



Master Thesis

2015-04-24

Live Migration for Docker Containers

Context

Docker is an open platform to build, ship, and run applications. It is often considered as a lightweight form of virtualisation that does not require full-blown virtual machines, but uses operating system mechanisms on the host system to achieve strong isolation and resource management. These isolated entities are called *Docker Containers*.

While Docker Containers are flexible, lightweight, and easy to use, the Docker Engine, i.e. the run time system, lacks a feature that has become very common for regular hypervisors (the entities running regular Virtual Machines): live migration of containers. Live migration allows moving containers between Docker Engines, i.e. hosts, without having to shut down the container as well as without having any other user or software accessing this container noticing the migration.

Scope of the Thesis

This thesis deals with the challenge of integrating migration support into Docker. In order to fulfil this task, you should first revise strategies of process migration on Linux systems that have been thoroughly investigated in literature. In addition, you should consider strategies modern hypervisors use for migrating virtual machines. This has been analysed in earlier work on which this thesis can build.

Taking the results of this analysis, a strategy shall be developed that describes how the migration shall take place and a prototype implementation of this feature is to be provided together with an ad-hoc steering framework to trigger and control the progress of the migration. An integration of this steering functionality into existing Docker tools is a plus, but not necessary.

Once the prototype is available, the functionality shall be evaluated and performance be measured. Again, a methodology to do this has been developed in earlier work, and this thesis can build and extend on this earlier work.

Requirements and Comments

If this thesis achieves good progress and outcome, its results are to be integrated in the PaaSage research project (<http://paasage.eu>) which is released under an OpenSource license. For that reason, we appreciate if you are ready to OpenSource your results.

This thesis will most likely touch the Linux kernel API or other low-level Linux functionality. For that reason basic knowledge and experience with Linux systems is recommended (but no must).

If you are interested in this or similar theses, please contact Jörg Domaschka either by mail or in directly in his office.

**Faculty of Engineering and
Computer Science**

mail: joerg.domaschka@uni-ulm.de

office: Uni West, 43.2.217

Institute of Information
Resource Management