



Cloud/Container based Integrated Development Environments

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Chief Technologist, Novatec



#whoami



matthiashaeussler



@maeddes



NOVATEC

Chief Technologist

Hochschule
für Technik
Stuttgart

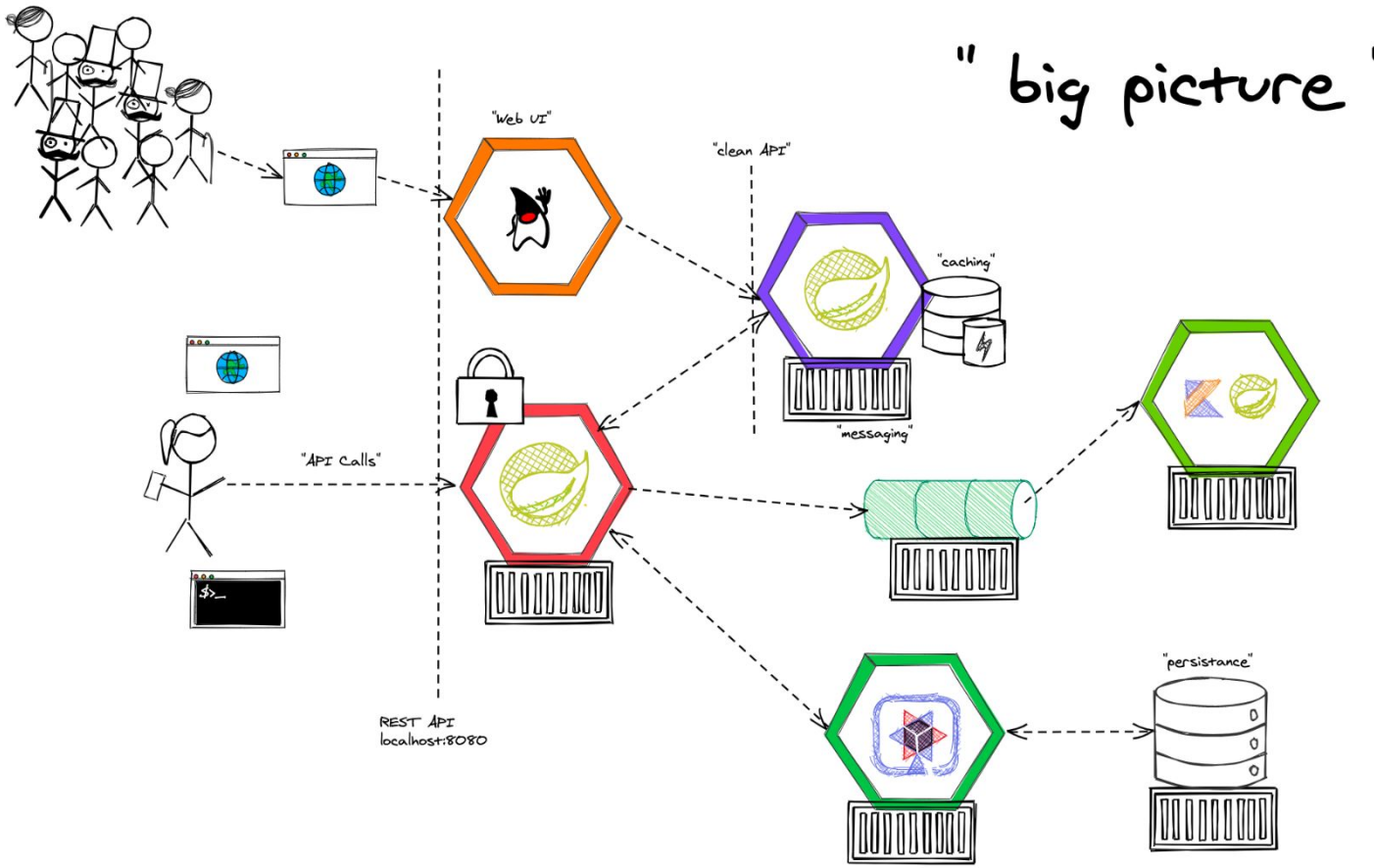
ESSLINGEN
UNIVERSITY

For people and technology.

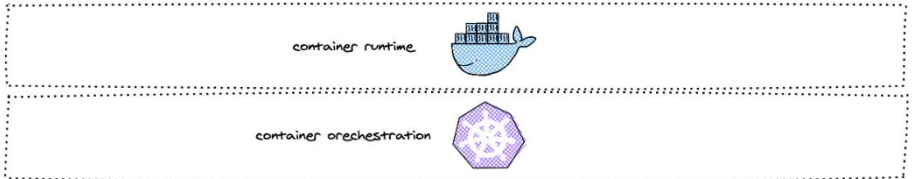
Distributed Systems

Why this talk?

"big picture"

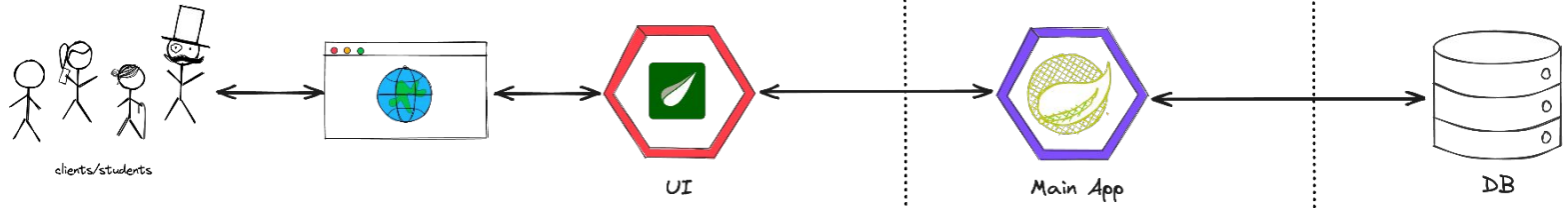


- polyglot / poly-framework architectures
- clean API
- secure
- containerized
- customizable



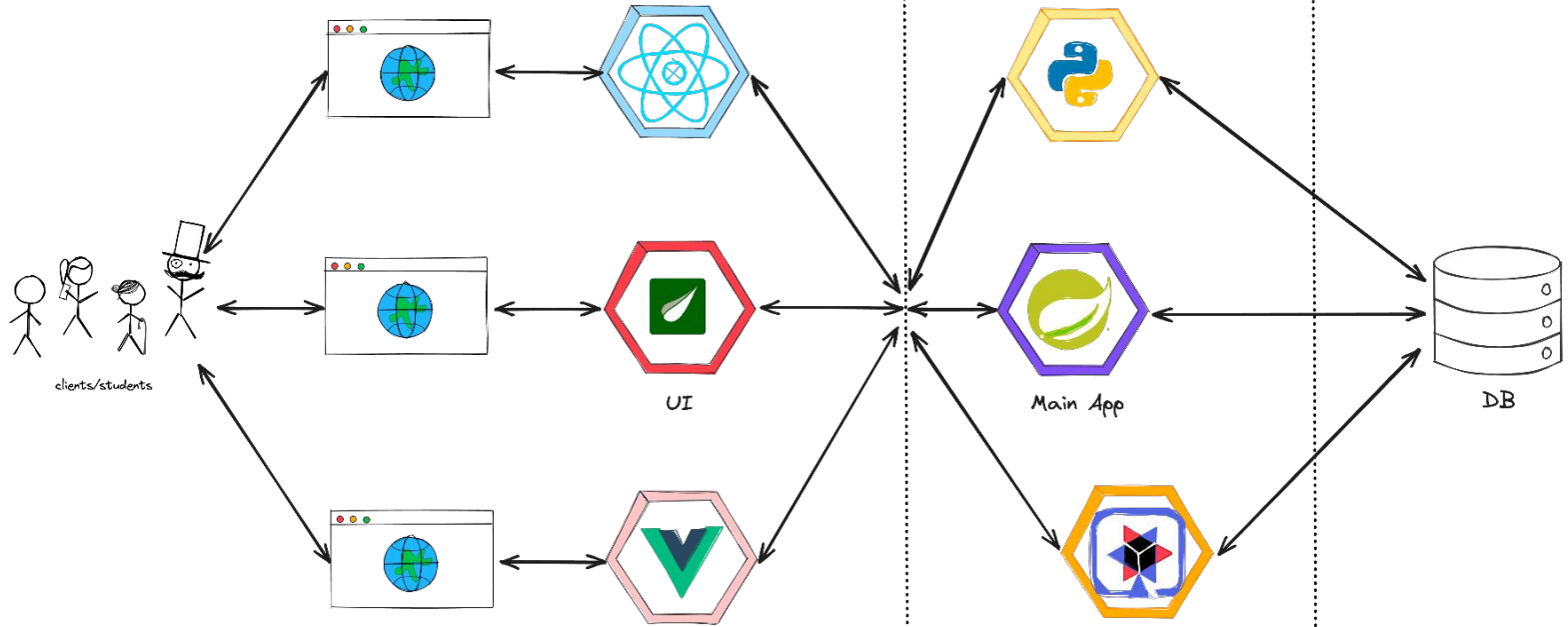
REST API

Persistence API



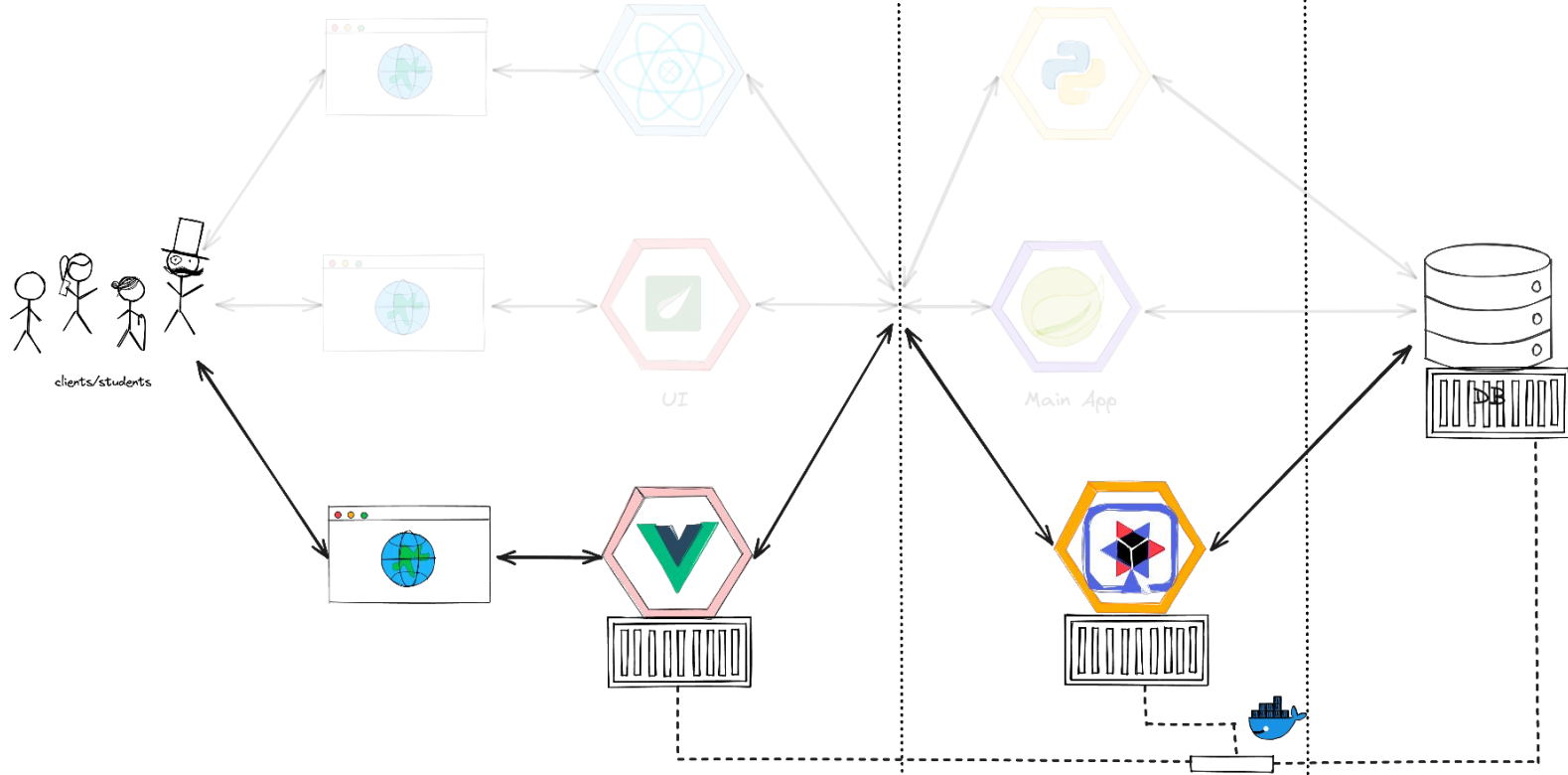
REST API

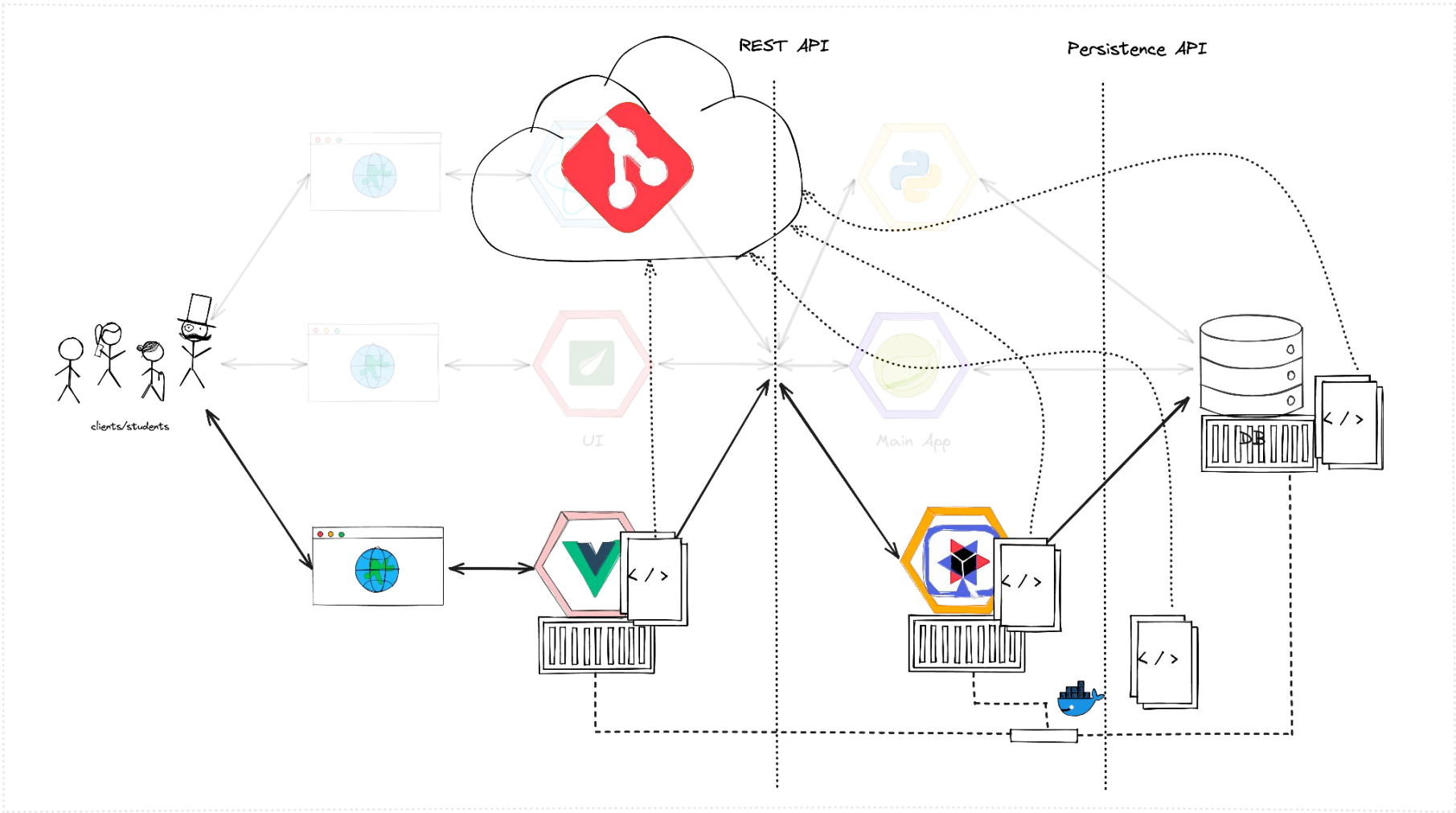
Persistence API



REST API

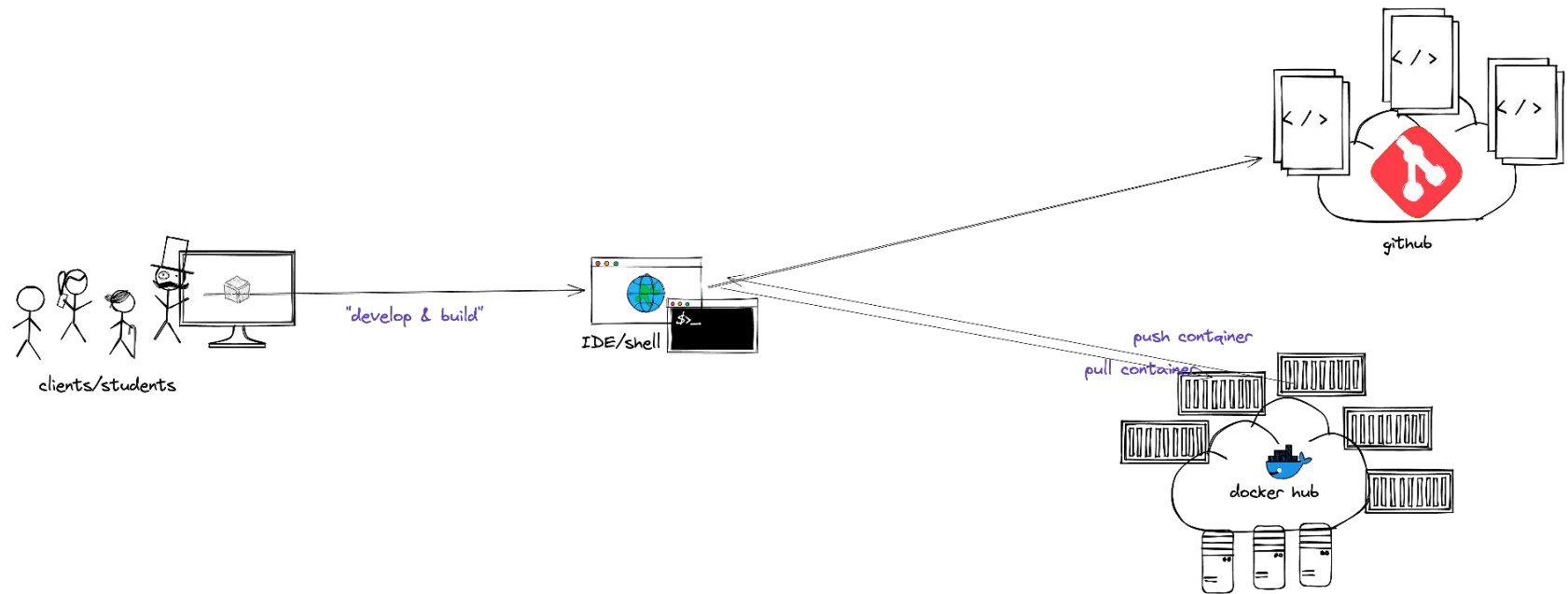
Persistence API

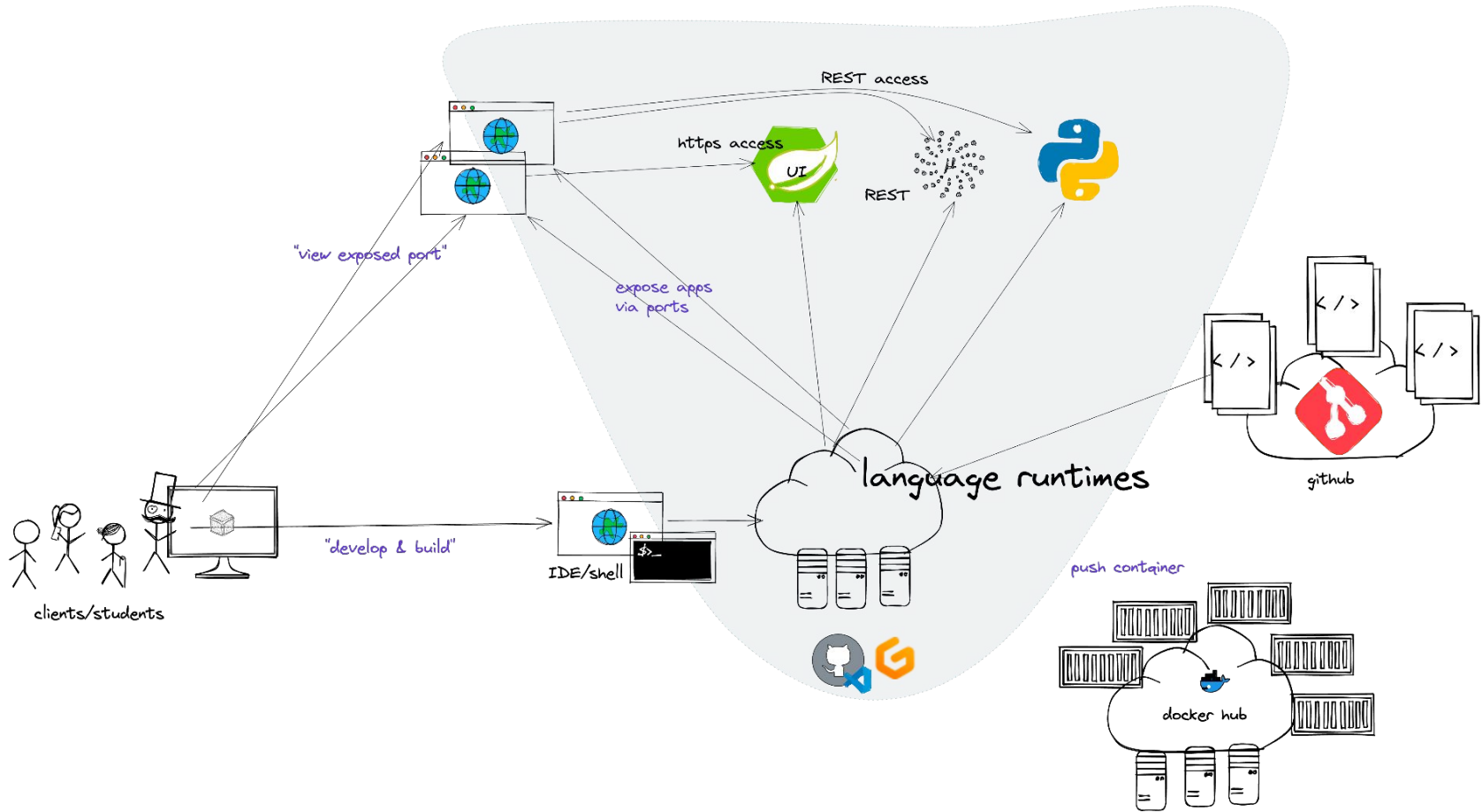


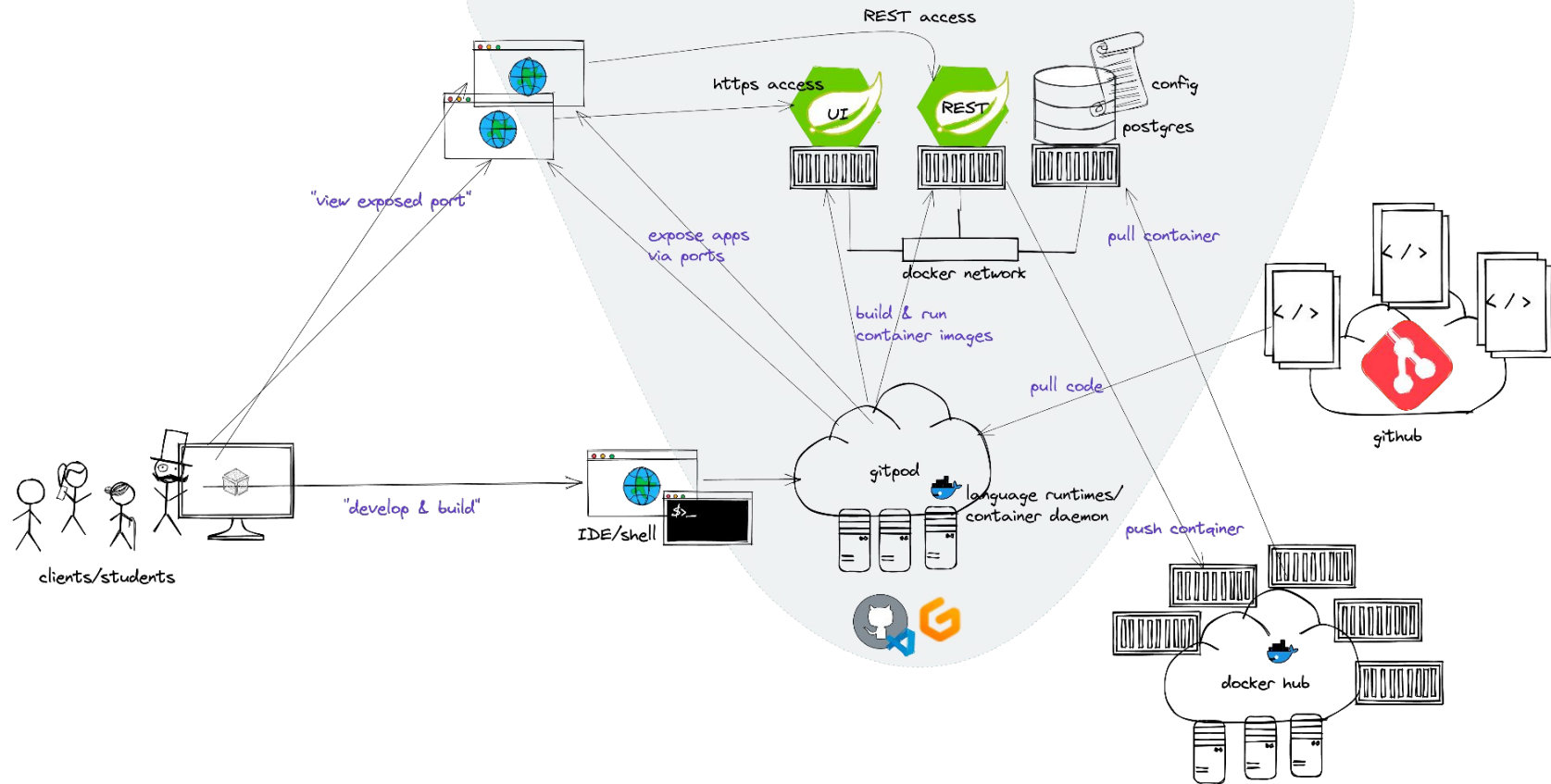


Problems?

- Programming Skill
- Container Skill
- Operating System Skill
- Remote Debugging
- Local (dev) environment setup








Free trials

BALANCE

496.39 Credits

99% remaining Monthly limit: 500 Credits




CURRENT PERIOD
Aug 22, 2023 – Sep 22, 2023 View Usage →

CURRENT PLAN

Free

✔ **500 credits**
50 hours of Standard workspace usage.

 **Codespaces**
Included quotas reset in 29 days. [See billing documentation](#)

Usage hours 0.00 of 120.00 included core hours used \$0.00


Core hours are calculated by multiplying the compute types by their per-hour rates, which can vary

| | Included | Paid | Price / hour | Total |
|---------|----------|------|--------------|--------|
| 2-core | 0.00 | 0.00 | \$0.18 | \$0.00 |
| 4-core | 0.00 | 0.00 | \$0.36 | \$0.00 |
| 8-core | 0.00 | 0.00 | \$0.72 | \$0.00 |
| 16-core | 0.00 | 0.00 | \$1.44 | \$0.00 |
| 32-core | 0.00 | 0.00 | \$2.88 | \$0.00 |













GitHub

 **cloud-ide** Public

 Pin  Unwatch 1  Fork 0  Star 0

 main  1 branch  0 tags Go to file Add file <> Code Gitpod

| maeddes stuff | |
|-------------------------------------------------------------------------------------------------|----------------|
|  .devcontainer | more docs and |
|  .vscode | more docs and |
|  sample-app | update |
|  LICENSE | Initial commit |
|  braindump.md | stuff |

Local
Codespaces

Codespaces + ⋮


Your workspaces in the cloud


On current branch


legendary goggles ● Active ⋮


main No changes


Codespace usage for


 Open in ... →


 Rename

 Export changes to a branch


 Change machine type

 Keep codespace


 Stop codespace

 Delete

Help people interested in this repository understand your project by adding a README file. [Add a README](#)

About 

No description, website, or topics provided.

-  MIT license
-  Activity
-  0 stars
-  1 watching
-  0 forks

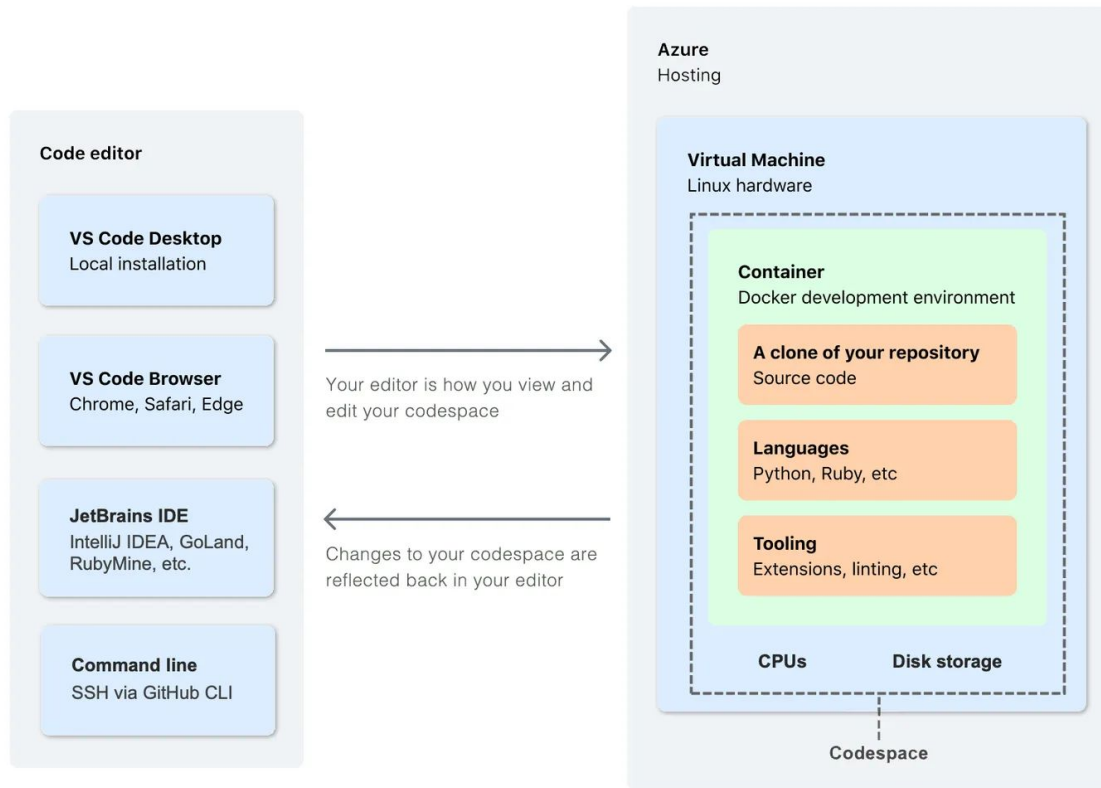
Releases

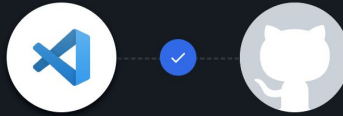
No releases published
[Create a new release](#)

Packages

No packages published
[Publish your first package](#)

Support





GitHub for VS Code is requesting additional permissions



GitHub for VS Code by Visual Studio Code

would like additional permissions to



Codespace

Manage codespaces



Personal user data

Email addresses (read-only), profile information (read-only)




Existing access

✓ Full control of private repositories

✓ Update github action workflows

Organization access

 dqualizer ✓

 NovatecConsulting ✓

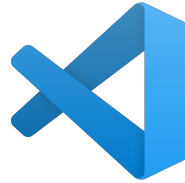
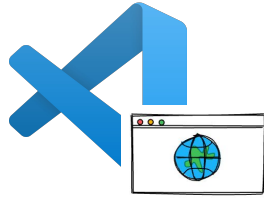
Cancel

Authorize Visual-Studio-Code

Authorizing will redirect to
<https://vscode.dev>

Support

IDEs



git



Cloud



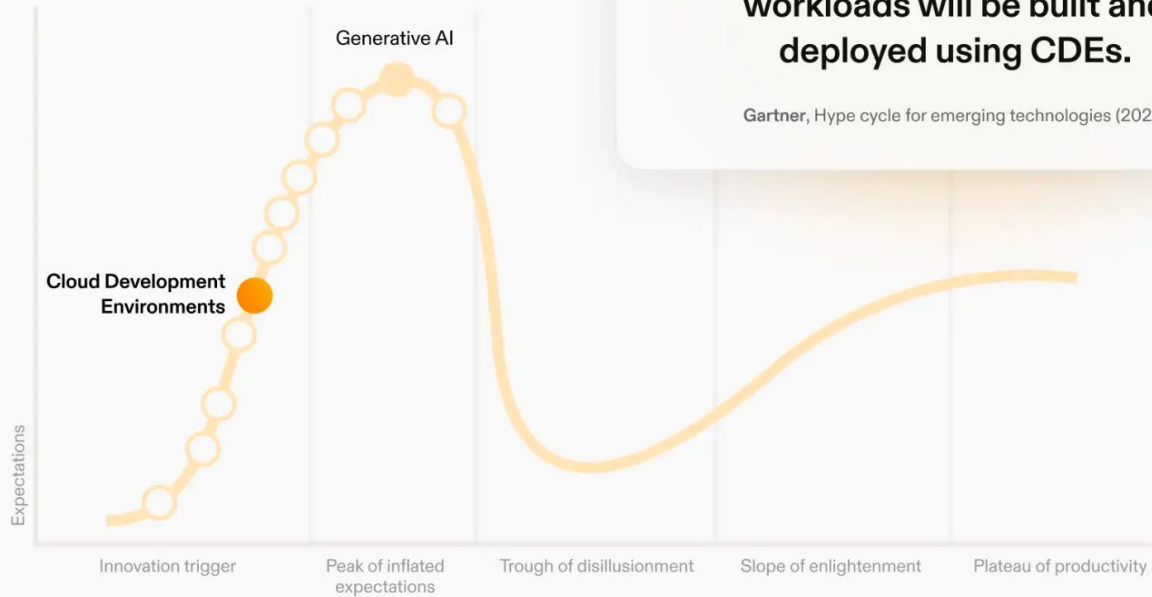
Codespaces “Light”

<https://github.com/maeddes/cloud-ide>



<https://github.dev/maeddes/cloud-ide>





“ **By 2026, 60% of cloud workloads will be built and deployed using CDEs.** ”

Gartner, Hype cycle for emerging technologies (2023)

maeddes-cloudide-aru3608gi1p.ws-eu104.gitpod.io

J DemoApplication.java 1, M

sample-app > src > main > java > com > example > demo > J DemoApplication.java > DemoApplication > main(String[])

```

1 package com.example.demo;
2
3 import org.springframework.boot.SpringApplication;
4 import org.springframework.boot.autoconfigure.SpringBootApplication;
5 import org.springframework.web.bind.annotation.GetMapping;
6 import org.springframework.web.bind.annotation.RestController;
7
8
9 @SpringBootApplication
10 @RestController
11 public class DemoApplication {
12
13     @GetMapping
14     public String sayHello(){
15
16         return "Hello";
17     }
18
19     @PostMapping
20
21     public
22
23 }
24
25

```

You, 1 second ago | 2 authors (Matthias Haeussler and others)

You, 1 second ago | 2 authors (Matthias Haeussler and others)

Run |

gitpod / workspace

PROBLEMS 1

gitpod / workspace

INSOLE

OUTLINE

TIMELINE

MAVEN

JAVA PROJECTS

- demo
 - src/main/java
 - com.example.demo
 - DemoApplication + 1, M
 - src/main/resources
 - src/test/java
 - JRE System Library [JavaSE-17]
 - Maven Dependencies

Support

Connect Git provider



Select your cloud - yours or ours



Choose IDEs and editors





~~Codespaces~~ but...



Open Source

No vendor lock-in. 100% free and open source built by developers for developers.



Client Only

No server side setup needed. Download the desktop app or the CLI to get started.



Unopinionated

Repeatable dev environment for any infra, any IDE, and any programming language.

Download DevPod



Mac (Silicon)



Mac (Intel)



Windows



Linux



Other

Support

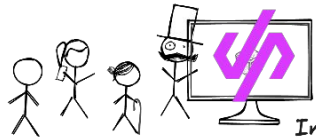
IDEs



git*

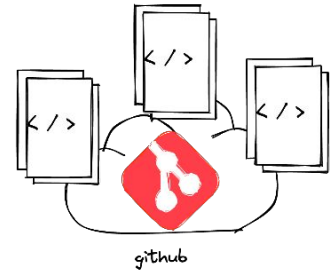
Cloud



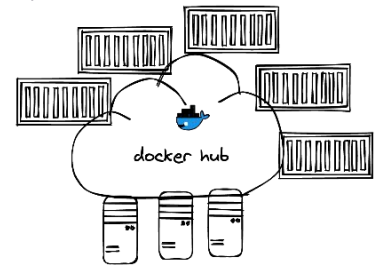


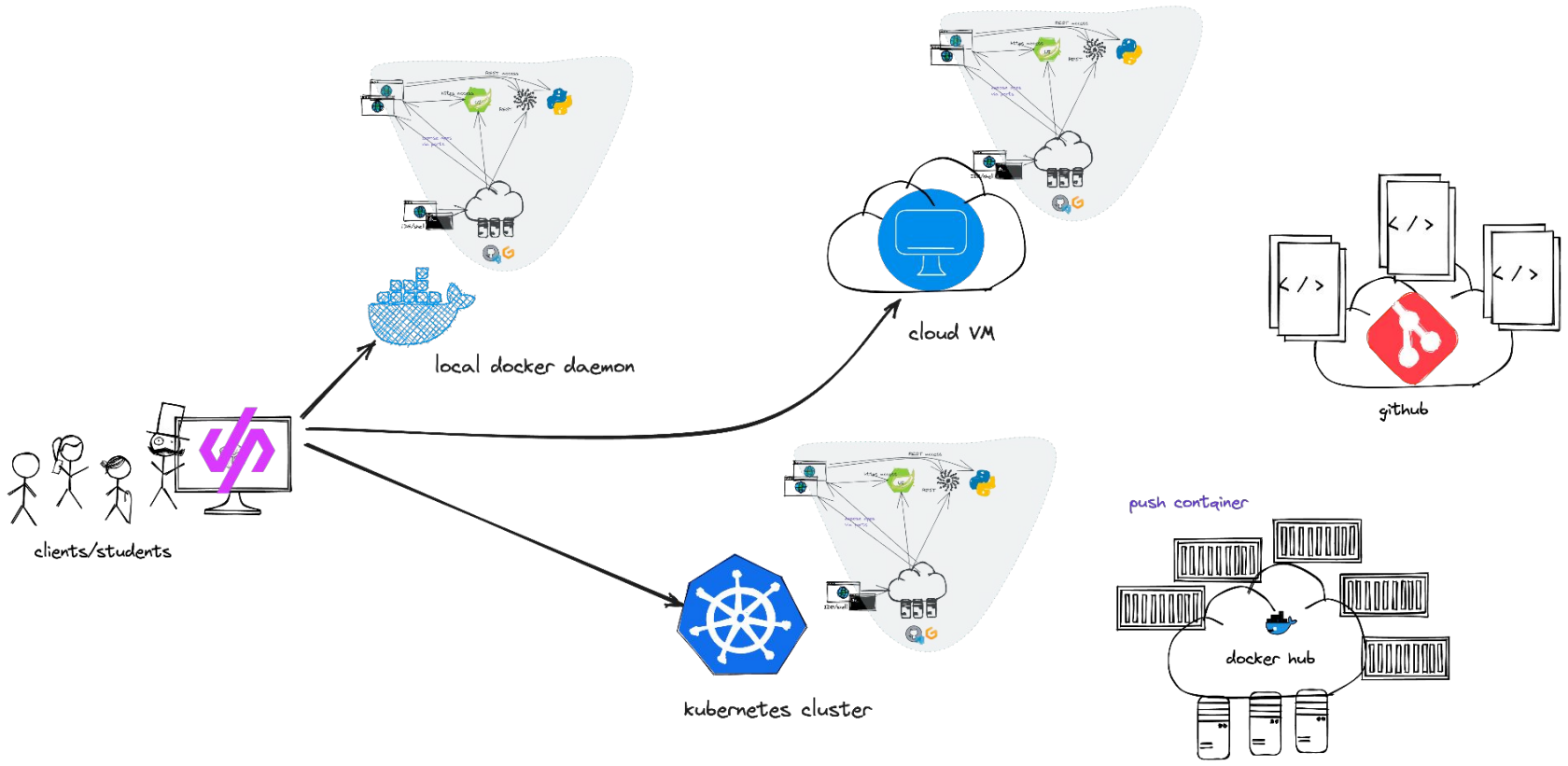
Install as client app

clients/students



push container









! .gitpod.yml M ×

! .gitpod.yml > ...

You, 39 seconds ago | 2 authors (You and others) | Gitpod Configuration - config

```
1 # Image of workspace. Learn more: https://www.gitpod.io
2 image: gitpod/workspace-full:latest
3
4 # List the start up tasks. Learn more: https://www.gitpod.io
5 tasks:
6   - name: Script Task
7     init: echo 'init script' # runs during prebuild =>
8     command: echo 'start script'
9
10 # List the ports to expose. Learn more: https://www.gitpod.io
11 ports:
12   - name: Frontend
13     description: Port 3000 for the frontend
14     port: 3000
15     onOpen: open-preview
16
17 # Learn more from ready-to-use templates: https://www.gitpod.io
18
```

! .gitpod.yml M  Dockerfile-gitpod-full-java21 ×

 Dockerfile-gitpod-full-java21 > ...

You, 3 days ago

```
1 # ALWAYS FOLLOW LINK (cmd + click) https://www.gitpod.io/docs
2 FROM gitpod/workspace-full
3
4 USER gitpod
5
6 # INSTALL LATEST JAVA
7 RUN bash -c ". /home/gitpod/.sdkman/bin/sdkman-init.sh && \
8     echo y|sdk install java"
9
10 # INSTALL COOL STUFF
11 RUN brew install fzf exa buildpacks/tap/pack kubectl
12 RUN yes | $(brew --prefix)/opt/fzf/install
13
14 # DEFAULT TO ZSH
15 ENV SHELL=/usr/bin/zsh
16
```



! .gitpod.yml M ×

! .gitpod.yml > ...

You, 39 seconds ago | 2 authors (You and others) | Gitpod Configuration - config

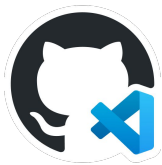
```
1 # Image of workspace. Learn more: https://www.gitpod.io/docs/quickstart
2 image: gitpod/workspace-full:latest
3
4 # List the start up tasks. Learn more: https://www.gitpod.io/docs/quickstart
5 tasks:
6   - name: Script Task
7     init: echo 'init script' # runs during prebuild =>
8     command: echo 'start script'
9
10 # List the ports to expose. Learn more: https://www.gitpod.io/docs/quickstart
11 ports:
12   - name: Frontend
13     description: Port 3000 for the frontend
14     port: 3000
15     onOpen: open-preview
16
17 # Learn more from ready-to-use templates: https://www.gitpod.io/docs/quickstart
18
```

! .gitpod.yml M Dockerfile-gitpod-full-java21 ×

Dockerfile-gitpod-full-java21 > ...

You, 3 days ago

```
1 # ALWAYS FOLLOW THE LINK below
2 FROM gitpod/workspace-full
3
4 USER gitpod
5
6 # INSTALL LATEST JAVA
7 RUN bash -c ". /home/gitpod/.sdkman/bin/sdkman-init.sh && \
8     echo y|sdk install java"
9
10 # INSTALL COOL STUFF
11 RUN brew install fzf exa buildpacks/tap/pack kubectl
12 RUN yes | $(brew --prefix)/opt/fzf/install
13
14 # DEFAULT TO ZSH
15 ENV SHELL=/usr/bin/zsh
16
```

containers.dev

Development Containers

Overview Reference Specification Supporting Tools Guides Available Features Available Templates Collections

Development Containers

An open specification for enriching containers with development specific content and settings.

☆ Star 2,101

What are Development Containers?

A development container (or dev container for short) allows you to use a container as a full-featured development environment. It can be used to run an application, to separate tools, libraries, or runtimes needed for working with a codebase, and to aid in continuous integration and testing. Dev containers can be run locally or remotely, in a private or public cloud, in a variety of [supporting tools and editors](#).

The Development Container Specification seeks to find ways to enrich existing formats with common development specific settings, tools, and configuration while still providing a simplified, un-orchestrated single container option – so that they can be used as coding environments or for continuous integration and testing. Beyond the specification's core metadata, the spec also enables developers to quickly share and reuse container setup steps through [Features](#) and [Templates](#).

```
1 {
2   "name": "Go",
3   "build": {
4     "dockerfile": "Dockerfile",
5     "args": {
6       // Update the VARIANT arg to pick a version of Go: 1, 1.18, 1.17
7       // Append -bullseye or -buster to pin to an OS version.
8       // Use -bullseye variants on local arm64/Azure Siliicon.
9       "VARIANT": "1-bullseye",
10      // Options
11      "NODE_VERSION": "lts/"
12    }
13  },
14  "runArgs": [ "--cap-add=SYS_PTRACE", "--security-opt", "seccomp=unconfined" ],
15
16  // Configure tool-specific properties.
17  "customizations": {
18    // Configure properties specific to VS Code.
19    "vscode": {
20      // Set "default" container specific settings.json values on container create.
21      "settings": {
22        "go.toolManagement.checkForUpdates": "local",
23        "go.useLanguageServer": true,
24        "go.gopath": "/go"
25      },
26    },
27
28    // Add the IDs of extensions you want installed when the container is created.
29    "extensions": [
30      "golang.go"
31    ]
32  },
33 }
```

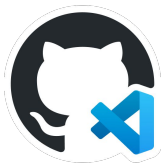
Use or create dev container definitions for a multitude of tech stacks and tools.



{ } devcontainer-universal.json M ×

.devcontainer > { } devcontainer-universal.json > ...

```
1 |
2 | {
3 |   "name": "Universal",
4 |   "image": "mcr.microsoft.com/devcontainers/universal:latest"
5 | }
6 |
```



{ } devcontainer-universal.json M X

.devcontainer > { } devcontainer-universal.json > ...

```
1  {{{
2  {
3    "name": "Universal",
4    "image": "mcr.microsoft.com/devcontainers/universal:latest"
5  }
6  {{{
```

{ } devcontainer-uni-java-docker.json M X

.devcontainer > { } devcontainer-uni-java-docker.json > ...

```
1  {{{
2  {
3    "name": "Universal",
4    "image": "mcr.microsoft.com/devcontainers/universal:latest",
5    "customizations": {
6      "vscode": {
7        "extensions": [
8          "vscjava.vscode-java-pack",
9          "ms-azuretools.vscode-docker"
10       ]
11     }
12  }
13  {{{
```



{ } devcontainer-universal.json M ×

.devcontainer > { } devcontainer-universal.json > ...

```
1  {{{
2  {
3    "name": "Universal",
4    "image": "mcr.microsoft.com/devcontainers/universal:latest"
5  }
6  }
```

{ } devcontainer-uni-java-docker.json M ×

.devcontainer > { } devcontainer-uni-java-docker.json > ...

```
1  {
2    "name": "Universal",
3    "image": "mcr.microsoft.com/devcontainers/universal:latest",
4    "customizations": {
5      "vscode": {
6        "extensions": [
7          "vscjava.vscode-java-pack",
8          "ms-azuretools.vscode-docker"
9        ]
10     }
11  }
12 }
```

{ } devcontainer-kubernetes.json M ×

.devcontainer > { } devcontainer-kubernetes.json > ...

```
1  {
2    "name": "Kubernetes - Minikube-in-Docker",
3    "image": "mcr.microsoft.com/devcontainers/base:bullseye",
4
5    "features": {
6      "ghcr.io/devcontainers/features/docker-in-docker:2": {
7        "enableNonRootDocker": "true",
8        "moby": "true"
9      },
10     "ghcr.io/devcontainers/features/kubectl-helm-minikube:1": {
11       "version": "latest",
12       "helm": "latest",
13       "minikube": "latest"
14     },
15     "ghcr.io/meaningful-ooo/devcontainer-features/homebrew:2": {},
16     "ghcr.io/devcontainers-contrib/features/btop-homebrew:1": {},
17     "ghcr.io/devcontainers-contrib/features/curl-homebrew:1": {}
18   },
19   "customizations": {
20     "vscode": {
21       "extensions": [
22         "vscjava.vscode-java-pack"
23       ]
24     }
25   }
26 }
27 }
```



BALANCE

285.2 Credits

57% remaining

Monthly limit: 500 Credits



CURRENT PERIOD

Oct 22, 2023 – Nov 22, 2023

[View Usage →](#)

CURRENT PLAN

Free

✔ **500 credits**

50 hours of Standard workspace usage.

UPGRADE PLAN

Pay-as-you-go

\$9 per month for the first 1,000 credits and pay-as-you-go after that for \$0.036 per credit, excluding VAT.

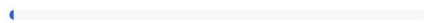
[Upgrade Plan](#)



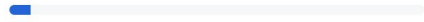
Codespaces

Included quotas reset in 23 days. [See billing documentation](#)

Usage 1.81 of 120.00 included
> **hours** core hours used **\$0.00**



✓ **Storage** 0.87 of 15.00 included GB-
month used **\$0.00**

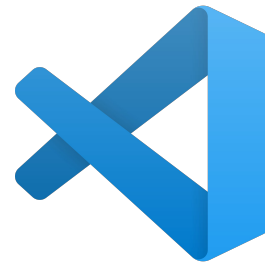
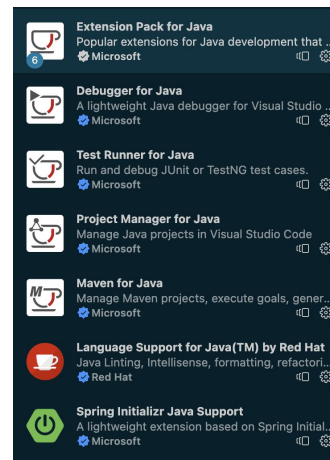
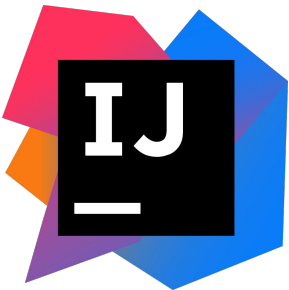
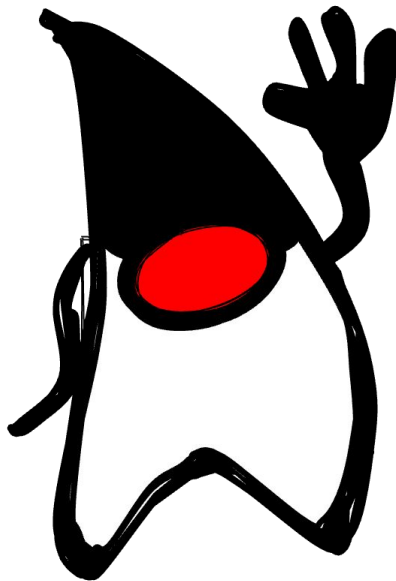


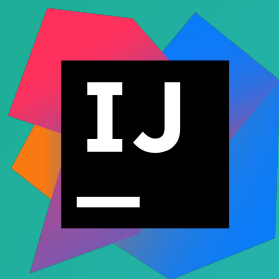
Storage usage is updated daily and billed monthly

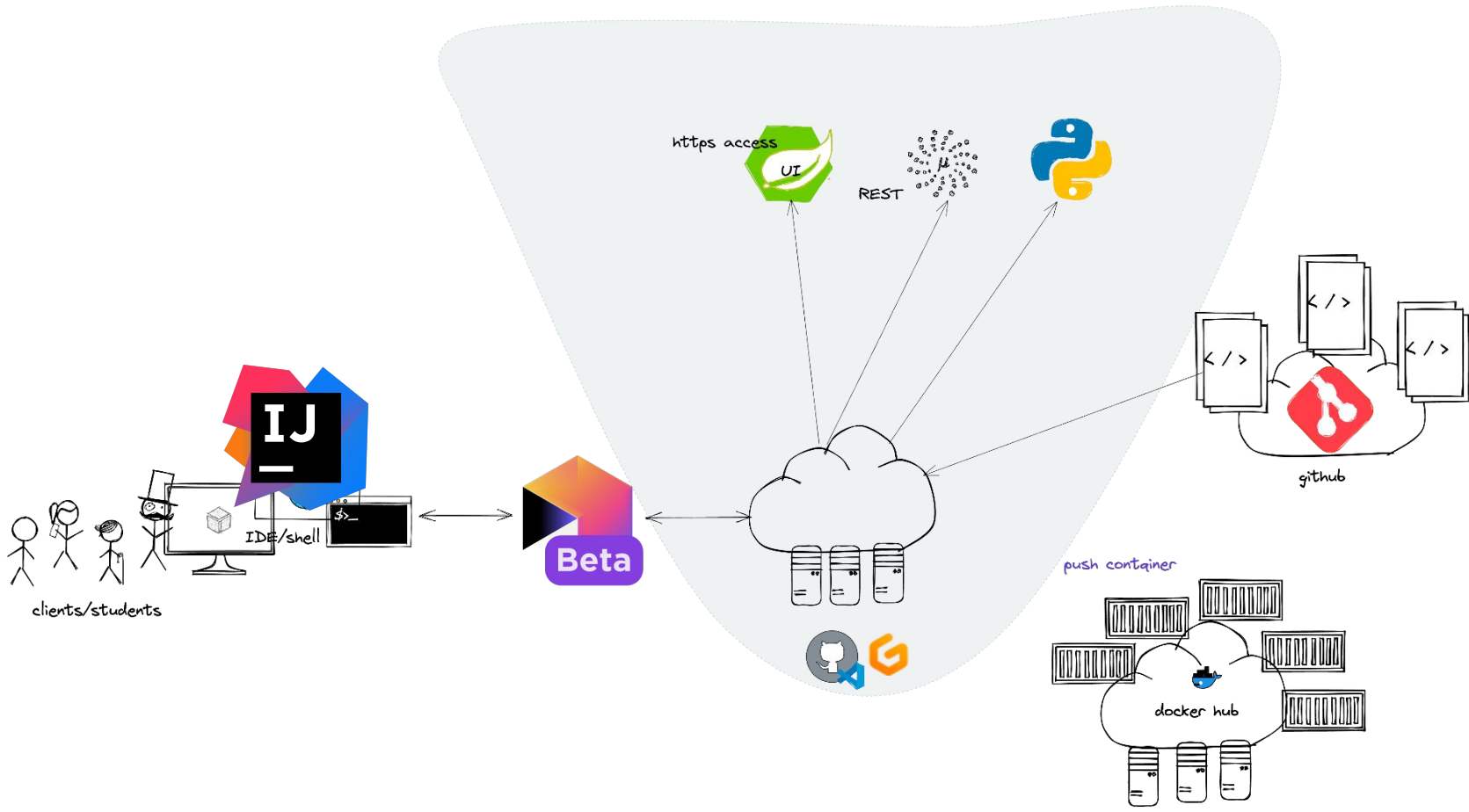
| | Included | Paid | Price / GB | Total |
|-------------------------|----------|------|------------|--------|
| Storage | 0.87 | 0.00 | \$0.07 | \$0.00 |
| Prebuild Storage | 0.00 | 0.00 | \$0.07 | \$0.00 |

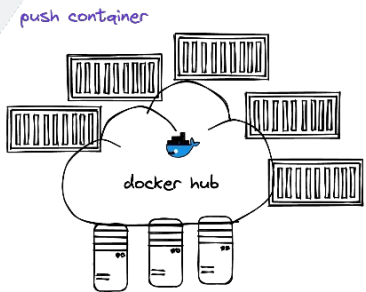
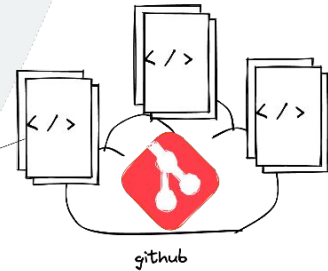
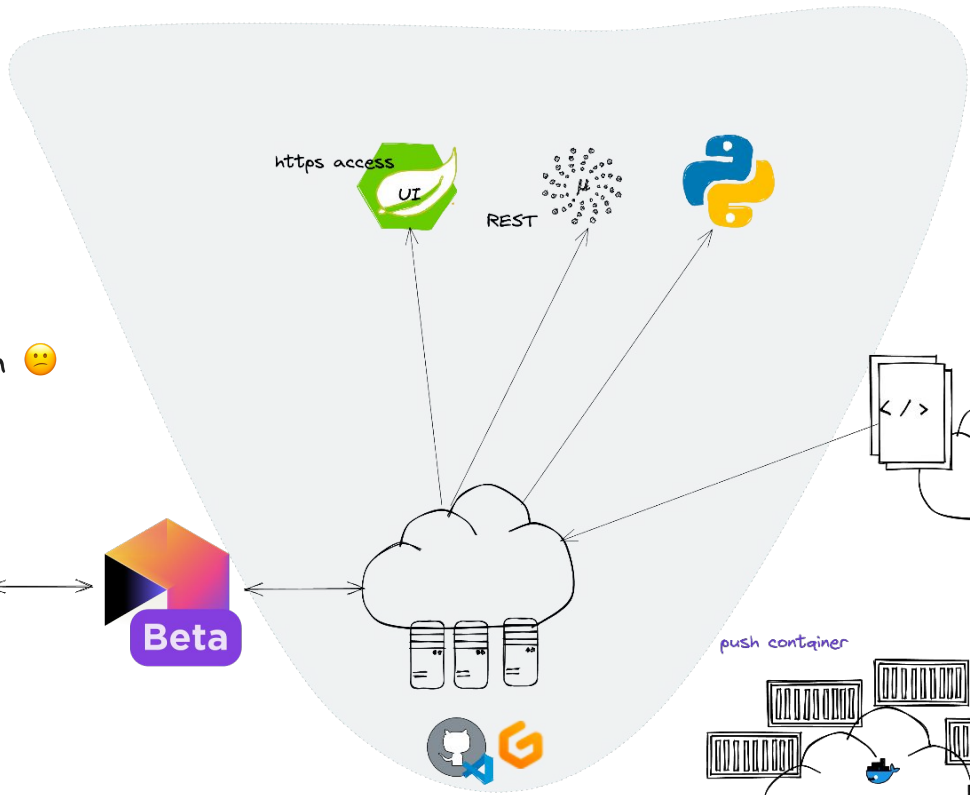
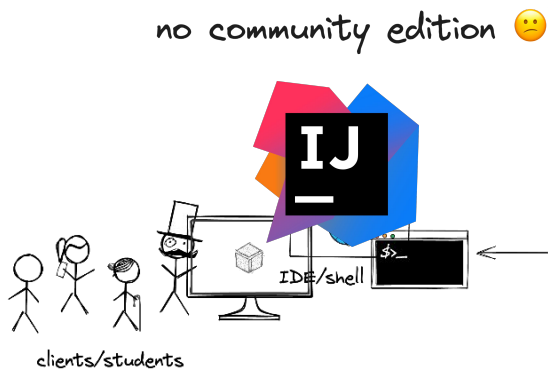
\$0.00 monthly spending limit | [Set up a spending limit](#) **\$0.00**













JetBrains Gateway
2023.2.1

All Providers

Connections

SSH

JetBrains Space

GitHub Codespaces

Connect with a Link

Run the IDE Remotely



SSH Connection

New Connection

More ↗



JetBrains Space

Connect to Space

More ↗



GitHub Codespaces

Connect to Codespaces

More ↗

Install More Providers



Gitpod

Install More ↗



Google Cloud

Install More ▾



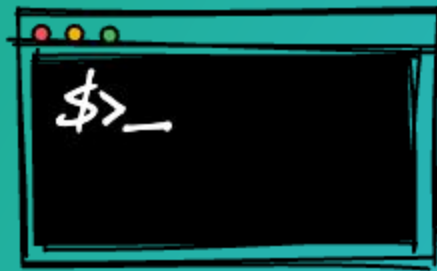
Amazon CodeCatalyst

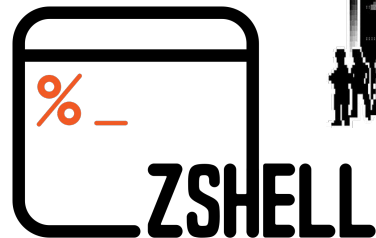
Install More ↗

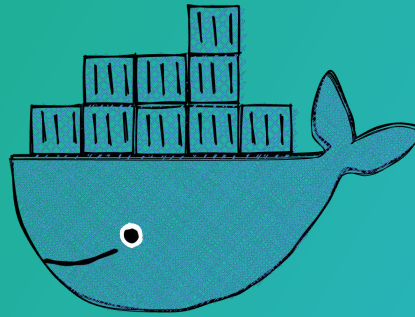


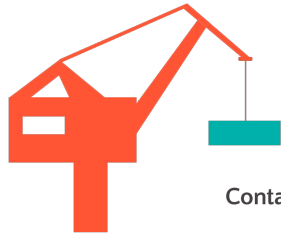
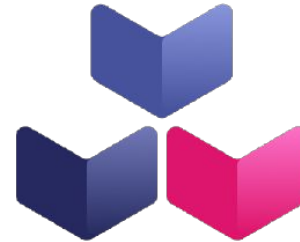
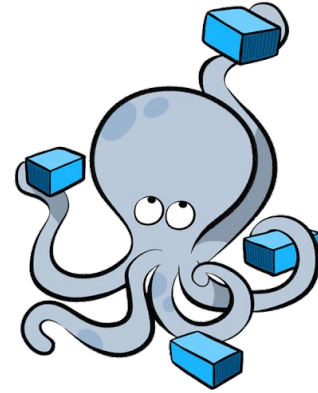
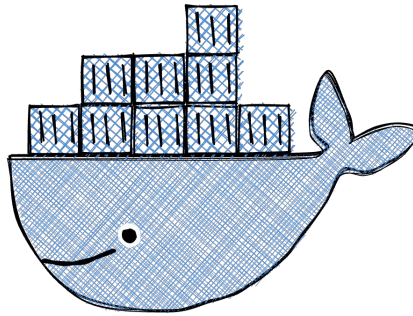
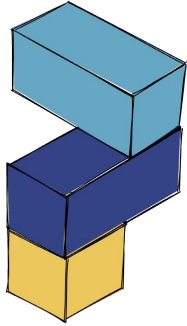
Coder

Install More ↗









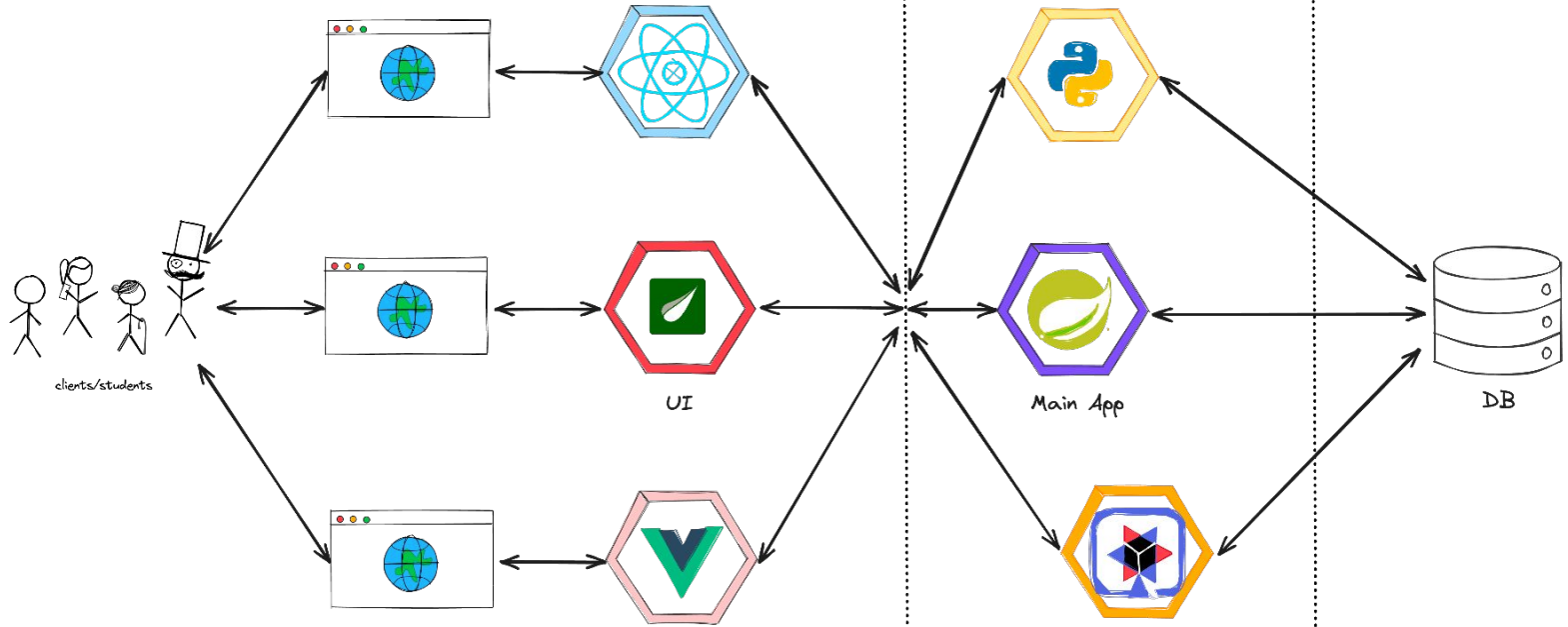
Jib

Containerize your Java application.

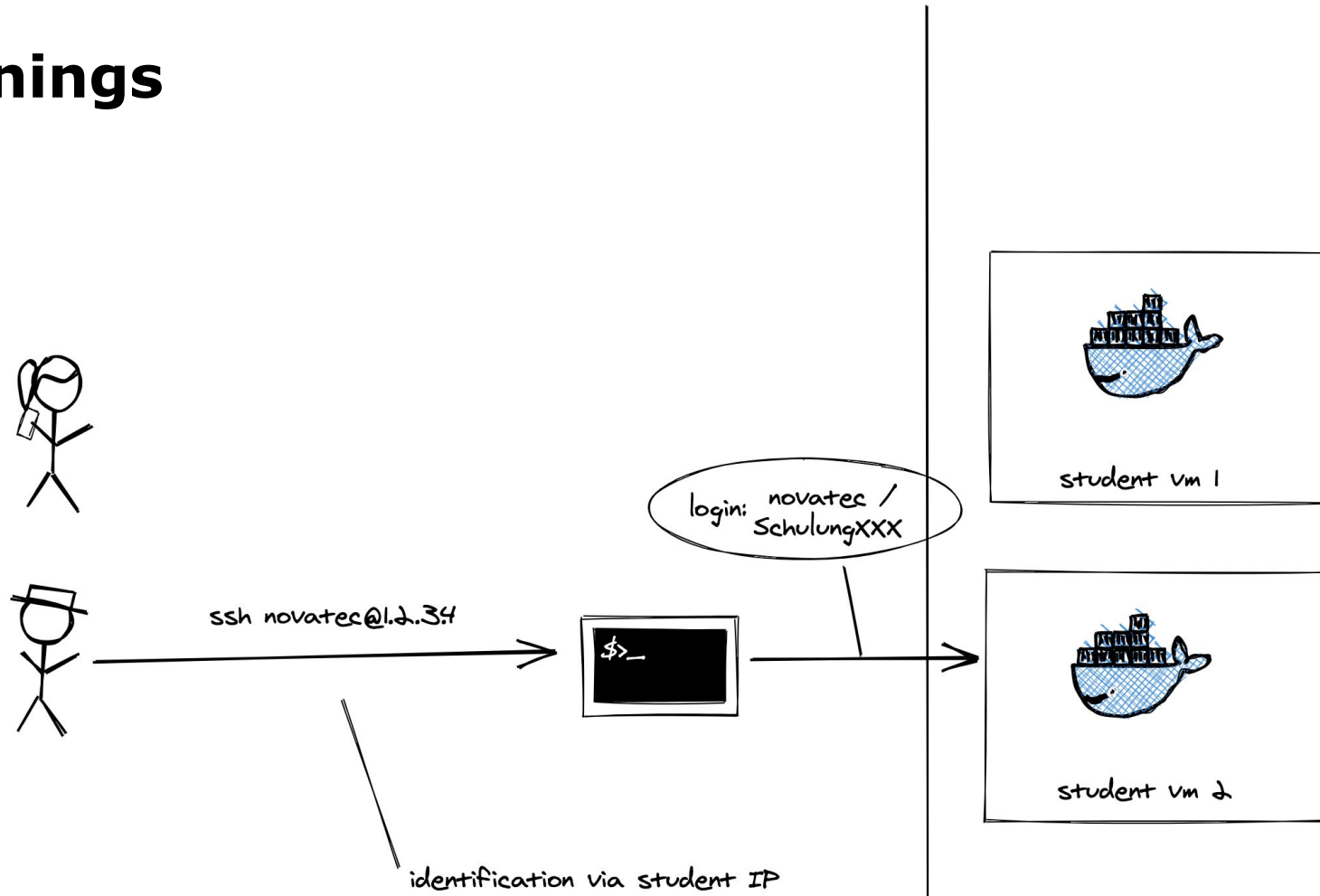
Scenarios

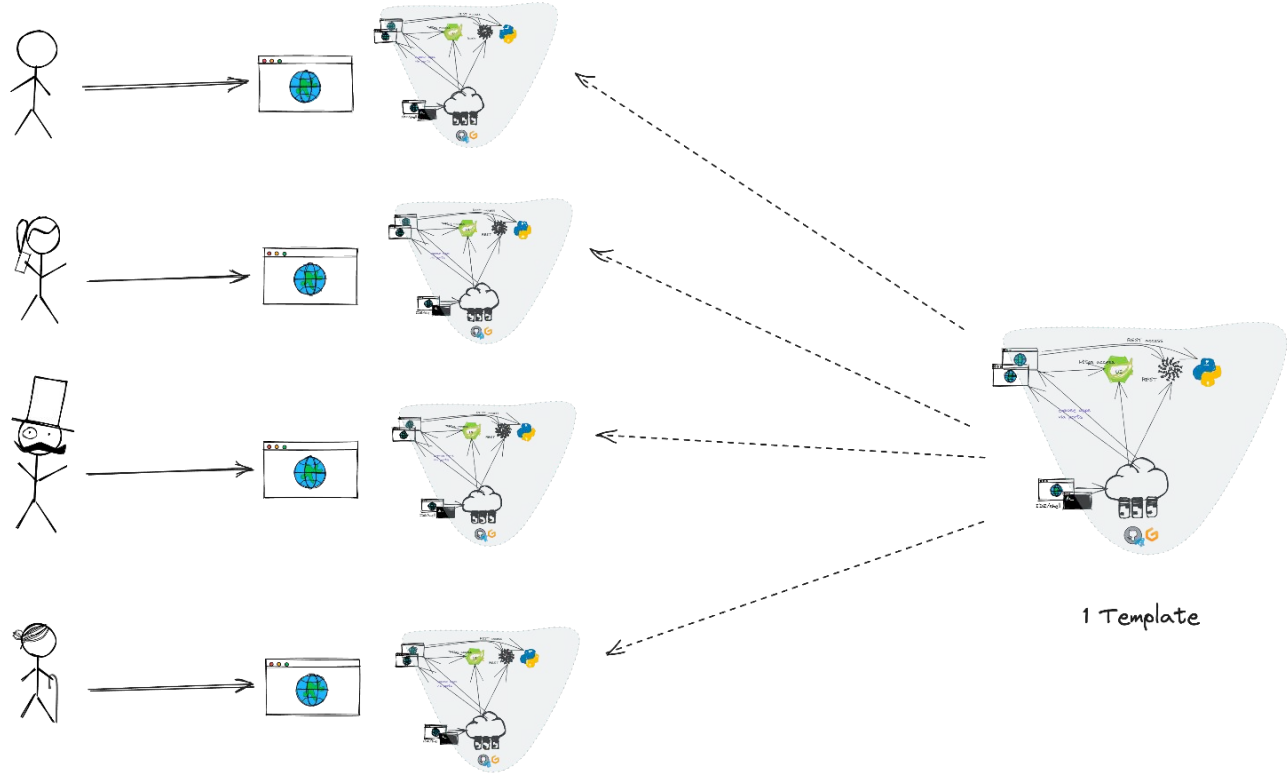
REST API

Persistence API

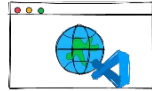
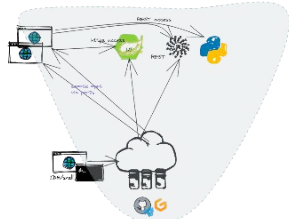


Trainings

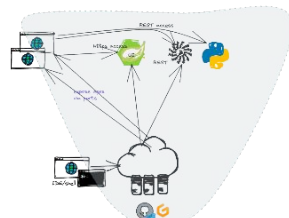




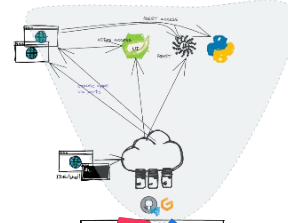
Project A



Project B



Project C



Thanks!



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