Cloud Computing Platform for High-level Physics Applications Development

Abstract

To facilitate software development for the high-level applications on the particle accelerator, we proposed and prototyped a web-based computing platform, the so-called 'phyappscloud' [1]. Based on the technology stack composed by Python, JavaScript, Docker, and Web service, such a system could greatly decouple the deployment and development, that is the users only need to focus on the feature development by working on the infrastructure that served by 'phyapps-cloud', while the service provider could focus on the development of the infrastructure. In this contribution, the development details will be addressed, as well as the demonstration of developing Python scripts with physics tuning algorithm on this platform.

Background and Intentions

The high-level physics controls applications development at FRIB is based on a software solution based on Python programming language. The framework designed and implemented is named as **PHANTASY**, which is brief for Physics High-level Applications and Toolkit for Accelerator SYstem [7]. From the interactive scripting environment to GUI application development, PHANTASY solves the problem of building applications with friendly user interface from the physics tuning algorithms. The following figure shows the development workflow.

	Scripts/Console App		GUI App PyQt5 + Qt-o		Develop GUI apps and packages for deployment		
AS)	Model Engines (FLAME, IMPACT, TRACK)		b Services	IOCs (func, data)			
HANT	Middle Layer (Pyt	Test against FRIB accelerator					
F	Virtual Accelera	ators	FRIB Acce	elerator	Develop tuning algorithms against virtual accelerator		

'phyapps-cloud' is the byproduct of PHANTASY project, it provides an alternative way to deploy all the development to a centralized web-based computing platform, the users can work with any web browser to develop the physics application in a private workspace.

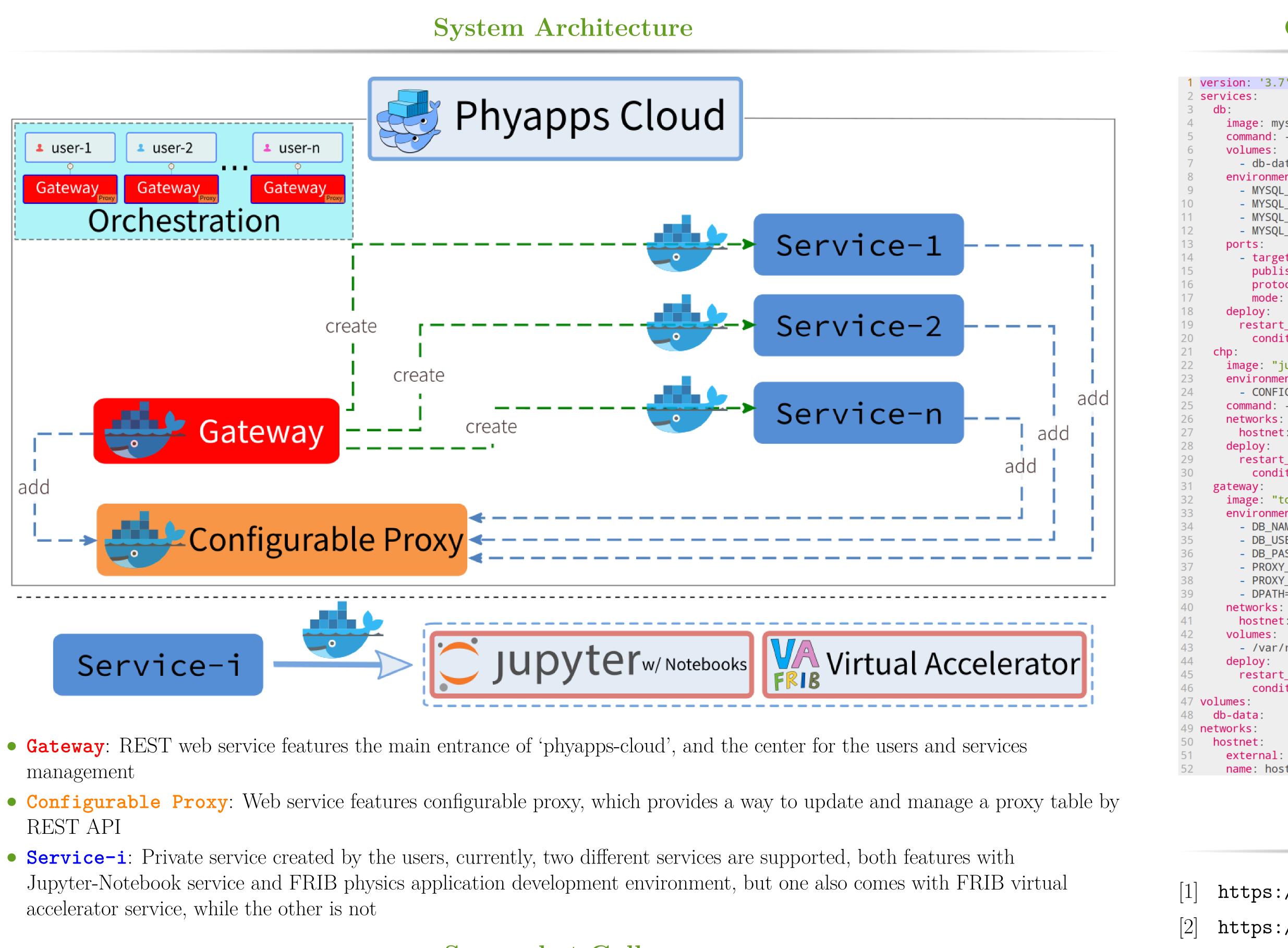
The deployment is achieved by Docker Swarm [3], all the developed web applications and virtual accelerator physics application are packed as Docker container images. By incorporating mature development work from the opensource community, many other powerful functionality could be introduced to 'phyapps-cloud' Swarm stack.

The deployment of 'phyapps-cloud' is controlled by a dockercompose YAML file, and another Makefile is built to control all the system-depends environmental variables, e.g. TOKEN, IP, etc., which make it easy to deploy on different servers and even cloud service providers (AWS, Azure, GCP, etc.).

Start: $SRV_{IP} = 10.20.30.40$ make deploy Stop : \$ make stop

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Screenshot Gallerv

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Compose YAML Snippet

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name: host

References

[1] https://github.com/archman/phyapps-cloud

[2] https://www.docker.com/

[3] https://docs.docker.com/engine/swarm/

[4] https://cloud.docker.com/repository/docker/

tonyzhang/phyapps-gateway

[5] https://flask.palletsprojects.com/

[6] https://getbootstrap.com/docs/4.3

[7] T. Zhang *et al.*, "High-level Physics Controls Applications Development for FRIB", in this

proceedings, paper TUCPR07.

Acknowledgements

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