Evaluation of Scalability in the Fission Serverless Framework

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Abstract

Containerization has become an emerging approach in modern software engineering since it enables the shipping of the software products with all required dependencies in a platform-independent way \cite{1}. Containerization eliminates the virtualization costs of not used OS services and the kernel itself per container. Moreover, containerization supports isolation effectively since the containers are seem to be separate operating systems but they use a shared kernel \cite{6}.

The containers are lightweight and they enable the fast and simple deployment and configurations. However, this approach is limited only one host. Kubernetes is a container orchestration system which manages Docker containers over multiple Docker hosts \cite{8}.

Function as a Service (FaaS) is a category of cloud computing services that provides a platform allowing programmers to develop, maintain, operate, scale and manage application functionalities without the complexity of building and maintaining the infrastructure typically associated with developing and deploying an application. This new abstraction approach eliminates further configuration and deployment cost. Building an application following this model is one way of achieving a “serverless” architecture \cite{2}. This serverless programming approach provides the deployment of standalone function without launching any virtual machine or container \cite{8}.

Serverless programming is a rather new approach, however, there are real-world applications, for instance, Coca-Cola, Santander Bank and Expedia take advantage of this new paradigm \cite{3}.

Many frameworks are available for serverless programming, OpenFaaS, Kube-
less and Fission to name a few open source tools [4]. Earlier, we defined our functional approach for the Kubeless realm [7, 8]. However, it is still an open source artifact, VMWare has decided to stop driving and updating Kubeless [9]. Moreover, according to many aspects, Fission was evaluated as the most efficient serverless framework [5]. Furthermore, it has a wide language support and provides autoscaling which will be useful for measuring the speed of algorithms with different CPU settings.

In this paper, we present our efforts of the migration from Kubeless to Fission. We consider how these frameworks can be associated. We make connection between the elements of the frameworks. For a deeper comprehension, we measure and evaluate the scalability of Fission framework. This subtle distributed approach requires a comprehensive evaluation. We implement and execute some parallel algorithms for analyzing the scalability of the entire system. The main focus of testing this environment are sorting algorithms e.g. mergesort and testing both the parallel and non parallelized versions of these algorithms.

References


