

# LIP COMPUTING INFRASTRUCTURE AND SERVICES

João Pina (LIP) | Samuel Bernardo (LIP)





# Outline

## Introduction:

- Computing Group
- CNCA / INCD

## LIP IT infrastructure

- LIP Computing farm
- Tier 2
- Others: Cloud

## LIP Computing support services

- Challenges using the infrastructure and managing the projects
- Gitlab instance from CNCA/INCD
  - Platform for project management and software development
  - Simplify the access to the infrastructure
  - Future work

## Future LIP and CNCA Computing support services



# LIP Computing Group

3

The computing infrastructure is developed, maintained and operated by the:

- Distributed Computing and Digital Infrastructures group
- The group provides IT services to LIP and also to external users via CNCA
- Most of the team members also participate in EU innovation projects



# CNCA (ex INCD)

- CNCA - Centro Nacional de Computação Avançada
  - No profit private company that originated from a merge of INCD, Deucalion and some FCCN services (data, housing)
  - New statuses and currently accepting new members
  - FCT will be an associated member with control with majority of votes
- LIP will continue to be a member
  - The Tiers-2 and other services will operate under the scope of the CNCA
  - No expected major changes on the current services delivered to LIP users

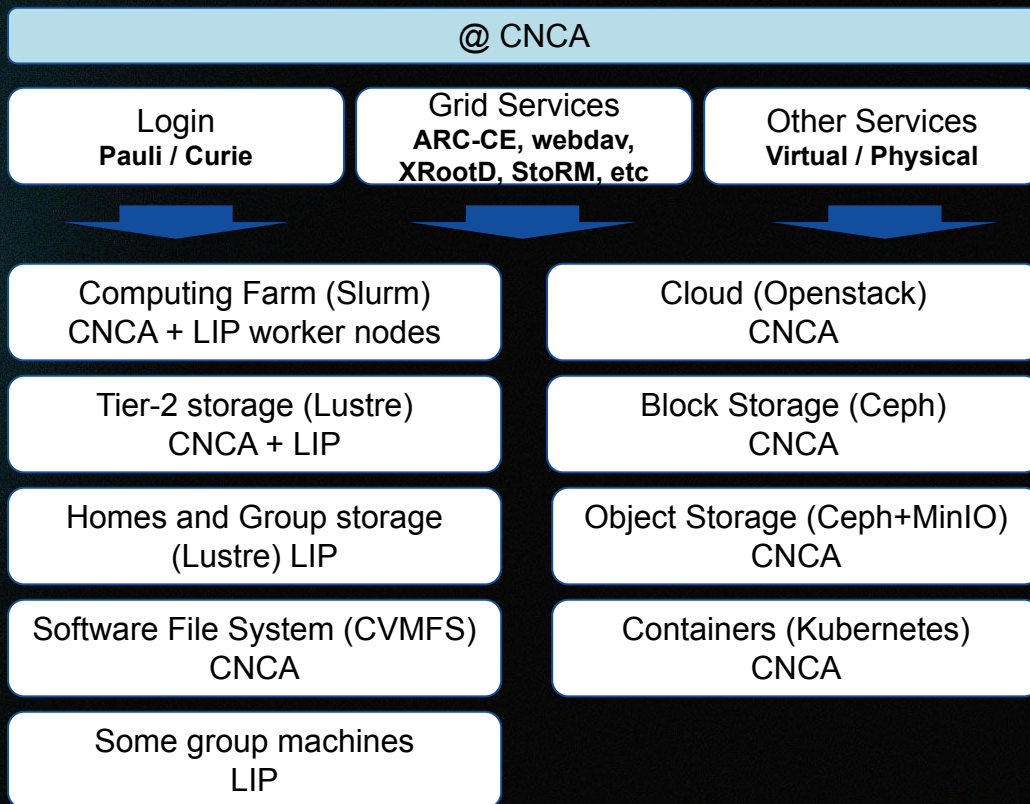
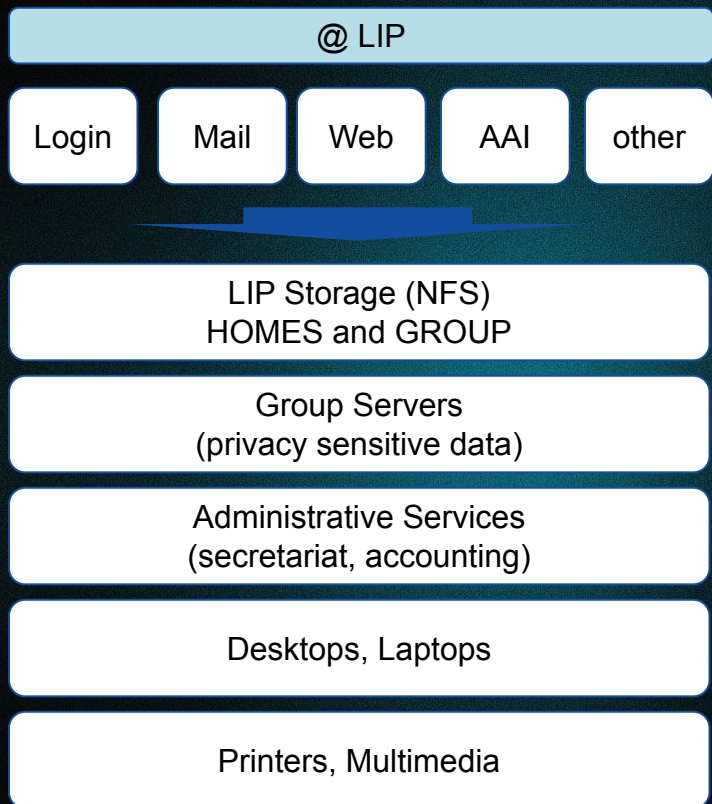


# LIP IT INFRASTRUCTURE

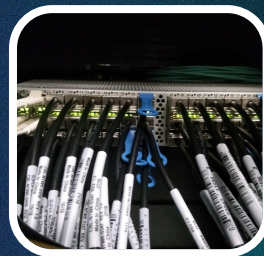


LIP.  
COMPUTING







**NGC @ LNEC**

Sala-Grid Datacenter  
New CNCA equipment  
LIP specific equipment

LIP users  
LIP Tier-2  
CNCA users

**U. COIMBRA**

Old Datacenter  
Physics Dep.  
Small LIP facility  
Point-of-Presence

**LIP @ 3LS**

Tape library  
Local network + services

**U. LISBOA @ REITORIA**

Mail, web, VMs  
Home directories



**ULisboa** datacenter @ Reitoria UL Lisboa

- Web, DNS, LDAP, IdP, Radius, mail, login, homes, group data, nextcloud, Indico, Wikis, web applications, accounting, etc

2x 10Gbps

**LIP Lisbon Datacenter** @ 3Is / TTC in Lisbon

- Data backups, backup services, Privacy sensitive data

LHCONE

100 Gbps

CNCA  
WAN

100 Gbps + 10 Gbps

2x 10Gbps

10Gbps

FCCN  
RCTS

U.C

**CNCA** datacenter sala-grid @ FCCN Lisbon

- ncg.ingrid.pt / incd.pt
- LIP farm, LIP storage, Tier-2, Tier-3

**UTAD** datacenter @ Vila Real

- Computing cluster
- Mostly for FCT / CPCA projects
- Opportunistic capacity

**LIP** Dep Physics UC datacenter @ Coimbra

- CNCA tape libraries
- LIP Coimbra servers should be moved here

**LIP Coimbra** facilities @ Coimbra

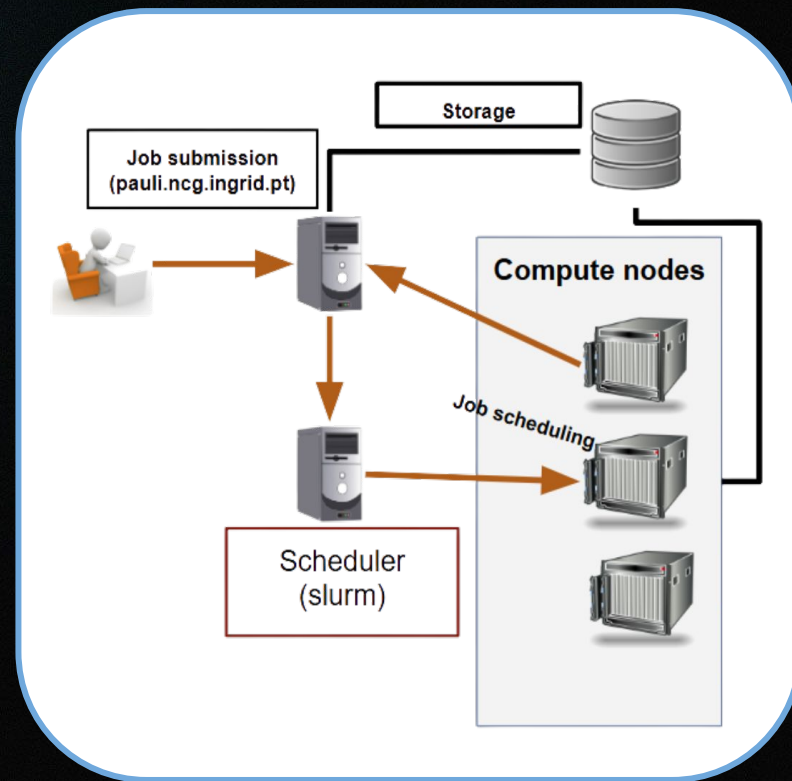
- Mail, DNS, LDAP, Radius, VMs, etc



## COMPUTING FARM

APPLICATIONS RUN IN A COMPUTE NODE:

- Linux
  - Pauli Centos 7
  - Curie AlmaLinux 9
- You do not have any direct access to the compute nodes
- Access through scheduler (Slurm)
- Storage accessible in both submission and compute nodes



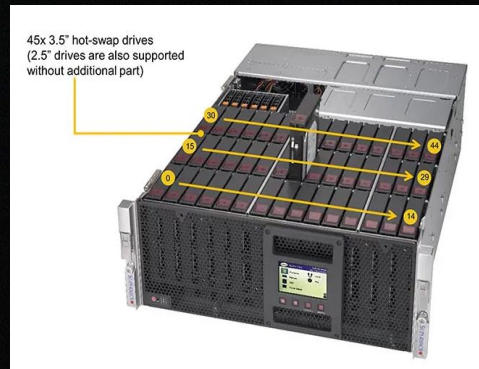


## LIP Computing farm at CNCA

Used @ INCD	Hours/year	~ CPU cores
Computing farm T2	14.800.000	2.000
Computing farm LIP	6.936.000	800
Cloud	3.700.000	430
Total	~ 25.500.000	~ 3.000

Upgrade of the LIP farm capacity in 2023

- **ATLAS trigger farm offered equipment and deployed at CNCA**





## LIP Storage farm at CNCA

Allocated usable @ INCD	Terabytes (df -H)
T2 + T3 (CNCA used by LIP)	1.514
LSTORE (CNCA used by LIP)	245
SHARE (LIP for group disks)	521
CMS (group acquired)	85
Pheno (group acquired)	254
Titan (group acquired)	176
CERN-cloud (group acquired)	87
HOMES (LIP)	44
Cloud computing (CNCA)	40
Others (CNCA and LIP)	30
Total	~ 3.000

/user LIP **personal home** only accessible to user

- Improved by LIP with server purchased in 2023
- User default quota of 200MB
- Can be increased on request

/shared (read write to GROUP)

- Purchased in 2023 without disks
- Groups can buy disks (still some slots available)

/lstore group acquired equipment servers + disks (read write to GROUP)

/cvmfs software distribution (read only)



# CNCA COMPUTING INFRASTRUCTURE



# CNCA Services

Provide **computing** and **data services** for the research community

Computing services:

- Cloud
- HTC
- Online Storage
- Data services
  - Polen data Repository  
<https://repositorio.polen.fccn.pt/>

**LIP TECHNICAL COORDINATION**





# CNCA Services

## **Can LIP access CNCA services?**

Yes, CNCA provides computing resources to all academia in Portugal.

## **How can I have access to CNCA services?**

Trough National Computing Calls or best effort access; ALL FCT approved projects can apply to fast track access.

## **What services can CNCA provide that I don't already have at LIP?**

Extra computing power trough HPC or GPU (Deucalion over 130 A100).





# DOCUMENTATION AND HELPDESK



## DOCUMENTATION

- LIP WIKI: <http://wiki-lip.lip.pt>
  - Configure email
  - Eduroam access
  - LIP internal groups documentation
  - LIP computing FARM access and commands
- MORE GENERIC FARM (CNCA): <https://wiki.incd.pt>



# TRAINING



LIP provides 6 training sessions per year under the EuroHPC project

EuroCC Calendar: <https://eurocc.fccn.pt/calendariopt/>

LIP dedicated slots:

**APRIL, SEPTEMBER & OCTOBER**

Introduction to HPC - hands-on tutorial

Advanced Job Submission in HPC – hands-on tutorial

Using Containers in HPC - hands-on tutorial

Advanced Use of Containers in HPC - hands-on tutorial



# Gitlab:

## explore collaboration enhancements



## Common issues:

- Project contributions spread along multiple user workspaces
  - PCs
  - Private storage spaces (like CernBox or user home dir)
- Difficulty to review or recover previous work
  - Backups spread
  - Contact the authors
  - Know who are responsible for the contributions



## Move on to a new approach:

- Share the work with your team
  - Work left on personal computer or private storages
  - Access anywhere
  - Control the access and avoid leaks
- Keep teams together
  - Share knowledge
  - Get reviews more often
  - Do smaller steps with feedback



# Gitlab groups and projects

The screenshot displays the GitLab interface for the 'EOSC Synergy' group. The left sidebar shows the group's navigation menu, including 'Pinned', 'Issues' (29), 'Merge requests' (1), 'Manage', 'Plan', 'Code', 'Build', 'Deploy', 'Help', and 'Admin'. The main content area shows the 'EOSC Synergy' group page with tabs for 'Subgroups and projects', 'Shared projects', 'Shared groups', and 'Inactive'. The 'Subgroups and projects' tab is active, displaying a list of subgroups and projects. The subgroups listed are 'Use Cases' (Owner), 'org' (Owner), and 'Deployments'. The projects listed are 'SQAaaS Wiki' (1 star, 1 year ago), 'sqaaaS-api-server' (0 stars, 1 week ago), and 'SQAaaS' (0 stars, 2 years ago). The 'SQAaaS Wiki' project description is: 'This GitLab project serves as a dedicated space for documenting essential procedur...'. The 'sqaaaS-api-server' project description is: 'SQAaaS API implementation'.

**EOSC Synergy**


**Subgroups and projects** Shared projects Shared groups Inactive




Search (3 character minimum) Stars




Subgroup/Project	Owner	Stars	Issues	Members	Actions
<b>Use Cases</b>	Owner	0	0	1	
<b>org</b>	Owner	1	0	1	
<b>Deployments</b>		0	13	1	
<b>SQAaaS Wiki</b>		1			
This GitLab project serves as a dedicated space for documenting essential procedur...					
<b>sqaaaS-api-server</b>		0			
SQAaaS API implementation					
<b>SQAaaS</b>		0			
2 years ago					



# Manage members and roles


 Next


  

 23  4  17

Project

S sample-gitlab-project


 Pinned


 Manage


Activity


Members


Labels

 Plan

 Code

 Deploy

 Analyze


 Help


GitLab.org / Sample Data Templates / sample-gitlab-project / Members


Members can be added by project *Maintainers* or *Owners*


Members 2659









Groups 1

 Filter members




Account 







Account	Source	Role	Expiration	Activity
 <b>jacopo beschi</b> @jacopo-beschi	Inherited from <a href="#">GitLab.org</a>	Developer	Expiration date 	8+ Nov 25, 2015 ✓ Jan 17, 2018 ✗ Mar 26, 2025
 <b>GitLab Bot</b> @gitlab-bot	Inherited from <a href="#">GitLab.org</a>	Maintainer	Expiration date 	8+ Nov 16, 2017 ✓ Nov 20, 2017 ✗ Mar 26, 2025
 <b>A'Jah Watts</b> @ajwatts	Inherited from <a href="#">GitLab.org</a>	Developer	Expiration date 	8+ Oct 04, 2021 ✓ Oct 04, 2021 ✗ Mar 26, 2025
 <b>AJ Bhaskar</b> @abhaskar-gl	Inherited from <a href="#">GitLab.org</a>	Developer	Expiration date 	8+ Jun 12, 2023 ✓ Jun 12, 2023 ✗ Mar 26, 2025





# Activity overview

 Next


 23


 4


 17


Project


S sample-gitlab-project


 Pinned


 Manage


 Activity


 Members


 Labels

 Plan


 Code

 Deploy

 Analyze


 Help

GitLab.org / Sample Data Templates / sample-gitlab-project / Activity


**GitLab Security Policy Bot** @gitlab\_security\_policy\_project\_24425533\_bot\_49df0f97d544ec5188d2133d3d2eb4b9

9 months ago


👤 joined project

**Kerri Miller** @kerrizor


3 years ago


 Commented on merge request !31 "Update karthick README.md"

Thanks for the contribution, @10cse61 - I think you meant to submit this possibly to a different repository?


**Kerri Miller** @kerrizor

3 years ago


 Closed merge request !31 "Update karthick README.md"

**GitLab Bot** @gitlab-bot


3 years ago


 Commented on merge request !31 "Update karthick README.md"

👋 @10cse61...


**Karthick Karthi.** @karthickramasamy


3 years ago

 Opened merge request !31 "Update karthick README.md"


**Grant Young** @grantyoung

4 years ago

 Opened merge request !30 "Id blanditiis consequatur ut."

**Grant Young** @grantyoung

4 years ago

 Commented on merge request !30 "Id blanditiis consequatur ut."

Vel...

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COMPUTING



# Manage issues for all projects in the group

The screenshot displays the GitLab Issue Boards interface for a group named "EOSC". The top navigation bar includes the GitLab logo, a search bar, and icons for repository (6), pull requests (2), and issues (5). Below the navigation bar is a sidebar with a "Group" section containing links for Pinned, Manage, Plan, Issues (29), Issue board (selected), Milestones, Code, Build, and Deploy. The main content area is titled "EOSC / EOSC Synergy / Issue Boards" and features a search bar and a "New list" button. The issues are organized into two columns: "Open" (29 issues) and "Closed" (11 issues). The "Open" column lists issues such as "Mark successful builds of assessments as permalinks in Jenkins" (sqaas-api-server #1), "Check why hadolint success is not being reported as such" (sqaas-api-server #3), "Add shellcheck tool" (sqaas-tooling #1), and "ERR\_OSSL\_EVP\_UNSUPPORTED when running 'npm run stage'". The "Closed" column lists issues such as "Small mistake in documentation" (sqaas-api-spec #1), "Loading issues with client plugin installer" (sqaas-jenkins-instance #1, marked as a Bug), "Ingress templates should support ingress class" (sqaas-helm-chart #4, marked as dev), and "Services templates supporting annotations and labels".

EOSC / EOSC Synergy / Issue Boards

Search

Group

- Pinned
- Manage
- Plan
- Issues (29)
- Issue board**
- Milestones
- Code
- Build
- Deploy

Open 29 +


- Mark successful builds of assessments as permalinks in Jenkins  
sqaas-api-server #1
- Check why hadolint success is not being reported as such  
sqaas-api-server #3
- Add shellcheck tool  
sqaas-tooling #1
- ERR\_OSSL\_EVP\_UNSUPPORTED when running 'npm run stage'




Closed 11 + New list

- Small mistake in documentation  
sqaas-api-spec #1
- Loading issues with client plugin installer  
Bug  
sqaas-jenkins-instance #1
- Ingress templates should support ingress class  
dev  
sqaas-helm-chart #4
- Services templates supporting annotations and labels



# Define milestones and set deadlines

 Next

📁 23

🔗 4

📧 17

🔍 Search or go to...

Project

S sample-gitlab-project

📌 Pinned >

👤 Manage >


📅 Plan ▾

Issues 29

Issue boards

**Milestones**

GitLab.org / Sample Data Templates / sample-gitlab-project / Milestones

 This is an archived project. Repository and other project resources are read-only.

Open 3

Closed 0

All 3

Due soon ▾

<b>Sample GitLab Project Milestone 1</b> 📁 GitLab.org / Sample Data Templates / sample-gitlab-project	expired on Aug 7, 2020 <b>Expired</b>	0/1 complete <div><div></div></div> 0%	⋮
<b>Sample GitLab Project Milestone 2</b> 📁 GitLab.org / Sample Data Templates / sample-gitlab-project	expired on Aug 14, 2020 <b>Expired</b>	0/1 complete <div><div></div></div> 0%	⋮
<b>Sample GitLab Project Milestone 3</b> 📁 GitLab.org / Sample Data Templates / sample-gitlab-project	expired on Aug 21, 2020 <b>Expired</b>	0/1 complete <div><div></div></div> 0%	⋮



# Store code and data along documentation

The screenshot displays the GitLab web interface. On the left is a dark sidebar with the GitLab logo and navigation options: 6 repositories, 2 forks, and 5 merge requests. Below these is a search bar and a 'Project' menu with options like Manage, Plan, Code, Merge requests (0), Repository (selected), Branches, Commits, Tags, and Repository graph. At the bottom of the sidebar are 'Help' and 'Admin' buttons. The main content area shows the breadcrumb path: / Deployments / sqaas-jenkins-operator / Repository. Below this is a table of repository files:


jenkins-operator	Use site internal proxy for retrieving co...	2 years ago
tools	Working release to deploy Jenkins Op...	1 year ago
.gitignore	Working release to deploy Jenkins Op...	1 year ago
LICENSE	Initial commit	3 years ago
README.md	Add references for kustomize	1 year ago
kustomization.yaml	Update to jenkins operator release v0...	1 year ago
namespace.yaml	Working release to deploy Jenkins Op...	1 year ago




Below the table, the 'README.md' file is selected, showing the title 'sqaas-jenkins-operator' and the following text:




Jenkins Operator can be installed using YAMLS or Helm Chart. Both implementations can be merged in a kustomization file. The difference is about the available options that each representation allows to configure.



# Review the contributions history

 Next

 23  4  17

Project

</> Code

Merge requests 29

Repository

Branches

Commits

Tags

Repository graph

Compare revisions


Locked files

Deploy >

Analyze >

Help

GitLab.org / Sample Data Templates / sample-gitlab-project / Repository graph

 This is an archived project. Repository and other project resources are read-only.

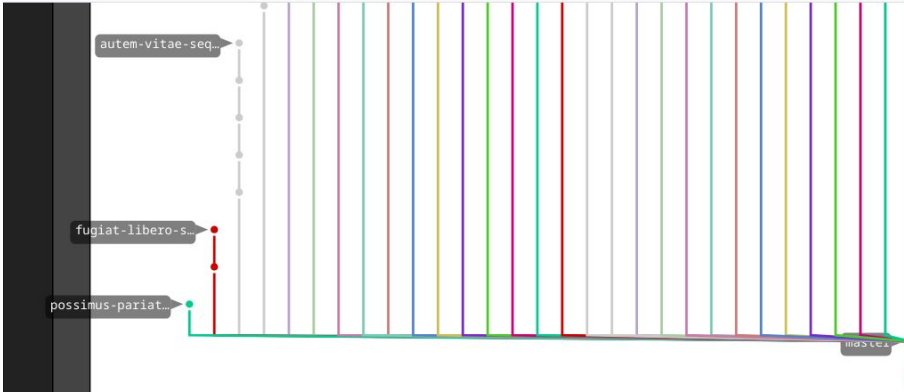
## Repository graph

You can move around the graph by using the arrow keys.

master

Git revision

☐ Begin with the selected commit



autem-vitae-seq...

fugiat-libero-s...

possimus-pariat...

Initial commit

Quo hic occaecati mollitia.

Quisquam nemo aut deleniti.

Ipsum saepe necessitatibus qui.

Quae aut optio ut.

Eos vel quia quis.

Et aut eius dolores.

Similique quia commodi dolores.

Magnam blanditiis ea voluptatibus.

Quis ratione earum tempora.

Update README.md

Initial commit



# Compare your work revisions

GitLab.org / Sample Data Templates / sample-gitlab-project / Compare revisions / master to at-adipisci-ducimus-qui-nihil

Changes are shown as if the source revision was being merged into the target revision. [Learn more about comparing revisions.](#)

**Source** gitlab-org/sample-data-templ... at-adipisci-ducimus-qui-nihil

**Target** gitlab-org/sample-data-templ... master

**Show changes**

- ☒ Only incoming changes from source
- ☐ Include changes to target since source was created

[Compare](#) [View open merge request](#)

**Commits on Source (2)**

- Nam recusandae dolorem cumque.** 763258bc  
Administrator authored 4 years ago
- Nisi ipsam rem repudiandae.** e10493c0  
Administrator authored 4 years ago

Showing 6 changed files with 177 additions and 8 deletions

[Hide whitespace changes](#) [Inline](#) [Side-by-side](#)

View file @ e10493c0

▼ **README.md**

```
1 - # Sample GitLab Project
2 -
3 - This sample project shows how a project in GitLab looks for demonstration purposes. It contains issues, merge requests and Markdown files in many branches,
4 - named and filled with lorem ipsum.
5 -
6 - You can look around to get an idea how to structure your project and, when done, you can safely delete this project.
7 -
8 - [Learn more about creating GitLab projects.](https://docs.gitlab.com/ee/gitlab-basics/create-project.html)
9 + ## Mollitia
10 + Dolor assumenda nihil.
11 + `Fuga.`### Sit
```



# Gitlab: maximize productivity



## Common issues:

- Infrastructure learning curve
  - Learn how to use specific tools to access the computing cluster
  - Understand the procedures for using existing resources
- Data and code issues
  - Get the results along the code release
  - Losing output in the computing workspace
  - Memory leaks
  - Low performance

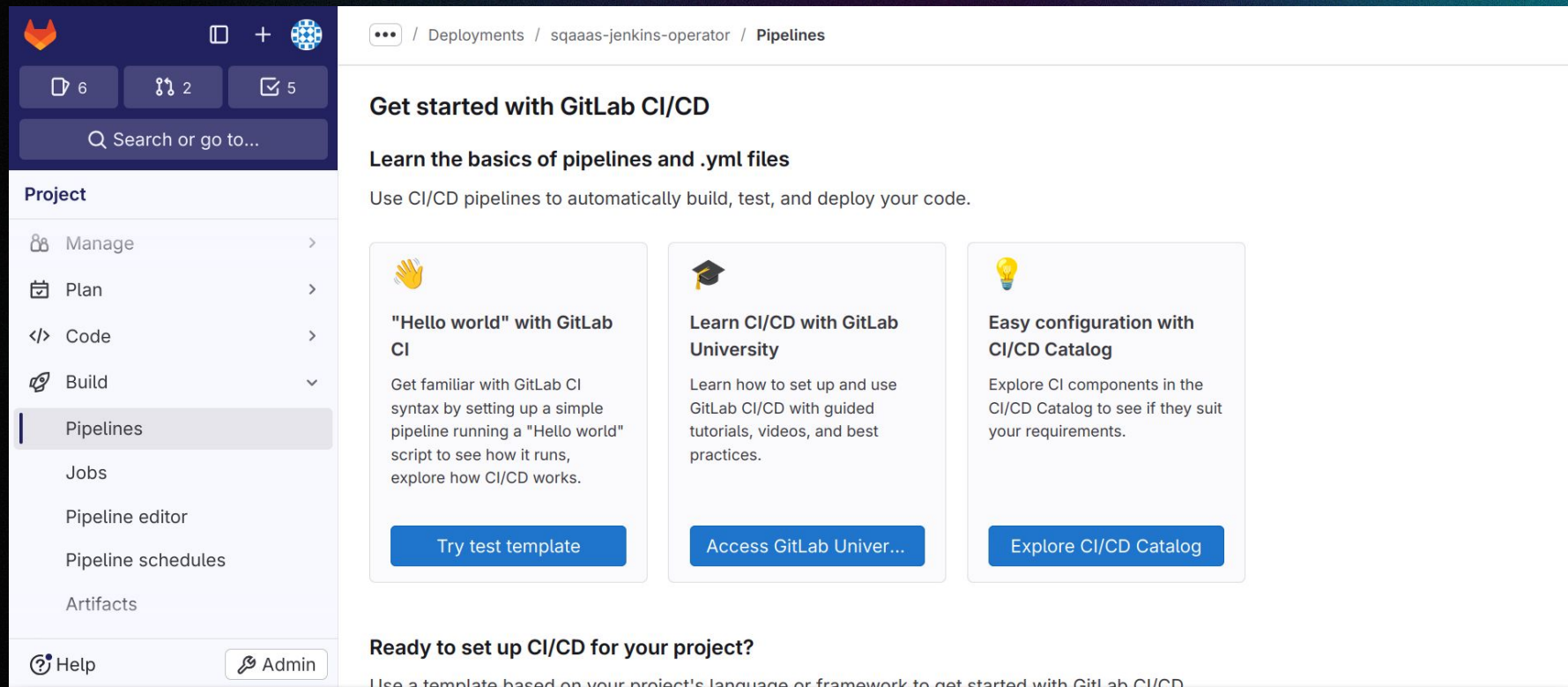


## Adopt new practices:

- Create pipelines to run your computations
  - Run your code automatically or manually when there is an update to your project repository
  - Job output directly in the Gitlab interface along your code updates
- Continuous development within your pipelines
  - Check code quality before submitting the computing jobs
  - Only merge the code after results validation



# Create pipelines for your computations



The screenshot shows the GitLab web interface. On the left is a dark sidebar with the GitLab logo at the top. Below the logo are three buttons: a document icon with '6', a group of people icon with '2', and a checkmark icon with '5'. Below these is a search bar with the text 'Search or go to...'. The sidebar menu is titled 'Project' and includes links for 'Manage', 'Plan', 'Code', 'Build', 'Pipelines' (which is highlighted), 'Jobs', 'Pipeline editor', 'Pipeline schedules', and 'Artifacts'. At the bottom of the sidebar are 'Help' and 'Admin' links.

The main content area has a breadcrumb trail: 'Deployments / sqaaas-jenkins-operator / Pipelines'. Below this is the heading 'Get started with GitLab CI/CD' and the subheading 'Learn the basics of pipelines and .yaml files'. A paragraph states: 'Use CI/CD pipelines to automatically build, test, and deploy your code.'

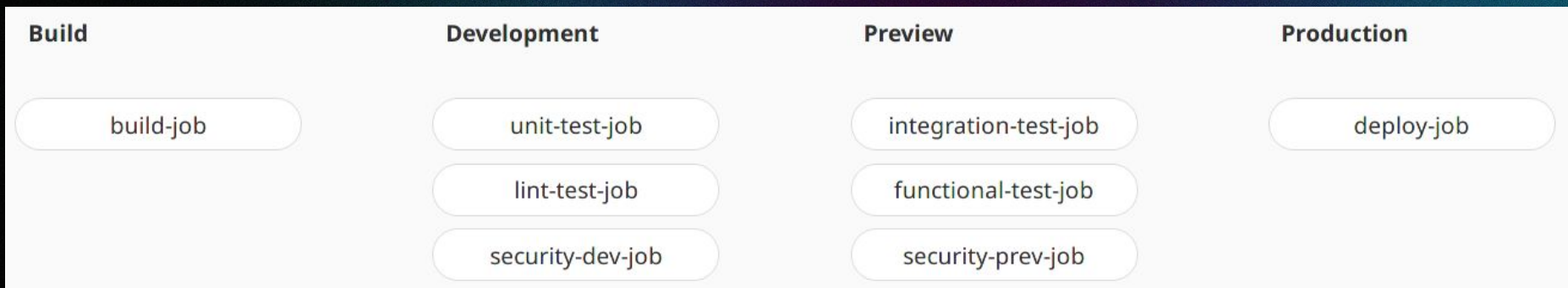
There are three cards in the main content area:

- "Hello world" with GitLab CI**: Features a hand icon. Text: 'Get familiar with GitLab CI syntax by setting up a simple pipeline running a "Hello world" script to see how it runs, explore how CI/CD works.' Button: 'Try test template'.
- Learn CI/CD with GitLab University**: Features a graduation cap icon. Text: 'Learn how to set up and use GitLab CI/CD with guided tutorials, videos, and best practices.' Button: 'Access GitLab Univer...'
- Easy configuration with CI/CD Catalog**: Features a lightbulb icon. Text: 'Explore CI components in the CI/CD Catalog to see if they suit your requirements.' Button: 'Explore CI/CD Catalog'.

At the bottom of the main content area is the heading 'Ready to set up CI/CD for your project?' followed by the text: 'Use a template based on your project's language or framework to get started with GitLab CI/CD.'



# Pipeline composed by stages and jobs





# Look into pipeline stages

D

Default

Project information

Repository

Issues

0

Merge requests

0

CI/CD

Pipelines

Editor

Jobs

Schedules

Security & Compliance

Deployments

Monitor

Infrastructure

Packages & Registries

Analytics

🕒

8 jobs for `main` in 4 minutes and 2 seconds

🚩

latest

🔑

`fab3eb66`

📄

🔗

No related merge requests found.

Pipeline

Needs

Jobs 8

Tests 0

Build

✓

build-job

🔄

Development

✓

lint-test-job

🔄

✓

security-de...

🔄

✓

unit-test-job

🔄

Preview

✓

functional-t...

🔄

✓

integration-...

🔄

✓

security-pre...

🔄

Production

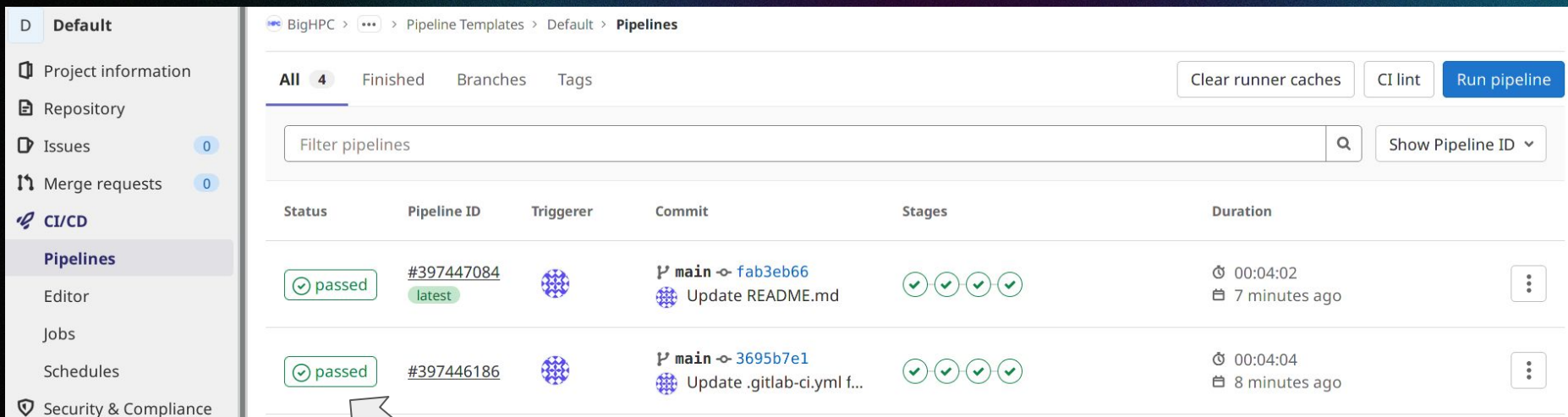
✓

deploy-job

🔄



# Click over status of pipeline after passing the tests



The screenshot shows the GitLab interface for the 'BigHPC' project. The left sidebar contains navigation links: Default, Project information, Repository, Issues (0), Merge requests (0), CI/CD, Pipelines (selected), Editor, Jobs, Schedules, and Security & Compliance. The main content area displays the 'Pipelines' page with a breadcrumb trail: BigHPC > Pipeline Templates > Default > Pipelines. At the top, there are tabs for 'All' (4), 'Finished', 'Branches', and 'Tags'. Action buttons include 'Clear runner caches', 'CI lint', and 'Run pipeline'. A search bar labeled 'Filter pipelines' and a dropdown for 'Show Pipeline ID' are also present. Below this is a table of pipelines:

Status	Pipeline ID	Triggerer	Commit	Stages	Duration
passed	#397447084 latest		main -> fab3eb66 Update README.md		00:04:02 7 minutes ago
passed	#397446186		main -> 3695b7e1 Update .gitlab-ci.yml f...		00:04:04 8 minutes ago

A white arrow points to the 'passed' status of the second pipeline (#397446186).



# Job output in the Gitlab interface

The screenshot displays the GitLab CI/CD interface. On the left is a sidebar with navigation links: Default, Project information, Repository, Issues (0), Merge requests (0), CI/CD (selected), Pipelines, Editor, Jobs (selected), Schedules, Security & Compliance, Deployments, Monitor, Infrastructure, Packages & Registries, and Analytics. A 'Collapse sidebar' link is at the bottom of the sidebar.

The main area shows the output of a job named 'lint-test-job'. The output is a list of steps with their durations:

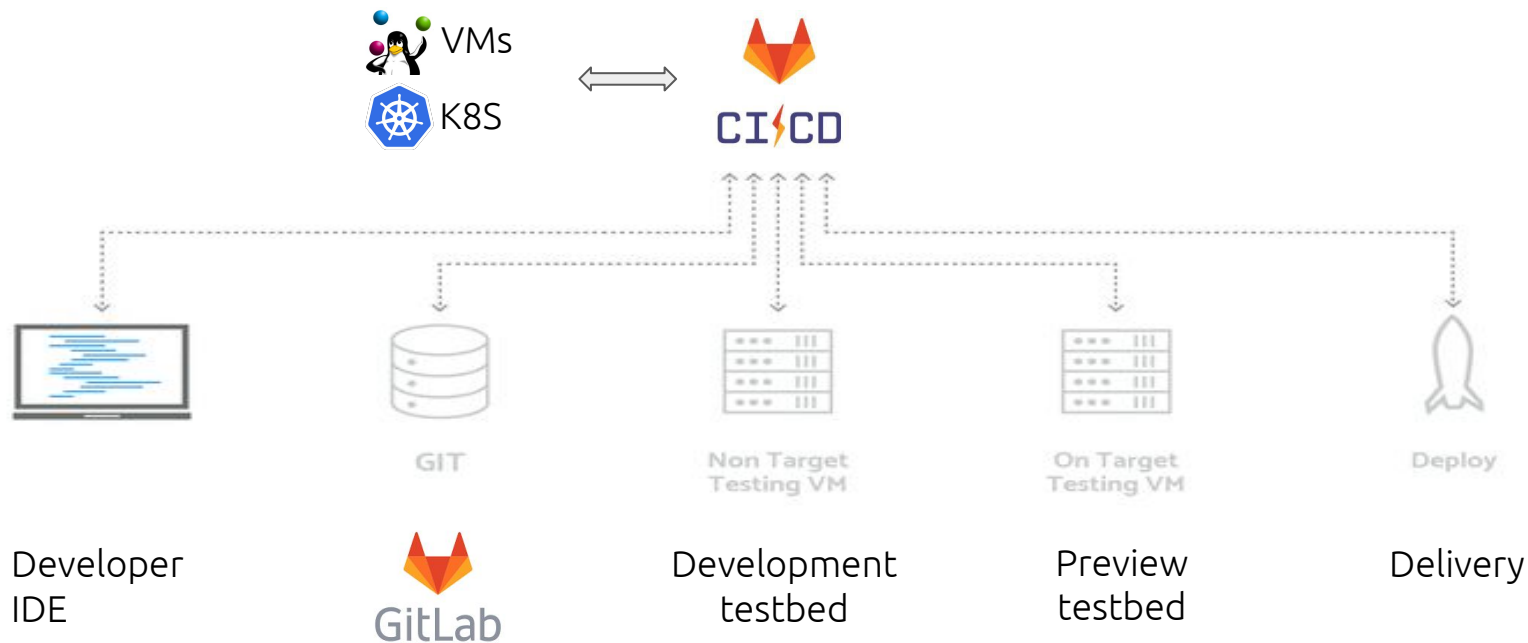
- 8 **Preparing environment** (00:01)
  - 9 Running on runner-ed2dce3a-project-30845538-concurrent-0 via runner-ed2dce3a-srm-1635421744-8d13alcd...
- 11 **Getting source from Git repository** (00:02)
  - 12 `$ eval "$CI_PRE_CLONE_SCRIPT"`
  - 13 **Fetching changes with git depth set to 50...**
  - 14 Initialized empty Git repository in /builds/bighpc/ci-cd/pipeline-templates/default/.git/
  - 15 **Created fresh repository.**
  - 16 **Checking out fab3eb66 as main...**
  - 17 **Skipping Git submodules setup**
- 19 **Executing "step\_script" stage of the job script** (00:10)
  - 20 Using docker image sha256:27d049ce98db4e55ddfaec6cd98c7c9cfd195bc7e994493776959db33522383b for ruby:2.5 with digest ruby@sha256:ecc3e4f5da13d881a415c9692bb52d2b85b090f38f4ad99ae94f932b3598444b ...
  - 21 `$ echo "Linting code... This will take about 10 seconds."`
  - 22 Linting code... This will take about 10 seconds.
  - 23 `$ sleep 10`
  - 24 `$ echo "No lint issues found."`
  - 25 No lint issues found.
- 27 **Cleaning up project directory and file based variables** (00:01)
- 29 **Job succeeded**

On the right, the job configuration is shown:

- lint-test-job** (Retry button)
- Duration:** 24 seconds
- Timeout:** 1h (from project)
- Runner:** #380987 (ed2dce3a) shared-runners-manager-6.gitlab.com
- Commit:** fab3eb66 (Update README.md)
- Pipeline:** #397447084 for main (development)
- Jobs:** lint-test-job, security-dev-job, unit-test-job



# Continuous development within your pipelines





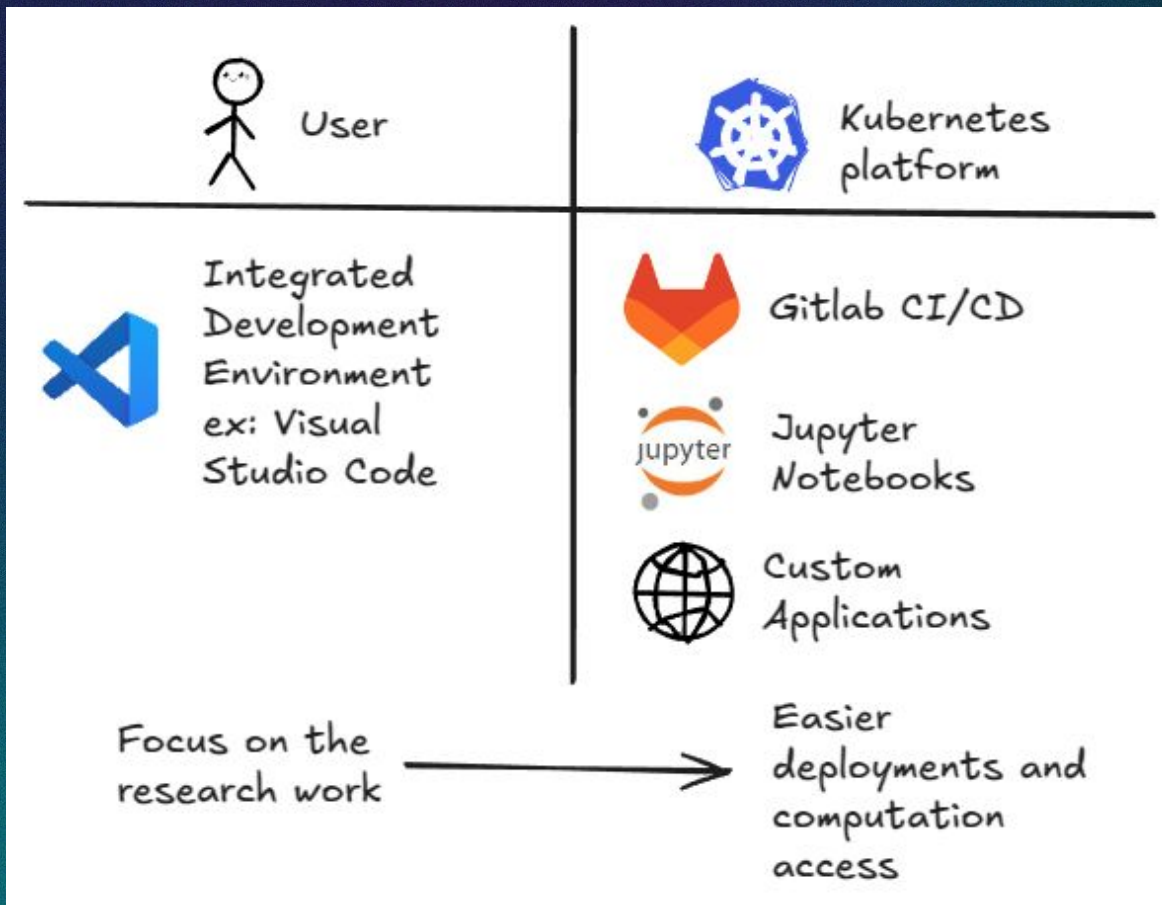
## Current pilot use cases at LIP:

- Electronics Lab
  - Keep all code, blueprints and data at Gitlab
  - Tasks management
- DGT project
  - All collaborators keep their contributions at Gitlab
  - Continuous development practices adoption
  - Pipelines to check code quality
  - Jobs and deployments automation



# Future CNCA computing services

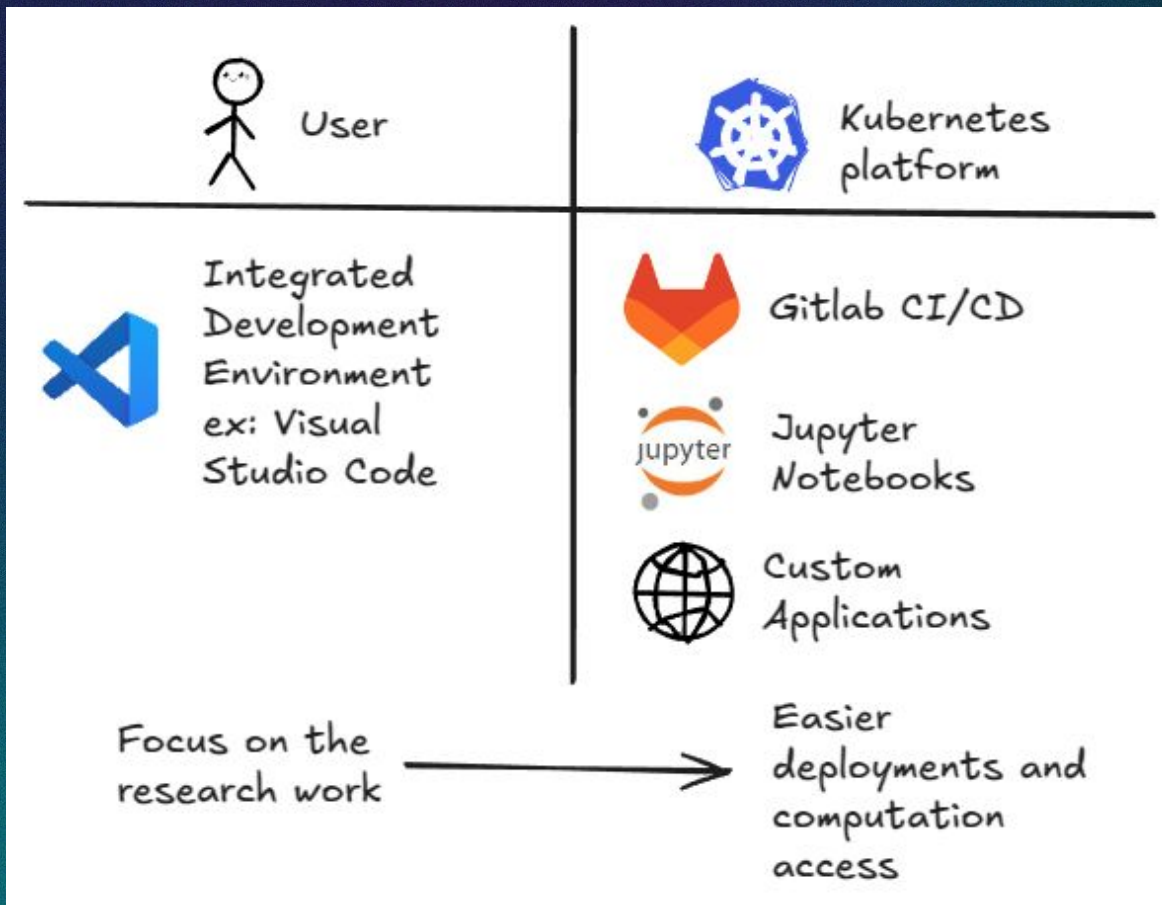




## Kubernetes:

- Industry leading open source container orchestration technology
- Works like a Job scheduler with autoscaling
- More portability with less chance of vendor lock-in





## Kubernetes:

- Automation of deployment and scalability
- Increased DevOps efficiency applying methodologies, such as, GitOps
- App stability and availability
- Enhanced flexibility and extensibility to adopt new features and functionalities



# NEXT STEPS



LIP.  
COMPUTING



- Gather LIP groups interest to the proposed practices
- Improve work methodologies
- Adopt novel practices
- Place LIP research into a bright future

Let's work together !



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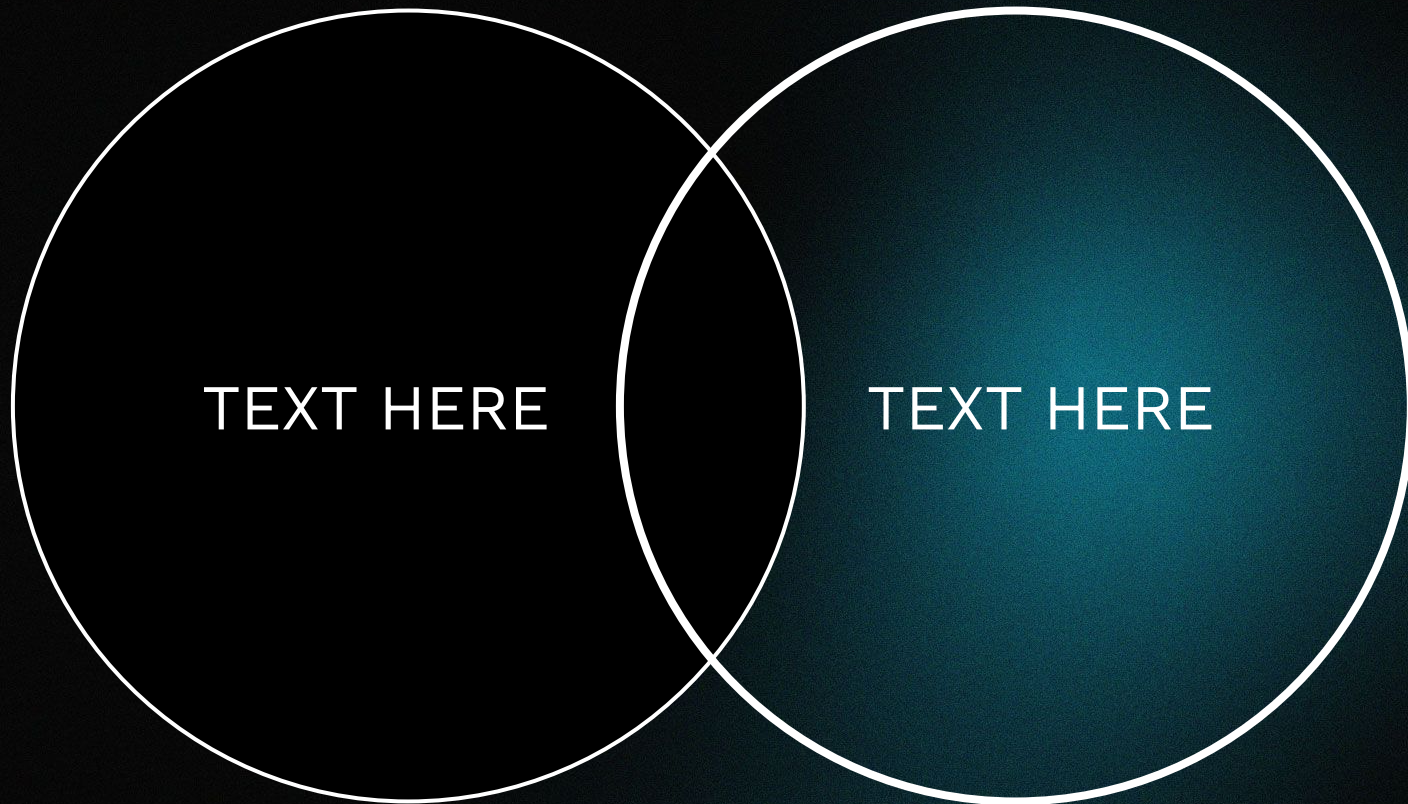
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