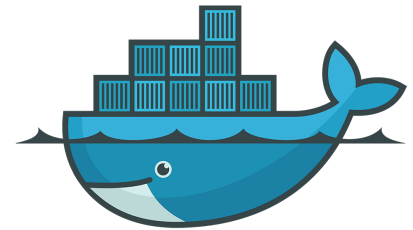


Dockerized Network Experiments Done Right

Motivation

At our chair, experimental performance evaluation of networking protocols or networked (distributed / Peer-to-Peer) systems is quite common. However, the amount of physical machines we possess is limited. For experiments that require many nodes of some distributed system, one approach is to execute multiple nodes on the same machine.



A different challenge are experiments that require a specific network topology or network properties to simulate the impact of adverse real-live conditions like packet loss or latency. In the past and amongst others, we used Docker^a to run nodes in containers and tools like Pumba^b to emulate network properties.

However, we have not yet formally investigated, which concrete limitations the utilization of tools like Docker impose on our experiments. This thesis shall analyze and quantify the impact of Docker on the performance of implementations and the network. Using this information, we want to create a model that helps to better understand the overall impact of Docker on networked systems. Lastly, we want to elaborate guidelines for performance experiments with Docker that yield as clean and realistic as possible measurement data.

^a<https://www.docker.com>

^b<https://github.com/alexei-led/pumba>

Your Tasks

- Familiarize with Docker internals and its configuration options for containers.
- Analyze potential impacts on performance caused by Docker.
- Design experiments suitable to measure Docker's performance impact.
- Using your experimental results, create a model able to express the overall performance impact of Docker on the investigated system.
- Design guidelines for successfully conducting Dockerized network performance experiments.

Prerequisites

- Experience with Linux-based operating systems and networking
- Helpful: Experience with Docker and related technologies

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