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Déploiement d'applications containerisées avec VIP sur EGI

Sandesh Patil ¹
Axel Bonnet ¹
Sorina Pop ¹
Tristan Glatard ²

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INSA Lyon; Université de Lyon, France

² Concordia University, Quebec, Canada

Le poster :



Deploying container-based applications on EGI with VIP

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VIP : Virtual Imaging Platform

- Free and open platform for the simulation and processing of medical images
 - 1400+ registered users;
 - 20+ applications available as a service;
 - Web portal at <https://vip.creatis.insa-lyon.fr/>
- Uses EGI resources from the biomed Virtual Organization to provide users with transparent access to high-throughput computing (through the DIRAC framework).



How it works?

- VIP [ref. 1] relies on Boutiques [ref. 3] to facilitate application deployment and execution on EGI resources. [fig. 1]
- Applications are fully described through Boutiques JSON descriptors.
- Descriptors point to Linux containers to facilitate application installation and sharing.

Containers

- Docker** containers are very popular, but the Docker daemon requires root privileges, preventing its support on HPC and HTC infrastructures.
- Singularity** answers this problem and thus popular in HPC centers. However, on EGI, it comes in variety of versions and configurations, which might prevent it's seamless use.
- Udocker** [ref. 2] is another alternative, which can be installed on the fly without root privileges.

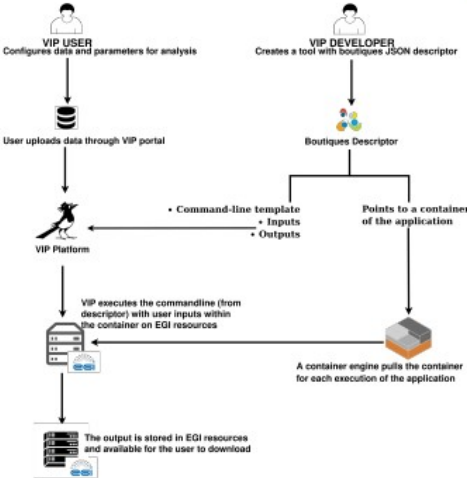


Fig. 1 – VIP relies on Boutiques and Linux containers for application deployment.

Container pre-deployment with udocker on CVMFS

- Udocker can pull the images (udocker pull <image_name>) on the fly from a central hub (e.g docker hub) on the EGI worker nodes [fig. 2]
- However, this may cause network issues for larger number of parallel jobs
- One alternative is to pre-deploy containers on CVMFS (CemVM File System) [ref. 4].
 - The image is pulled from the hub, then converted into a container (udocker create <container_name>).
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- VIP jobs are then able to use udocker with the pre-deployed containers.

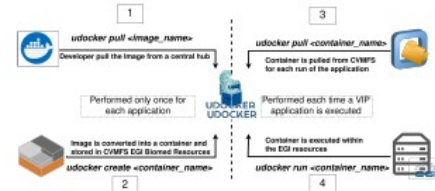


Fig. 2 – Pre-deployment of containers on CVMFS.

Conclusion and perspectives

- VIP is used by more than 1400 users for more than 20 applications of medical simulation and imaging, which are executed on EGI resources using linux containers.
- Containers are managed with udocker, which is deployed on the fly on EGI Worker Nodes.
- For some VIP applications, containers are pre-deployed on CVMFS.
- Pre-deployment of containers on CVMFS for production usage is very useful, but it may be cumbersome for testing and development.
- Having an EGI dedicated container registry could be a good alternative for testing and development usage.

References

- VIP : Glatard, Tristan, et al. 2013. « A Virtual Imaging Platform for Multi-Modality Medical Image Simulation ». IEEE Transactions on Medical Imaging 32 (1): 110-18
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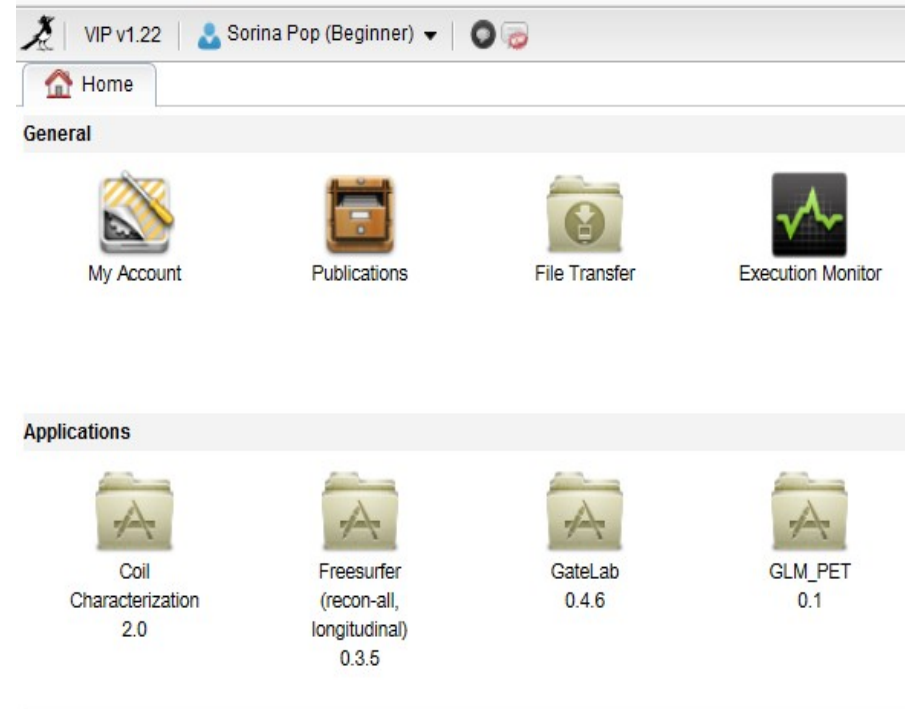
Funding

M Patil is funded by the French program "Investissement d'Avenir" run by the Agence Nationale pour la Recherche (ANR-11-INBS-0006).



VIP en une phrase

- Portail web
- Pour l'imagerie médicale
- AaaS
- Gratuit (pour la recherche)
- Utilise des ressources d'EGI (VO biomed)



VIP v1.22 | Sorina Pop (Beginner)

Home

General

- My Account
- Publications
- File Transfer
- Execution Monitor

Applications

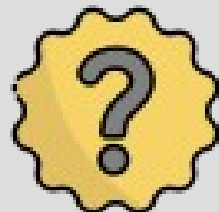
- Coil Characterization 2.0
- Freesurfer (recon-all, longitudinal) 0.3.5
- GateLab 0.4.6
- GLM_PET 0.1

VIP Home Page

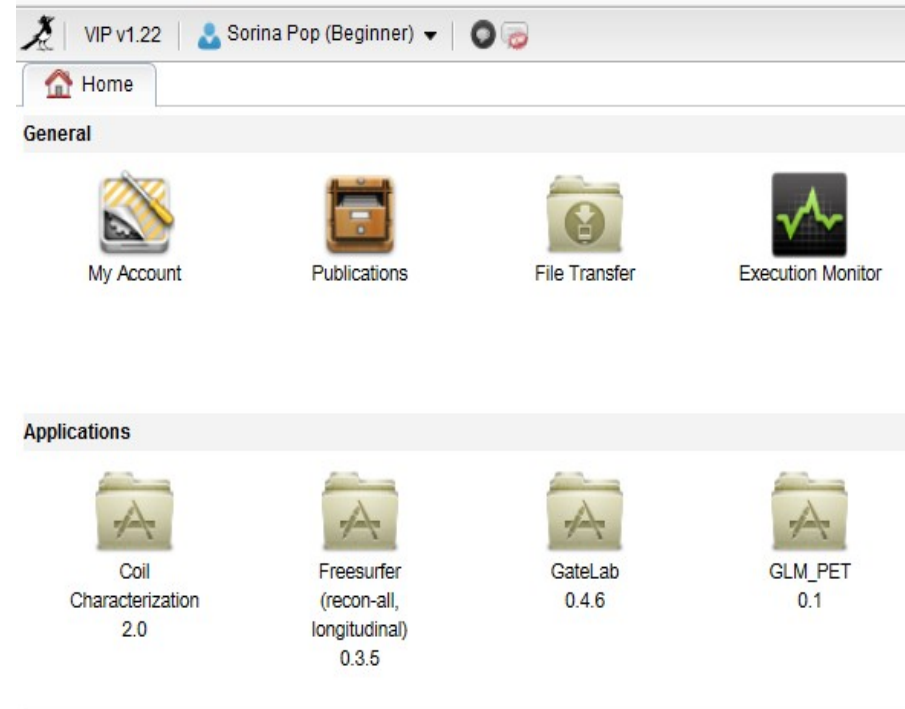
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Comment ?



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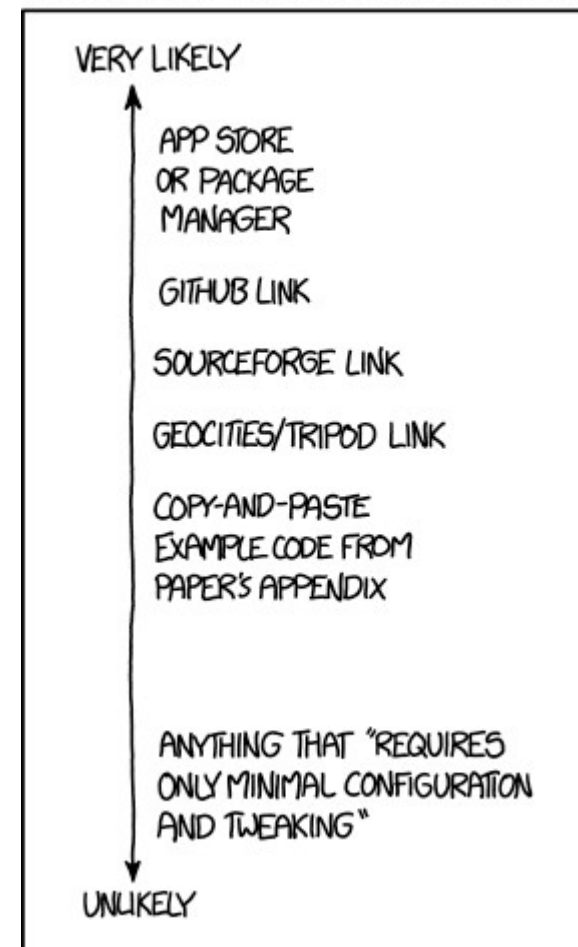
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Comment utiliser les ressources EGI ?

- Packager / Exécuter l'application

LIKELIHOOD YOU WILL GET CODE WORKING
BASED ON HOW YOU'RE SUPPOSED TO INSTALL IT:



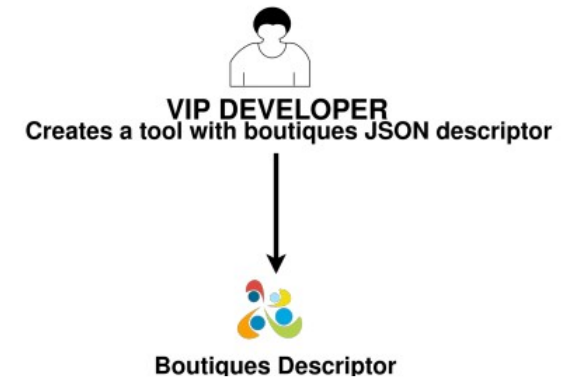
xkcd.com/1742 : Will it Work ?

Comment utiliser les ressources EGI ?

- ~~Packager / Exécuter l'application~~
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Comment intégrer de nouvelles applications ?



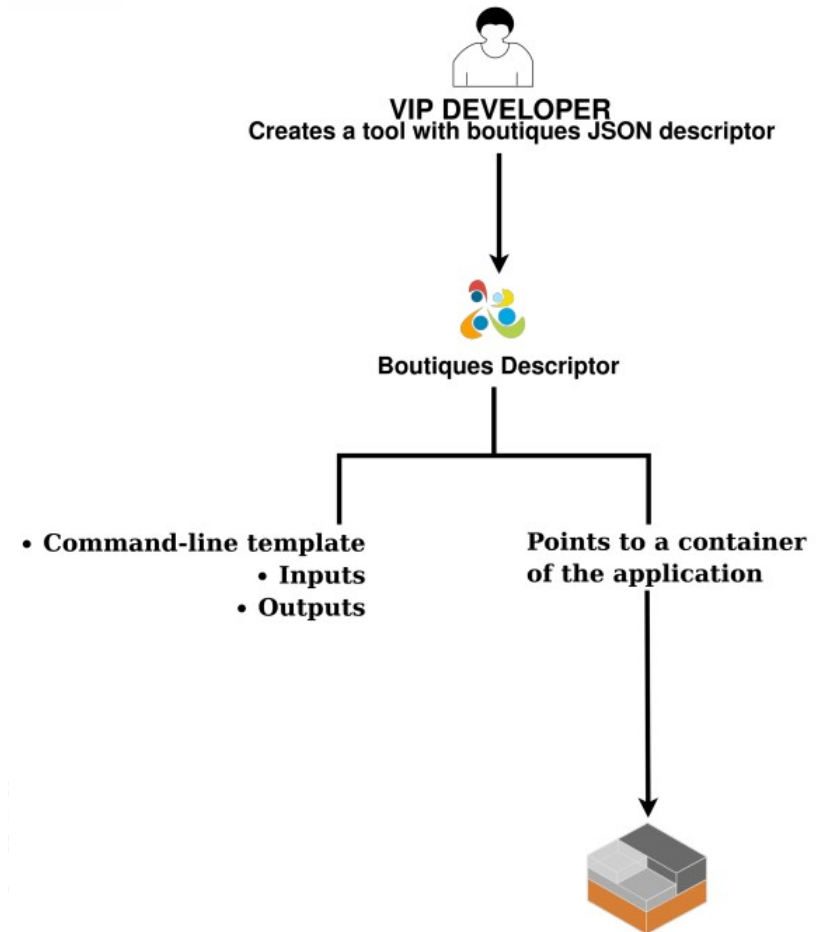
Solution basée sur :

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Solution basée sur :

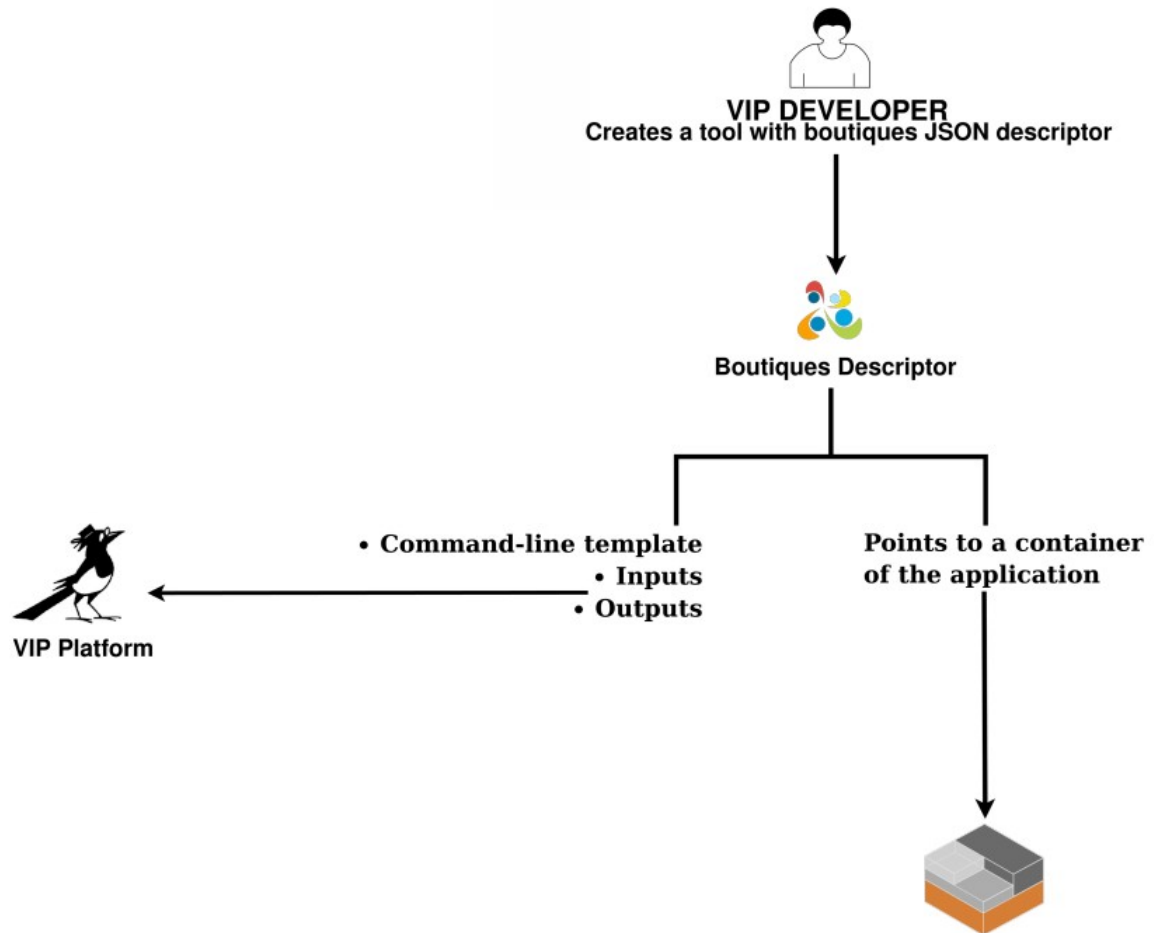
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Comment intégrer de nouvelles applications ?

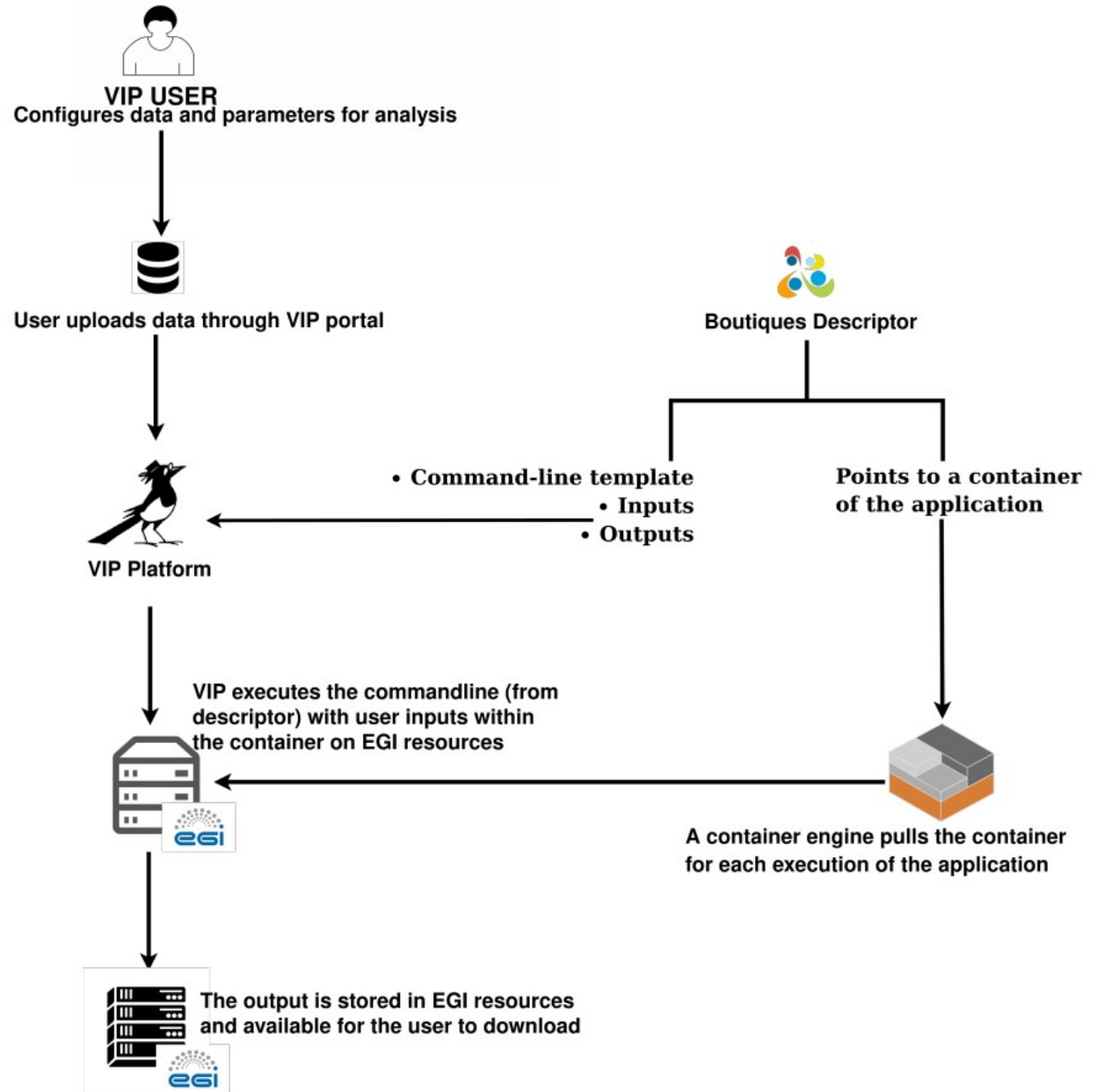
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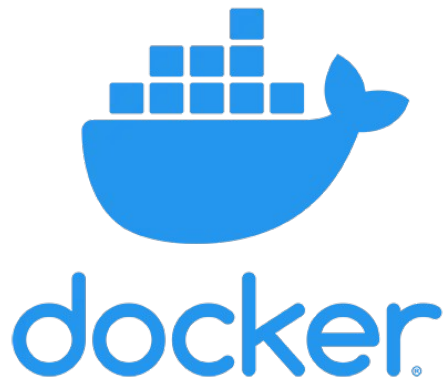


Comment les exécuter ?

- Solution basée sur :
- Boutiques
 - Containers



Quelle technologie de container ?



Merci !



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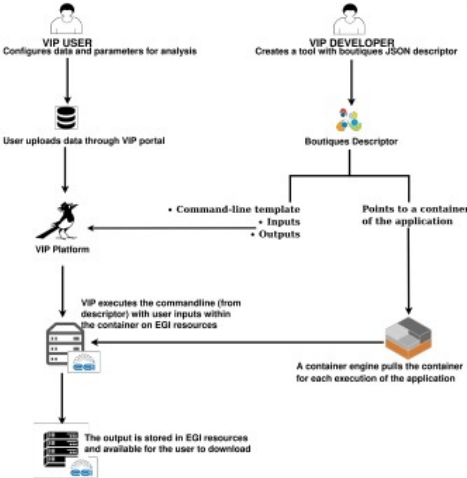


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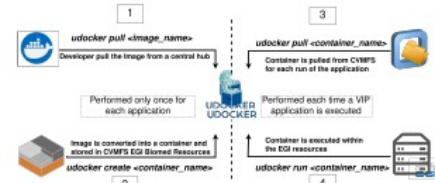


Fig. 2 – Pre-deployment of containers on CVMFS.

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