

Toward Cloud-Native Digital Repositories

Yinlin Chen, Lee Hunter, Zhiwu Xie, Virginia Tech, {ylchen, whunter, zhiwuxie}@vt.edu

Session Type

- Developer Track

Abstract

After launching several monolithic repositories for various services, both the software development team and the IT operations team at Virginia Tech Libraries have found it difficult to maintain these repositories while developing new features. Developing newly specialized repositories is becoming more difficult. Thus, an efficient, agile software development and continuous delivery process is needed.

To achieve this goal, we have been investigating Cloud-native approaches. A Cloud-native application is able to react to application requirement changes quickly; add new features frequently and efficiently; scale elastically; have resiliency, and take the advantage of cloud services. We have begun exploring various cloud services and re-architecting our existing monolithic application architecture toward a Cloud-native application infrastructure.

In this presentation, we will share our experiences and lessons learned in developing a Cloud-native institutional repository: what we have achieved so far; show our architecture design for the Cloud-native institutional repository; list the best practices we followed, and display the cloud benefits we gained. Finally, we present some possible strategies and directions for developing a Cloud-native institutional repository.

Conference Themes

- Infrastructure/Integrations - integrations between systems, changing technical environments

Keywords

Cloud-native applications, Institutional repository, Software architecture and development.

Technologies Used

Amazon Web Services, Docker, Fedora, Samvera, Serverless, Cloud-native architecture

Audience

Developers, DevOps, and repository managers

Background

Virginia Tech Libraries' Digital Library Development team developed several institutional repositories based on Samvera/Sufia and Fedora 4. In order to further speed up the traditional software development life cycle, we have started exploring new approaches based on the cloud infrastructure. This submission fits in the conference theme on Infrastructure/Integrations - integrations between systems, changing technical environments. We will share our experience and lessons learned on developing the cloud-native institutional repository and exchange our ideas with other conference attendees. We believe this presentation will benefit other institutions who also invest their software development in the rapid growth of cloud computing.

Presentation content

The presentation content listed below:

- Describe current challenges in developing institutional repositories using traditional software development process
- List of the key challenges we plan to solve using Cloud-native strategy
- What is Cloud-native and why should you move toward a Cloud-native institutional repository?
 - Monolithic vs Cloud-native application
 - Key characteristics and concepts
 - Cloud-native application architecture
- Present our current implementation and architecture of a Cloud-native institutional repository
 - How we have adopted the Cloud-native approach
 - How we transformed the current monolithic application into Cloud-native application
 - What cloud infrastructure and services we used to build applications that take advantage of cloud computing
- List the cloud benefits we will gain by adopting Cloud-native approach
 - Facilitating the software development life cycle
 - Elastic scale, resilience, and self-healing
 - Decreasing operational overhead and increasing the speed of software development
- Lesson learned and experience sharing
 - Present the best practices for developing a Cloud-native application
 - Re-architect system architecture and design using cloud approach
 - Present AWS services and features and also other cloud services and tools
 - Required technical skills for developing Cloud-native institutional repository
- Future work and discussion

Requirements

- A project/monitor cable for Mac Book Pro