



# Shiny-K8s, a toolkit to easily and reproducibly deploy your (R)Shiny app thanks to docker and Kubernetes (without mastering them!)

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## ► To cite this version:

Bryan Brancotte, Elodie Chapeaublanc. Shiny-K8s, a toolkit to easily and reproducibly deploy your (R)Shiny app thanks to docker and Kubernetes (without mastering them!). JOBIM 2024, Jun 2024, Toulouse (FRANCE), France. . pasteur-04643557

**HAL Id: pasteur-04643557**

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Submitted on 10 Jul 2024

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# Shiny-K8s, a toolkit to easily and reproducibly deploy your (R)Shiny app thanks to docker and Kubernetes (without mastering them!)

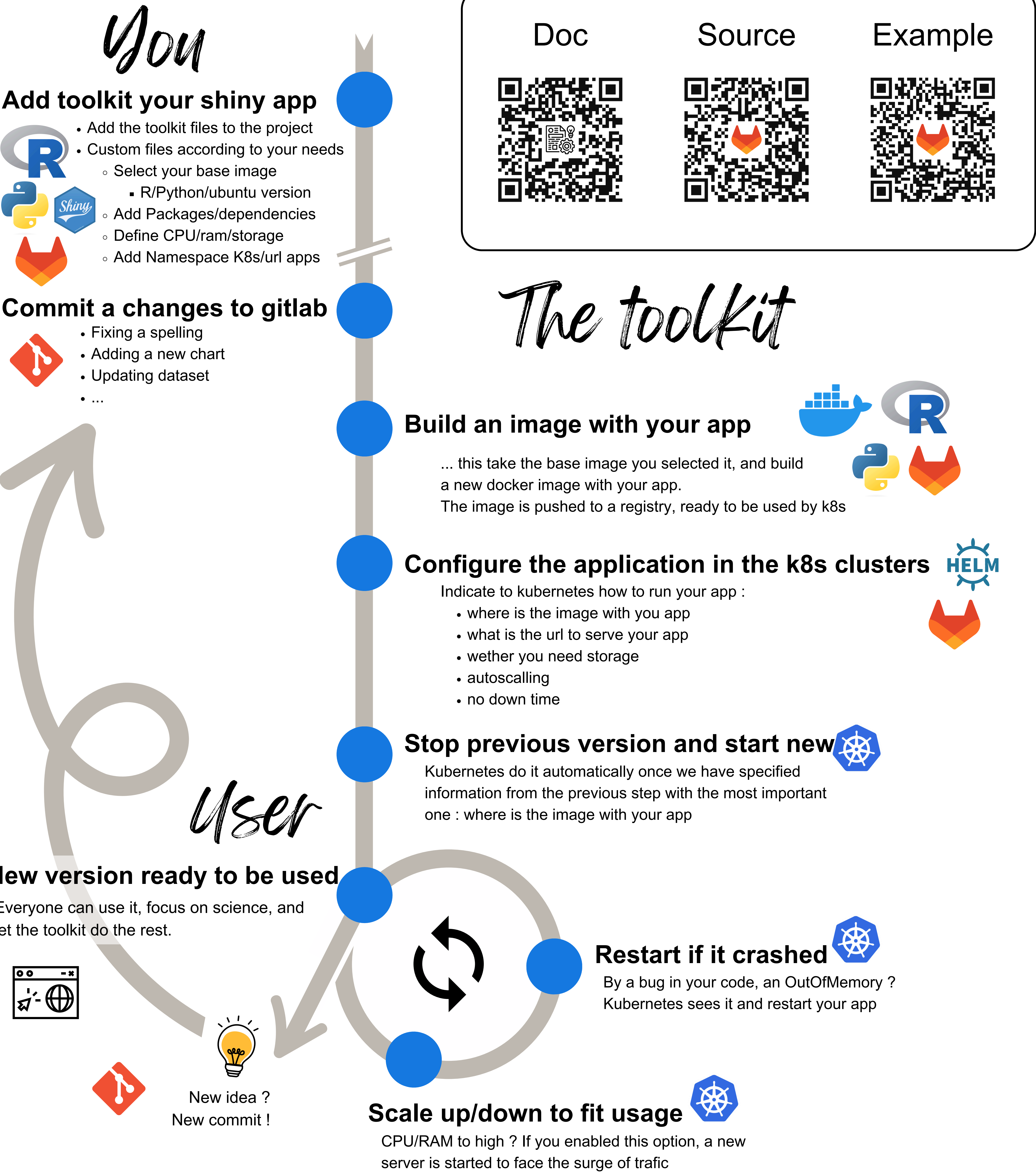
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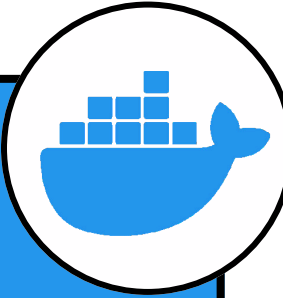


Keywords : Shiny, Kubernetes, Reproducibility, DevOps, Docker

At the bioinformatics hub of Institut Pasteur - Paris, Our Shiny-K8s toolkit simplifies the deployment of R Shiny [1] and shiny-python apps [2]. It uses Docker [3], Kubernetes [4], Helm [5], and GitLab-CI/CD [6] for automated deployment. It promotes software development best practice with GitLab source hosting and new instance automatically deployed for any new branch. Features include auto-scaling, updates without downtime, persistent storage, and private project content. The toolkit provides step-by-step documentation, and is available under an MIT license. Multiple projects at the Institut Pasteur are already using the toolkit.



## Docker



Container technologies like Docker enable you to encapsulate your application, its dependencies, and the operating system within an image. Our toolkit proposes pre-built images featuring different versions of R/Python, Ubuntu, and a configured ShinyServer. On top of these "images" your app and its dependencies are added.

## Helm



How your application will run in kubernetes cluster is described by multiple templates. Helm allows to circumvent the configuration of these templates into one single small configuration file. Using true/false your unleash no-down-time, private registry, usage-based automated scalling of your app. Resources allocation (core, ram, storage) is also centralized in this file.

## Kubernetes



Kubernetes functions like a cloud, where containers replace VMs. Once your application is defined by templates, Kubernetes main task is to continuously adjust its state to align with your requirements: if a container crashes, it starts a new one; more storage asked, it is applied.

## Gitlab CI/CD



Continuous Integration and Deployment consists in having a workflow which test your app, build it, deploy it, package doc, publish it, ... CI/CD is triggered on any event such as commit. In the Shiny-K8S toolkit, we implemented a workflow where we build the image containing your app along with its dependencies, then use the template packaged by helm to describe how your app should be deployed, and actually transmit it to kubernetes. In this CI/CD workflow manually triggered task allows you to end data to your app in kubernetes

### Facilitated and encouraged by the toolkit

- Your app is more **reproducible** : every changes are tracked, you can redeploy a previous commit at anytime.
- Using **git branches** is encouraged : when a new branch is created, a new instance of your app starts serving this version of your app, with no additional task to do, just git checkout -b my-next-feature
- "I don't want my data in git"** Adding your data in the source repository is not always the best choice (private data, too big, regular new version, ...). You can ask the toolkit to fetch data from any given url.

### Plan B No Kubernetes?

You can still use the docker compose made for production settings, it pulls the image from the gitlab registry, and serve your app. Just ask your sysadmin a virtual machine, and an url routed to the VM.