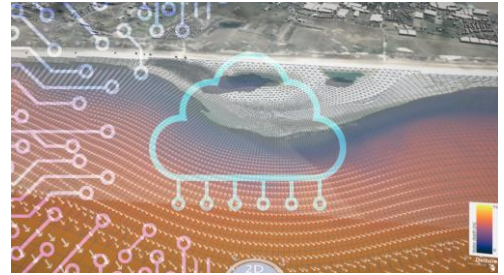# Investigate the efficiency of autoscaling strategies in the cloud

This graduation internship is best suited for Bachelor Computer Science.

HKV is a consultancy firm which provides state-of-the-art services in the areas of flood risk and water management. We translate cutting-edge technologies and knowledge to practical applications using high analytical and technical skills.

We offer a graduation internship position at HKV in the Product & Services group in close collaboration with the Deltares Software Centre, giving the student the opportunity to experience what working for a water & software-oriented consultancy is like. We are located in Delft at the Delfttechpark and in Lelystad.

Prior knowledge/experience on cloud computing or simulation software is preferred, but not mandatory.

Motivation

The Netherlands are shaped by the ocean, wind, waves and currents shape our delta. Climate change and rising sea levels add further to this pressure. To understand these processes, simulation software simulates the effect of storm surges, hurricanes, tsunamis, detailed flows and water levels and waves on our country. The software used for water and climate simulations are computationally demanding. Cloud computing offers the opportunity for more detailed or faster simulations.

The Delft3D FM Suite[1] is an example of such simulation software. The engines of this suite can run large computations in parallel on distributed memory.

The era of cloud computing has just begun and we have not yet fully exploited its potential. Cloud computing offers horizontal scalability and elasticity. Problems could be solved more in parallel. Cloud platforms offer many configuration options, which leaves users of the Delft3D FM suite with choices that are not always easy to make. How to move to the cloud and make optimal use of the benefits of the cloud?

What will change if an application, or part of it, is migrating from the premises to the cloud? Should a software architect rethink design? Which viewpoints and quality attributes are touched upon?

Internet: www.hkv.nl

Contact:
Mattijn van Hoek

Email: hoek@hkv.nl
Telefoon: 06-35119762

Research Questions

In this graduation internship:
- You will analyze the cloud-readiness of the existing Delft3D FM Suite based on the viewpoints of the system architecture.
- You set up evaluation strategies for high performance computing of the software architecture. Consider, scalable-efficient computing, energy-efficient computing and cost-efficient computing.
- You define methods to get insight and monitor upfront the usage of memory, CPU and costs of the defined simulation models.

[1] { HYPERLINK : "https://www.deltares.nl/en/software/delft3d-flexible-mesh-suite/" }