Cloud Development Environment

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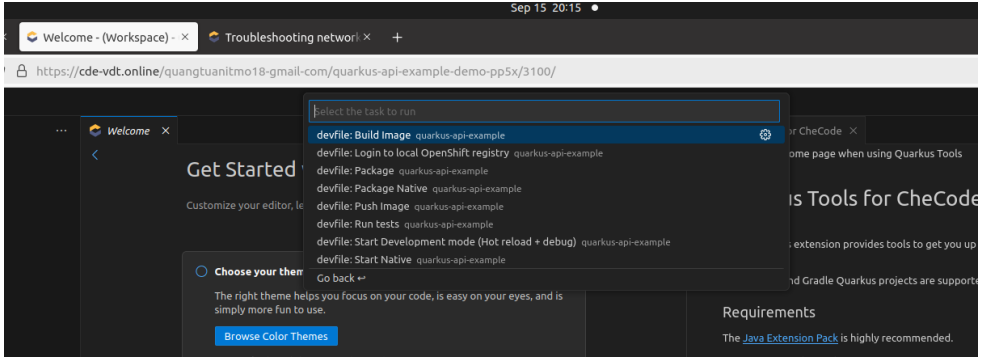
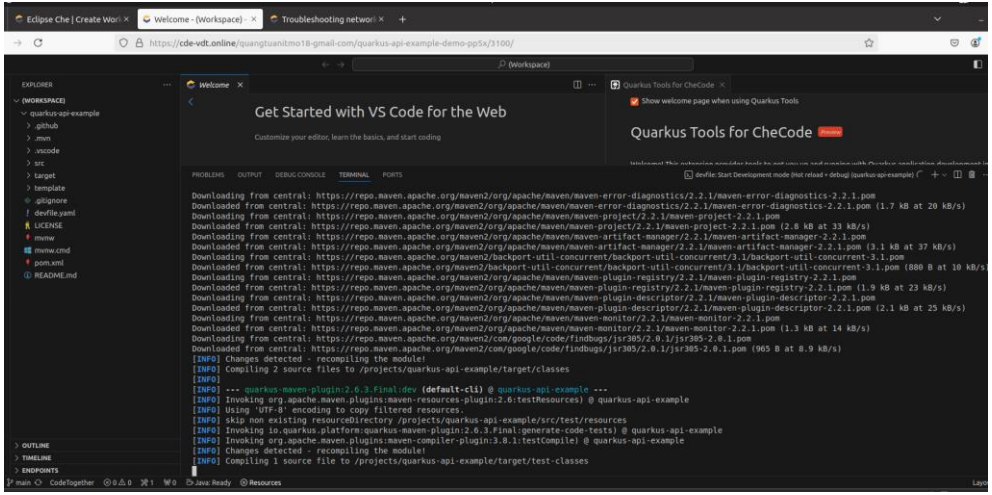
Introduction to CDE

- Remote IDE
- Use a preconfigured development environment
- Contains basic development tools such as IDE, dependencies, git, etc.
- Useful for developers work in enterprises or open-source contributor

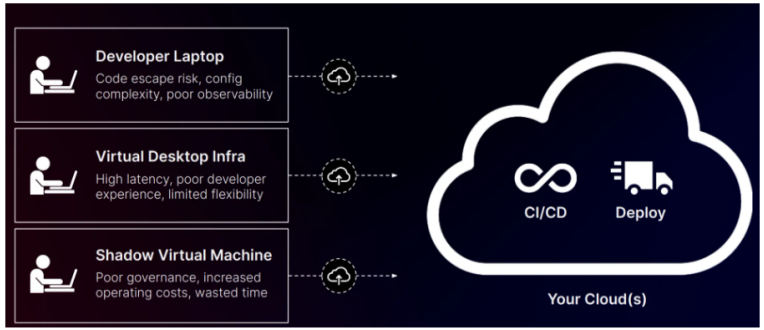




Why cloud development environment?

- Configuration Complexity
- Poor Observability
- Limited Scalability
- Low Mobility

How develppers code today



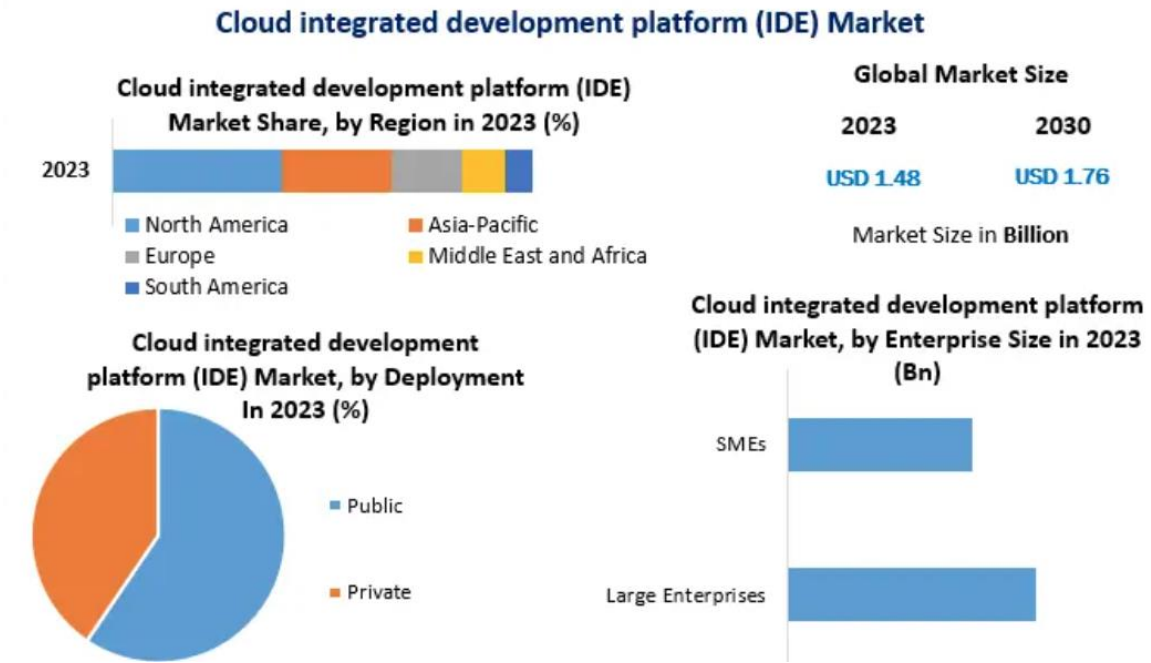
=> Cloud solution (cloud development environment)

- Time saving
- Scalability
- Work anywhere
- Choose your editor
- Easy deployment

How developers code with CDE

[1] *What is a Cloud Development Environment? Is it better than localhost?*
[2] *Why are Cloud Development Environments Spiking in Popularity, Now?*
[3] *Cloud Development Environments: Everything You Need To Know*

CDE Market



[1] Cloud integrated development platform (IDE) Market: Global Industry Analysis and Forecast (2024-2030)

CDE vs RDP

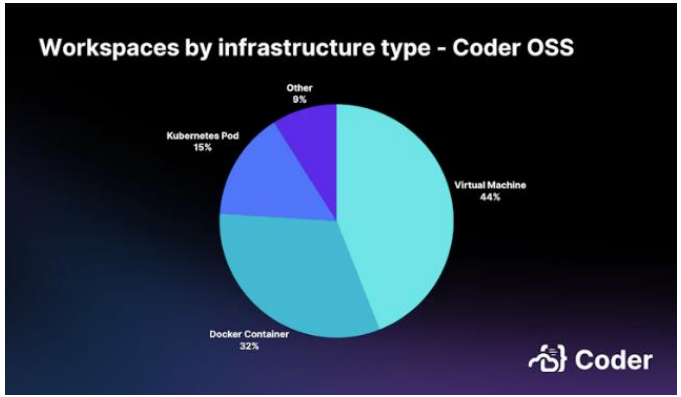
Criteria	Cloud development environment	Remote desktop protocol
Primary Purpose	Development environment with pre-configured IDEs	Remote access to full desktop (Windows/Linux)
Architecture	Runs on containers/VMs, optimized for development with auto-scaling and shared resources	Access to cloud-hosted desktop with full control
Development Tools	Pre-configured tools (IDEs, Docker, Git)	User installs tools on remote desktop
Performance	Low latency, optimized for coding	Limited scalability compared to CDE
Scalability	Easily scales with containerized environments	Can scale via additional remote desktops but typically less dynamic than CDE scaling
App Setup	Pre-installed tools, quick setup	Manual setup of tools required
Mobility	Accessible via browser, OS-independent	Needs RDP client, device-dependent access
Cost	Pay-as-you-go, cost-effective for short-term use	Higher costs due to full machine provisioning
User Experience	Optimized coding experience with instant setup	Full desktop experience, less coding optimization
Collaboration	Low latency, optimized for coding	Limited scalability compared to CDE
Flexibility	Highly flexible, integrates with CI/CD pipelines and cloud services	Full desktop flexibility, but harder to automate and integrate into modern cloud-native development pipelines

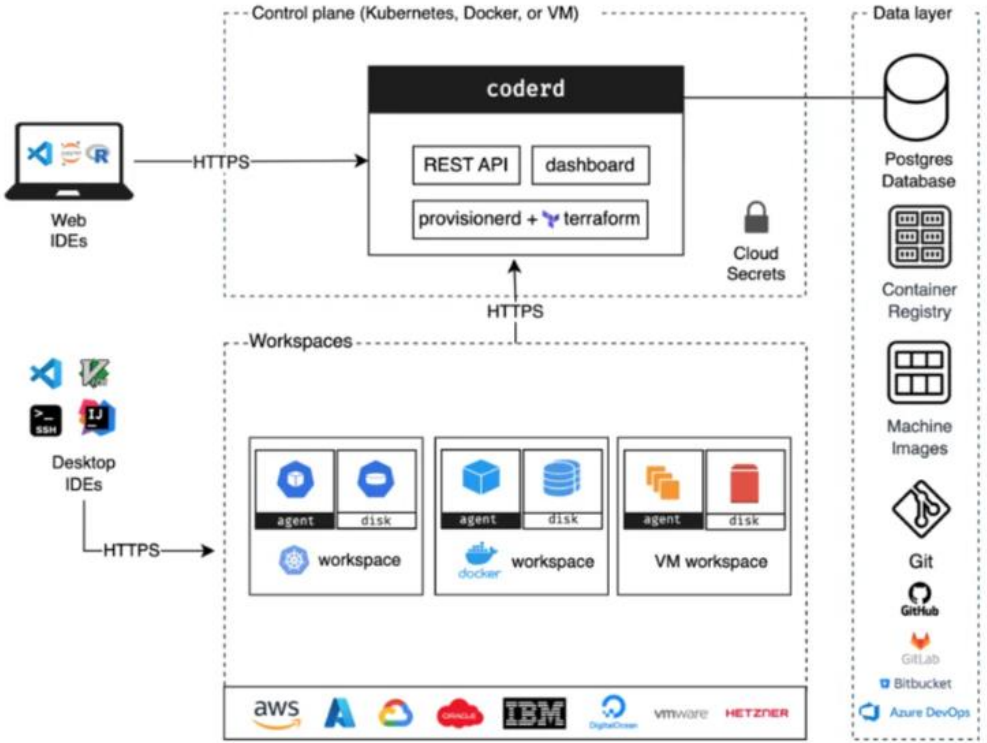
Objectives and tasks

- Research, build a solution set and package tools, deploy the Cloud Development Environment platform.
- Propose solutions to improve, expand, and integrate the features of the cloud development environment into the Viettel Cloud ecosystem

CDE architecture

- CDE in Container or Virtual Machine
- CDE in Kubernetes

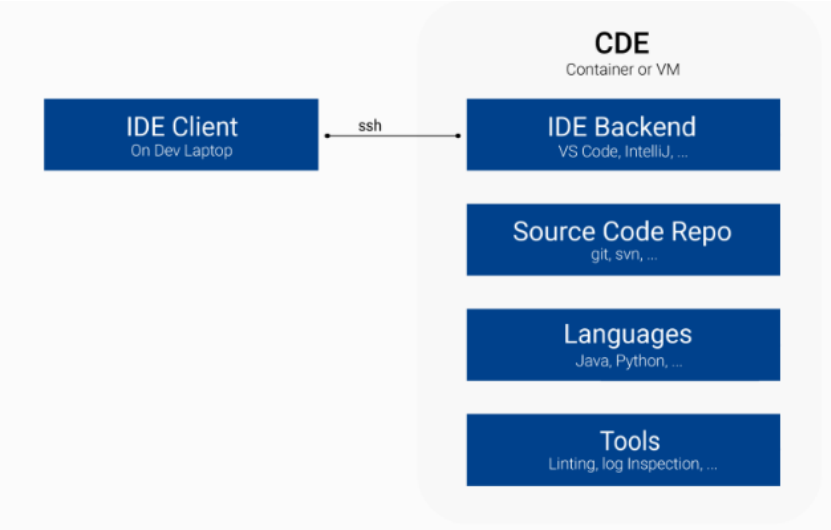


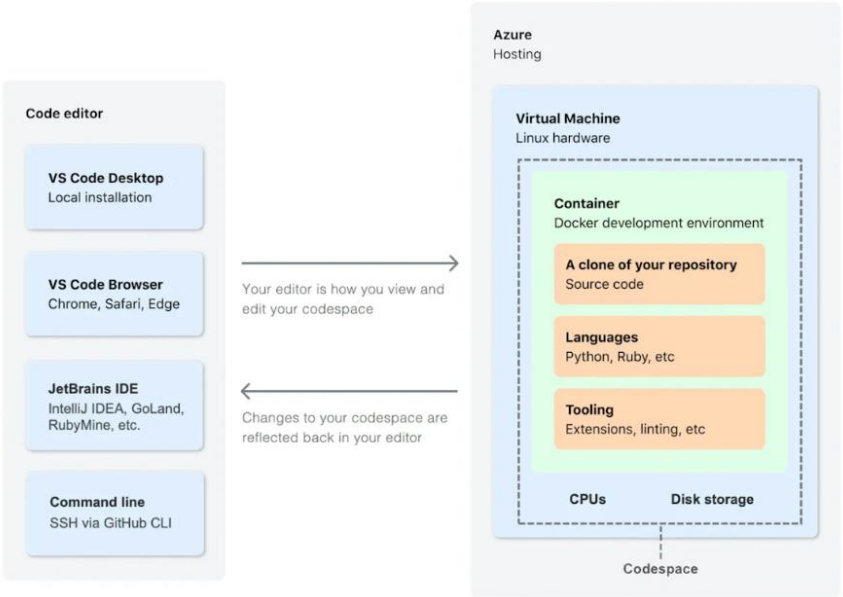


[1] [Reference Architectures for CDEs: Kubernetes vs. VMs]

CDE architecture

CDE in Container or VM

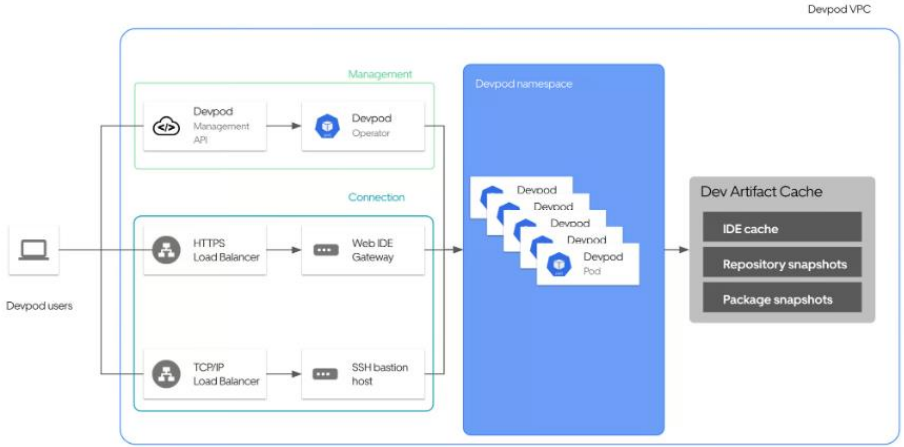


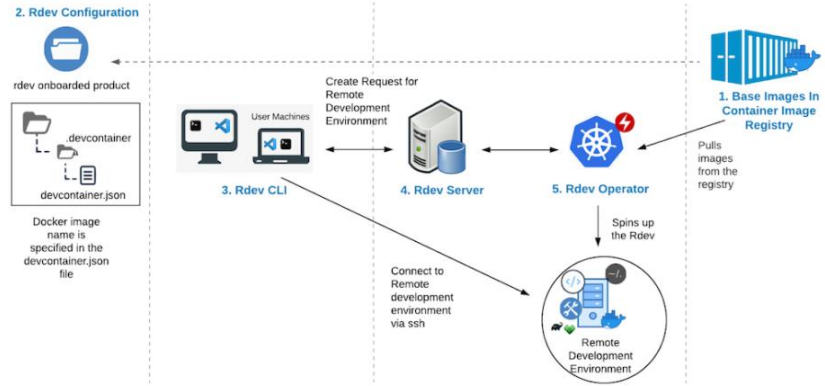


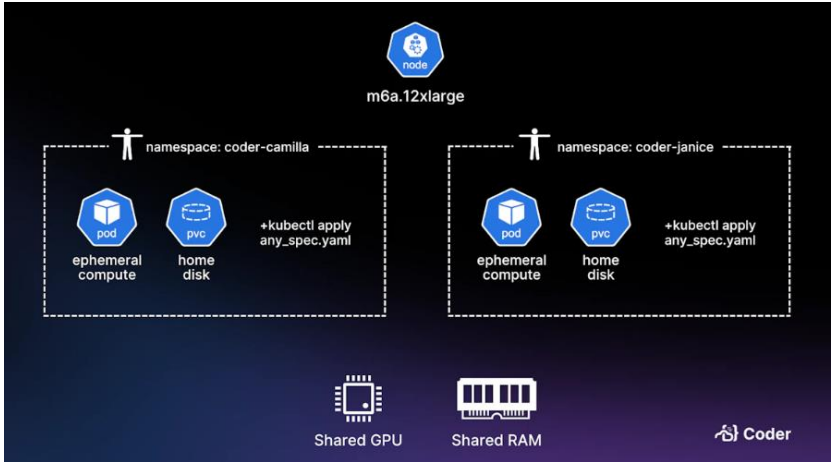
[1] How CDEs work?
[2] GitHub Codespaces overview

CDE architecture

CDE in Kubernetes



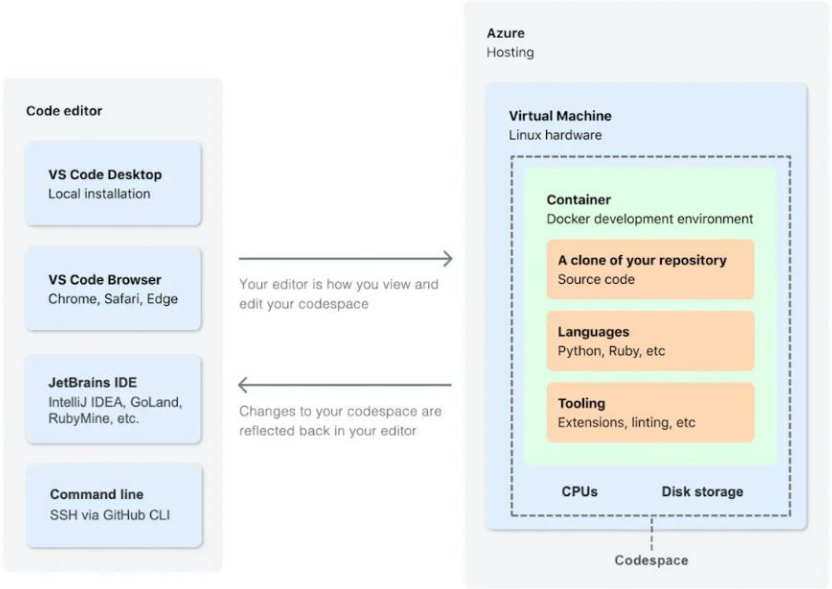


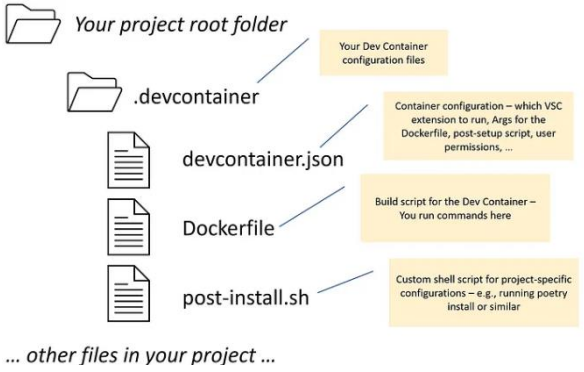


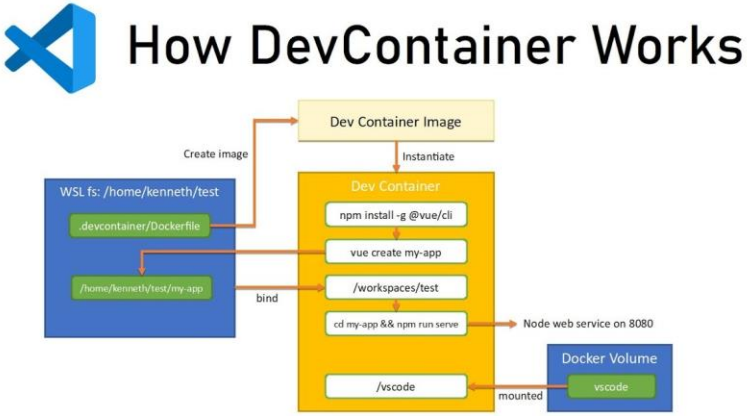
[1] GitHub Codespaces overview
[2] Building in the cloud with remote development

Big-tech solutions

Github codespace





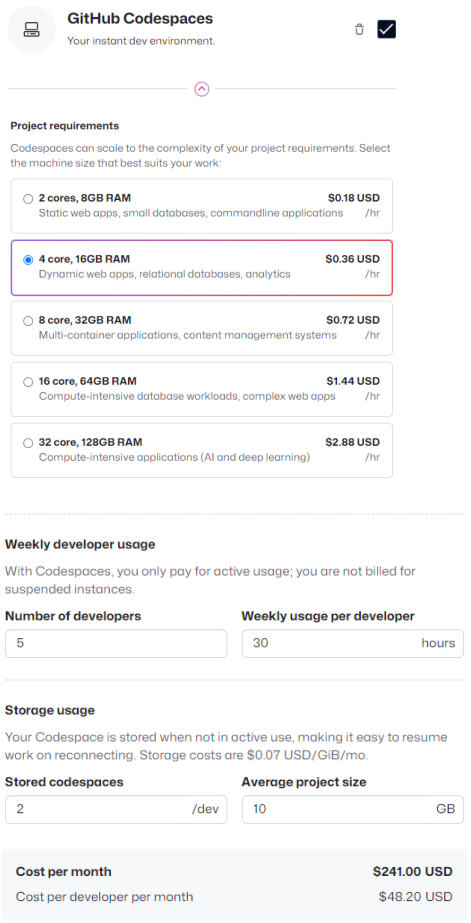


[1] GitHub Codespaces overview
[2] How DevContainer works

Big-tech solutions

Github codespace - pricing

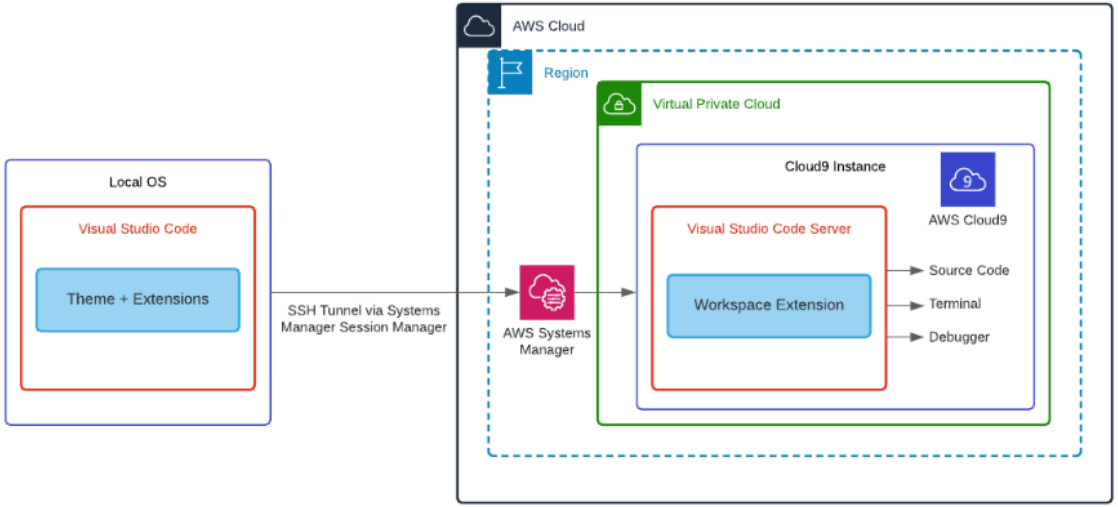
Component	Machine type	Unit of measure	Included usage multiplier	Price
Codespaces compute	2 core	1 hour	2	$0.18
Codespaces compute	4 core	1 hour	4	$0.36
Codespaces compute	8 core	1 hour	8	$0.72
Codespaces compute	16 core	1 hour	16	$1.44
Codespaces compute	32 core	1 hour	32	$2.88
Codespaces storage	Storage	1 GB-month	Not applicable	$0.07

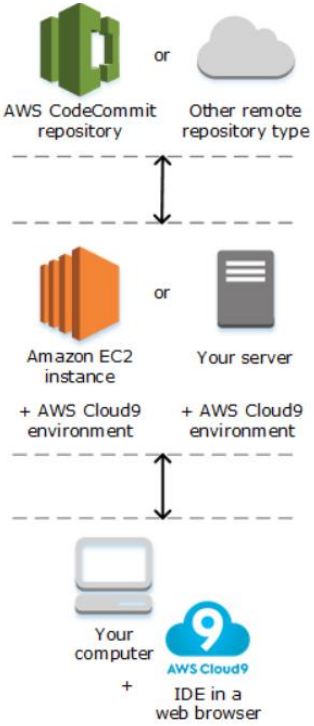


[1] [About billing for GitHub Codespaces]

Big-tech solutions

AWS Cloud9





[1] [What is AWS Cloud9?]
[2] [Use AWS Cloud9 to Power Your Visual Studio Code IDE]

Big-tech solutions

AWS Cloud9 - pricing

Pricing example (monthly estimates for AWS Cloud9 EC2 environments)

If you use the default settings running an IDE for 4 hours per day for 20 days in a month with a 30-minute auto-hibernation setting your monthly charges for 90 hours of usage would be:

Type of charge	Amount	Comments
Compute fees*	$1.05	t2.micro Linux instance at $0.0116/hour x 90 total hours used per month = $1.05
Storage fees	$1.00	$0.10 per GB-month of provisioned storage x 10-GB storage volume = $1.00
Total monthly fees	$2.05	

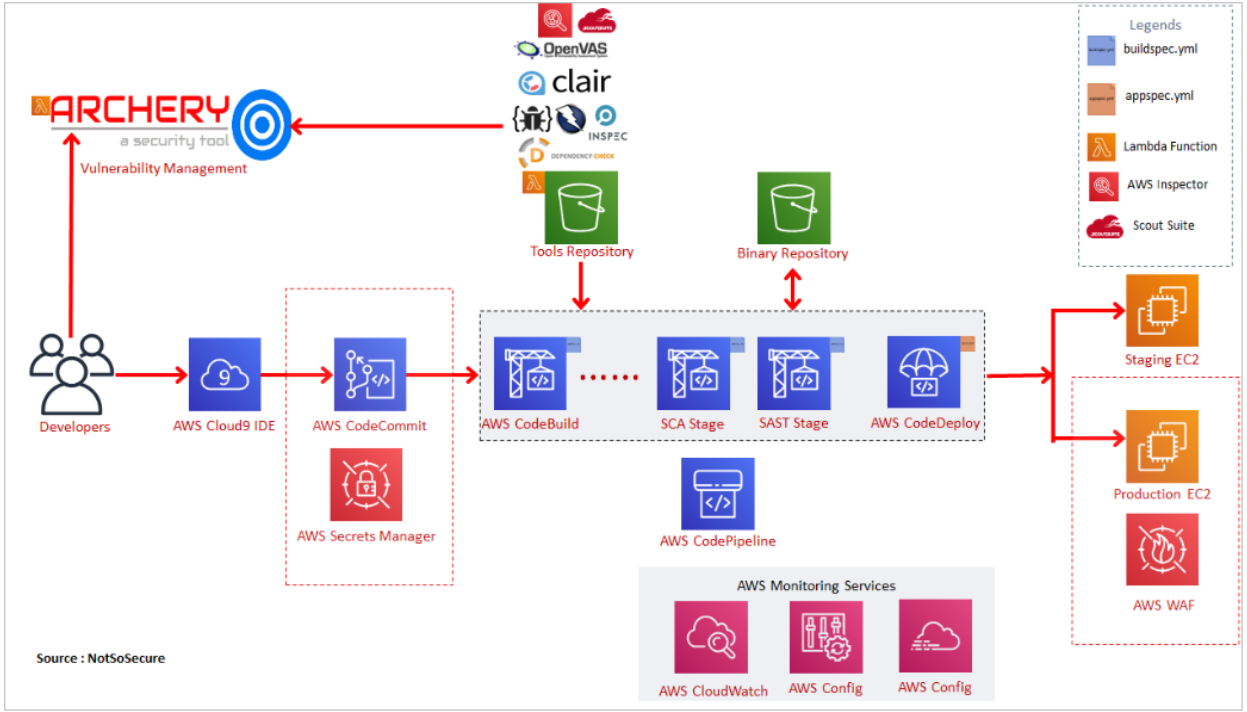
AWS Cloud9 offers a broad selection of EC2 instance types. You can use the AWS Simple Monthly Calculator to view your monthly estimates, based on instance type and expected usage.

*Based on On-Demand EC2 Linux Instance pricing.

[1] AWS Cloud9 Pricing

Big-tech solutions

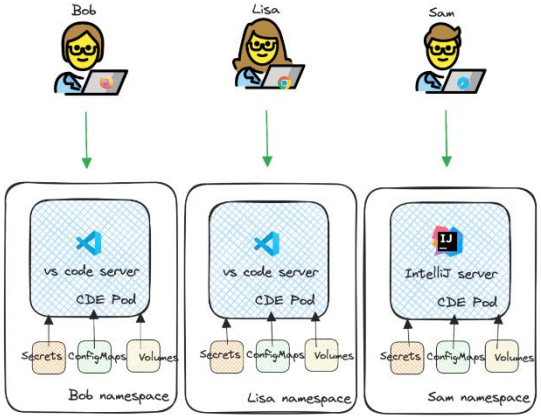
AWS Cloud9

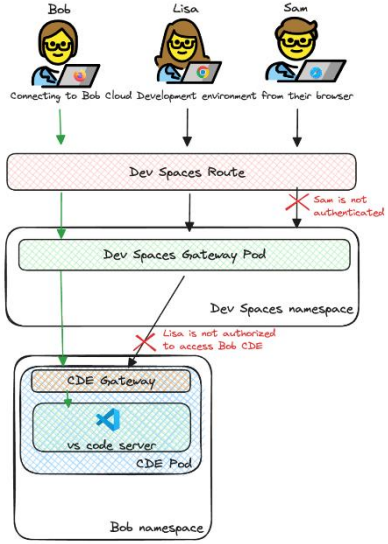


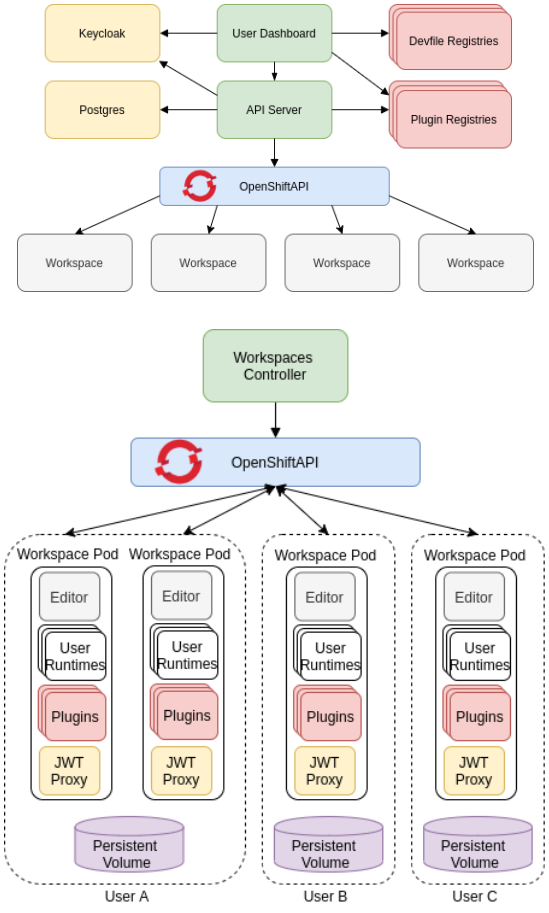
[1] Build a Web App and IDE in AWS
[2] Achieving DevSecOps using AWS Cloud Native Services

Big-tech solutions

OpenShift Dev Space







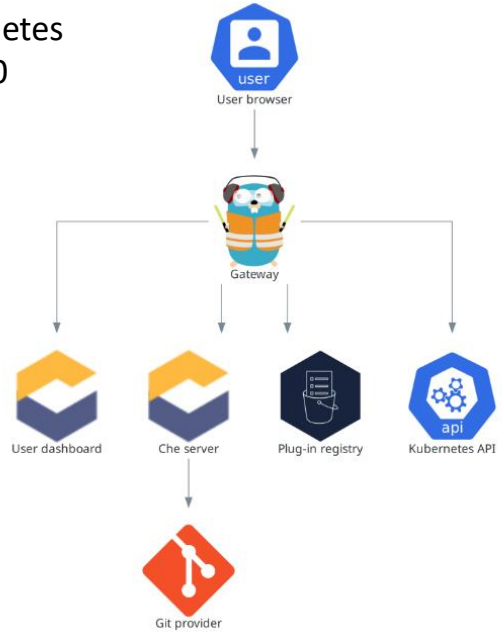
DEVELOPMENT WITH OPENSHIFT DEV SPACES

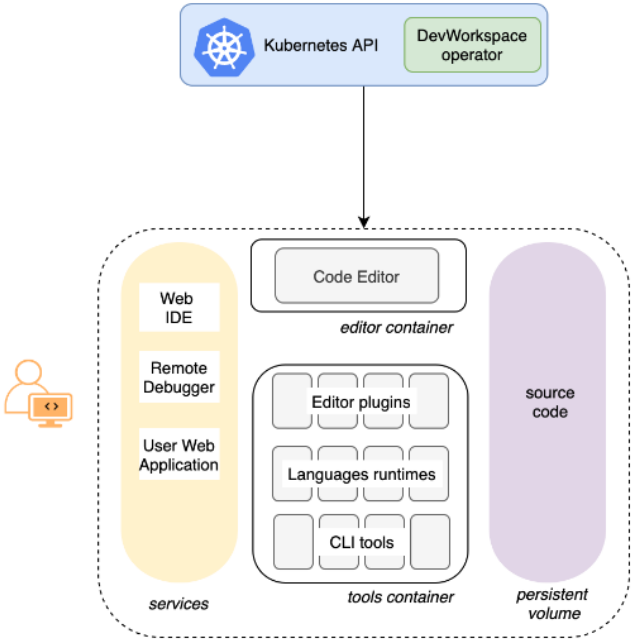
Eclipse Che

[1] CodeReady Workspaces architecture overview
[2] CodeReady Workspaces scales up, is now Red Hat OpenShift Dev Spaces

Eclipse-che

- DevSpace is a RDE on Kubernetes
- RedHat products with EPL 2.0 licence

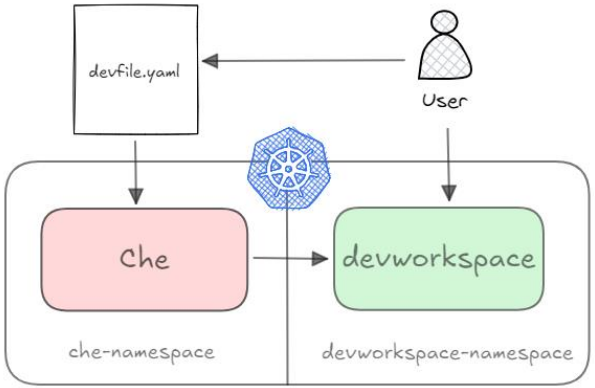


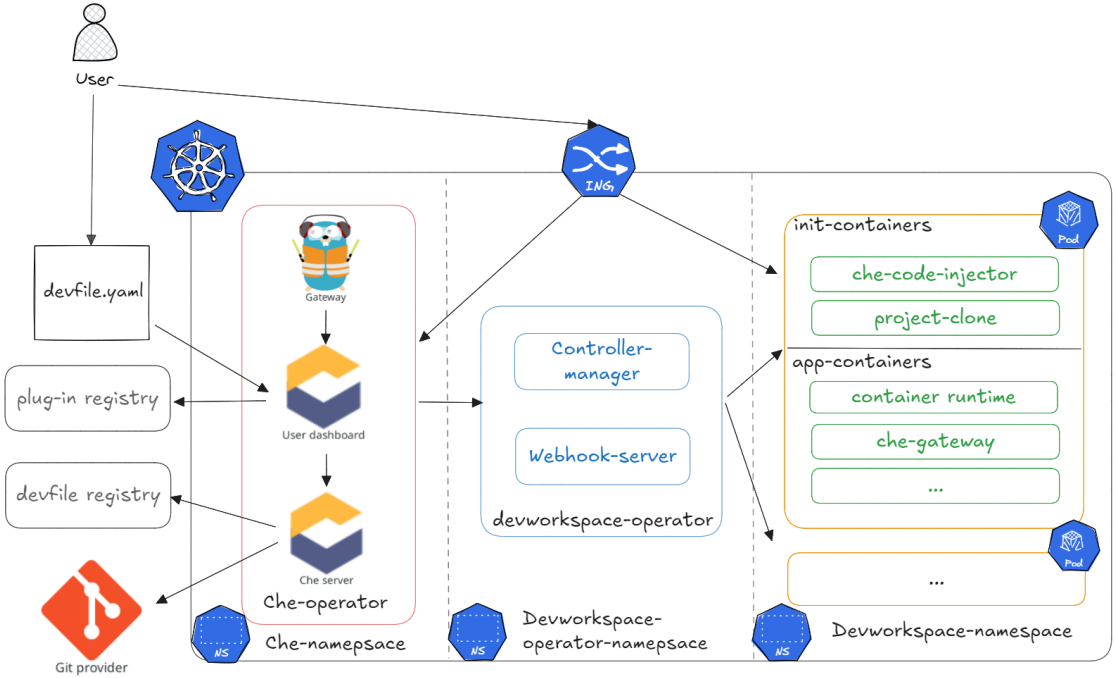


[1] Eclipse-che architecture – User workspaces
[2] Eclipse-che server components

Eclipse-che

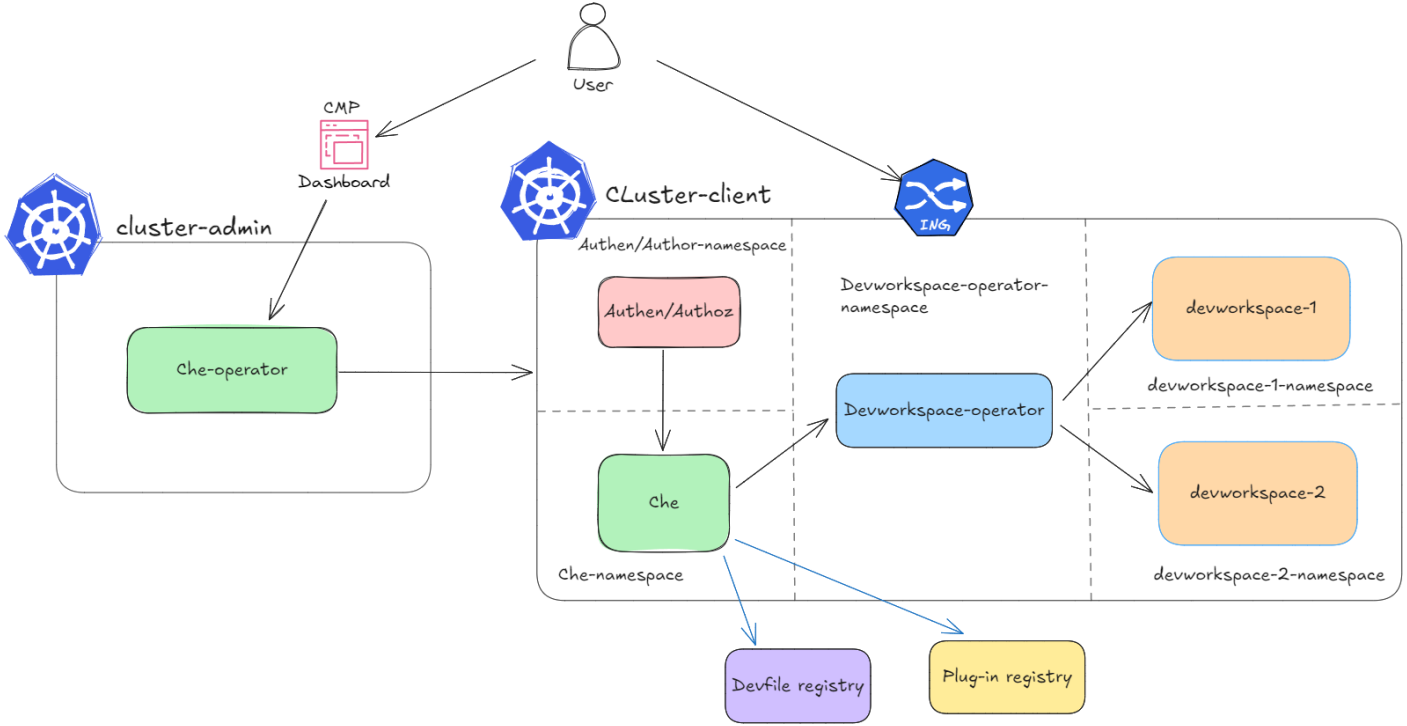
Devfile was accepted to CNCF
on January 11, 2022 at the Sandbox maturity level





[1] Eclipse-che – How it works
[2] Devfile

Integrate with Viettel Cloud



Integrate with Viettel Cloud

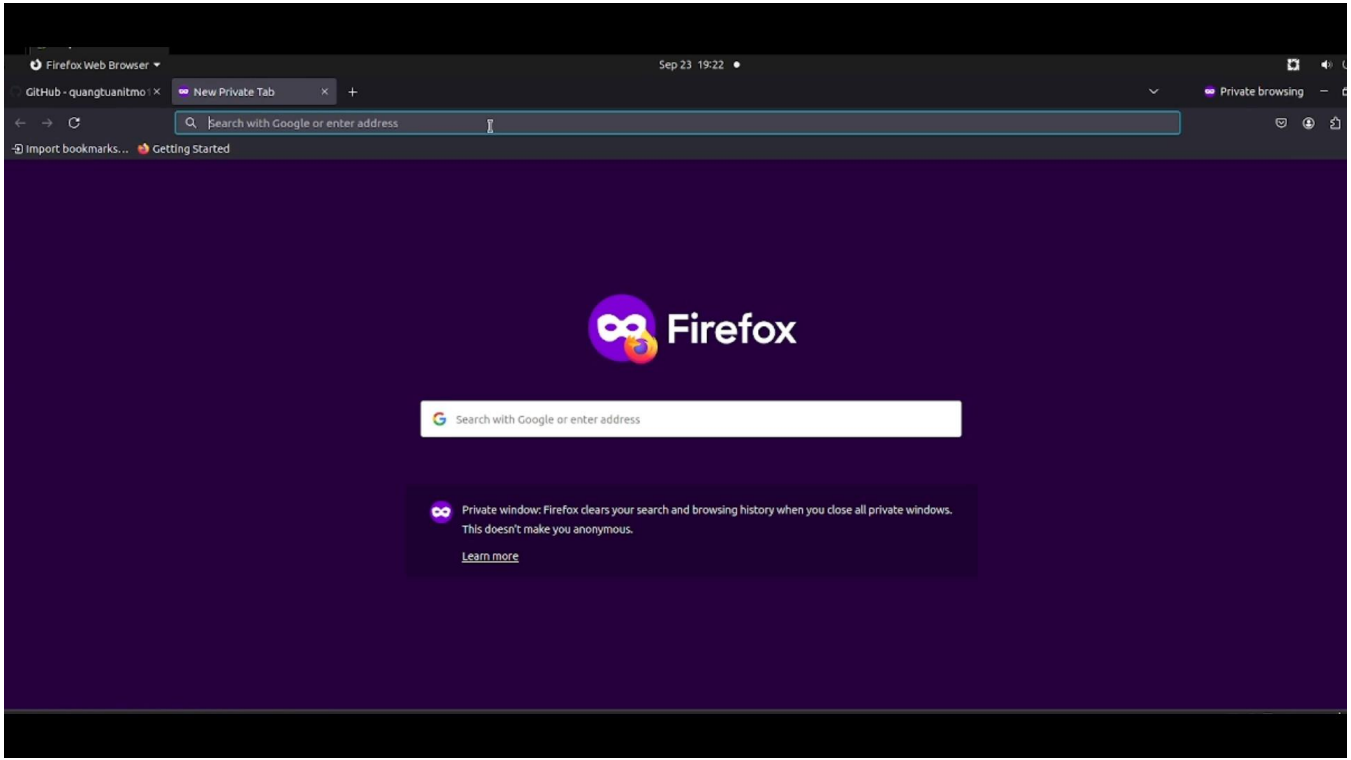
Target Audience:

- Large enterprises and corporations
- Small and Medium Enterprises (SMEs)
- Government

Viettel Cloud Development Environment Pricing

Tier	Free	Standard	Enterprise
Price	$0/month	Starting at $15/month	Custom Pricing
Compute	Shared: 1 CPU, 1 GB RAM	Dedicated: 2 CPUs, 4 GB RAM	Dedicated: 4+ CPUs, 8+ GB RAM
Storage	5 GB	50 GB	200+ GB
Bandwidth	Limited	100 GB/month	Unlimited
Support	Community support	Email support	24/7 priority support
Features	Basic IDE, Version control	Advanced IDE, Integrated CI/CD tools	Custom integrations, Advanced security
Collaboration	Single user	Up to 5 users	Unlimited users
Backup	No backup	Weekly backup	Daily backup with retention policies
Analytics	Basic usage statistics	Detailed analytics	Custom analytics and reporting
Security	Basic security features	Standard security features	Advanced security features & compliance

Demo


Firefox Web Browser
Sep 23 19:22
GitHub - quangtuanitmo
New Private Tab
Private browsing
Search with Google or enter address
Import bookmarks...
Getting Started
Firefox
Search with Google or enter address
Private window: Firefox clears your search and browsing history when you close all private windows.
This doesn't make you anonymous.
Learn more

Future works

- Integrate with Viettel Cloud
- Improve User Experience (UX/UI)
- Integrate with CI/CD and DevOps Tools
- Security and Compliance
- Custom Development Environments
- Enhance Developer Tools

Thank you