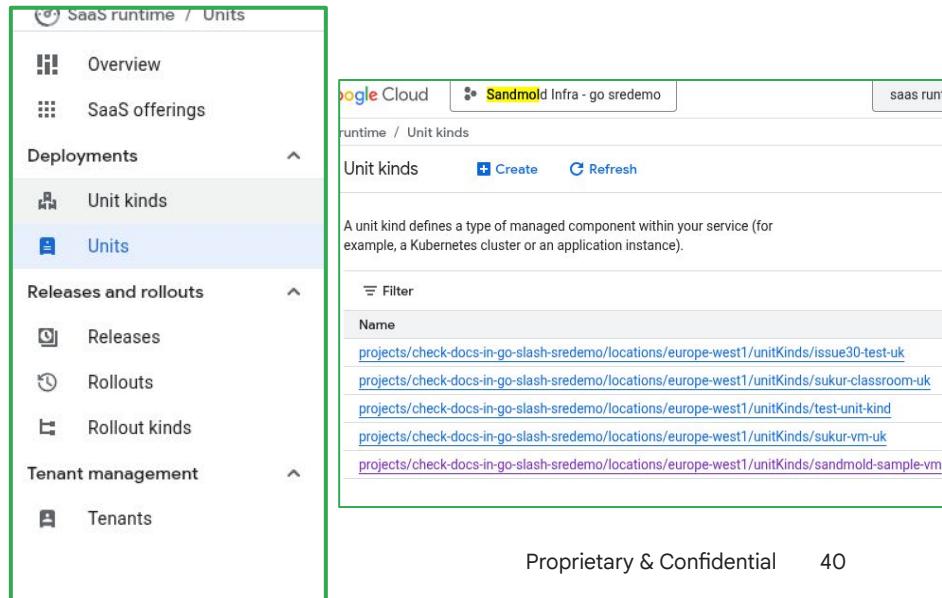
SaaS Runtime is in public Preview. Watch SaaS Runtime launch at Next '25.

SaaS Runtime

Automated SaaS life cycle management at Google scale

Jump start your SaaS journey using SaaS Runtime. Model, deploy, and operate your SaaS at scale. Quickly transform your SaaS services to be AI powered.

Try SaaS Runtime



SaaS runtime / Units

Unit kinds [Create](#) [Refresh](#)

A unit kind defines a type of managed component within your service (for example, a Kubernetes cluster or an application instance).

Name
projects/check-docs-in-go-slash-sredemo/locations/europe-west1/unitKinds/issue30-test-uk
projects/check-docs-in-go-slash-sredemo/locations/europe-west1/unitKinds/sukur-classroom-uk
projects/check-docs-in-go-slash-sredemo/locations/europe-west1/unitKinds/test-unit-kind
projects/check-docs-in-go-slash-sredemo/locations/europe-west1/unitKinds/sukur-vm-uk
projects/check-docs-in-go-slash-sredemo/locations/europe-west1/unitKinds/sandmold-sample-vm

Thank you



[go/sandmold](https://github.com/strebet/friction)
[go/sandmold-slides](https://github.com/strebet/friction-slides)
[go/sandmold-code](https://github.com/strebet/friction-code)

Try it? [go/friction-log](#) -> share w/ ❤ ricc@

The screenshot shows two terminal windows side-by-side. The left window displays a friction log for a project named 'friction' created by 'ricc' on September 12, 2025. It includes fields for Username (strebet), Date (Sep 12, 2025), Use case (empty), OS environment (Cloud Workstation, Debian), Product(s) used (ArgoCI self-managed org), Programming languages (empty), and Color Coding (empty). The right window shows the 'Friction Log of Sandmold installation' with instructions for setting up a GitHub action. The instructions include steps for creating a GitHub action workflow file, setting up secrets, and running the workflow. A note at the bottom of the log says: "Sandmold - the world mold sounds offputting, but that's my personal phobia of mold."

Google Cloud





Enter Sandmold!

Create a Sandboxed Playground to run GCP labs in a fire-and-forget Folder

Readme

Apache-2.0 license

Contributing



Riccardo Carlesso
Developer Advocate

Google Cloud

15 October 2025

Proprietary & Confidential



Slides graveyard

TITLE'S ARROUAD

• The title's arrouad is the one that makes me get chills.

HERE LIES FARQUAD

SOPPAIST

• Wrocks wi clu ditz ois ois out
• attas titons titres titon ois
• brennassassat peccat queats
• brenn brenn ois gounds

TITLE WOIN

• Pitter totter terror ois. I'll just over it or else it's irretrievable

- Attenou ois. I'll just wock up the screen
- Ewoks ois toots wi brenn brenn
- Bremm ois bremm ois bremm bremm
- Coochies ois coochies ois coochies

DANCE FRACONS

CHERE RUNK

GAMRES GERLIS

PORI MUN

BERES CARQUEST

DONKEY'S ANCESTORS

- Blaas ta thala wal
- corrut carful cheaby
- driftin' on a leafbed
- Stree forests tha pan
- and hair alcas shals
- frol mactha cities

Annoyin' and accid
Vics, eur blacca and kah
murn.

DONKEY'S ANCESTORS

- Nicer wo msh tha tibe:
- swelled land tied and yan
- Oheemstar be brennas
- tailminn ois farcio
- Corang-jim: anndes rayton
- does on reatty
- Mirgo oo or han antped on chec'
- sasses and thel limes
- baal there dico portefan

SHREIK

Scenarios



- **Hackathon at customer site.** Customer pays. Customer provides a list of emails, and makes you folder owner (possibly through a customer GAIA)
- **Onramp-based hackathon.** With **preregistration**, we can “overprovision” 1 project per person (knowing that only ~40% of people will come -> empty project)
- **Google-paid workshop.** We can tear up the lab for N people, ask for emails in a spreadsheet and associate one project per person (or 1 every N people if it's a team). We can then tear down easily after the event, containing the costs!





