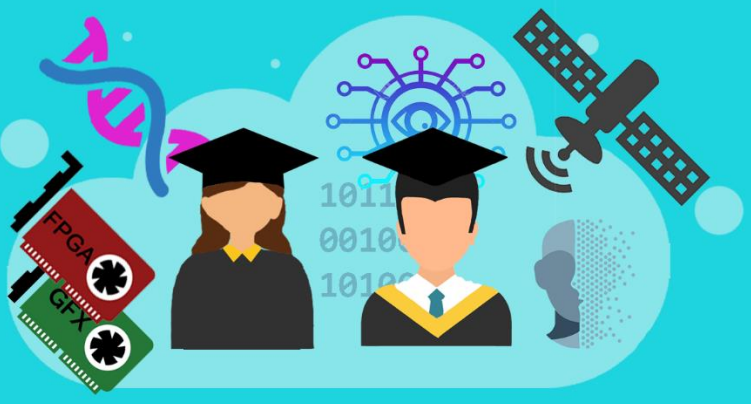
Diploma Thesis

Microproccessors and Digital Systems Laboratory



Economic analysis of modern Cloud platforms

Over the last decade, the adoption of cloud computing has seen explosive growth, both at consumer and enterprise levels and will continue to rise in the future. To take advantage of the benefits of cloud computing, users have to buy resources on a cloud provider, such as Amazon AWS, Google Cloud Platform or Microsoft Azure. A common practice for purchasing cloud resources is to profile an application locally and then buy the appropriate resources on the respective cloud provider. However, most of the times this approach fails to give satisfactory results, especially when considering the cost-performance tradeoffs, mainly for two reasons. The first one is that cloud providers perform Virtual Machine collocations on non-dedicated resources, thus hurting performance of applications due to interference. The second one is that, cloud users often do not take into account additional costs required for data transfers and manipulations as well as do not consider the huge cost increment when utilizing accelerators, compared to the performance gains they may gain.

In this thesis, we will perform an economic analysis of modern cloud platforms and explore the cost-performance tradeoffs of modern applications when executed inside a cloud environment. The thesis will include in-depth occupation with state-of-the-art cloud technologies, such as Docker containers and possibly Kubernetes orchestrator. The thesis will focus on profiling the performance of applications on different resources available on popular cloud providers and also explore the use of accelerators on the cloud.

PREREQUISITES:

Good knowledge of BASH scripting and the Linux operating system.

RELEVANT PUBLICATIONS:

Masouros, D., Koliogeorgi, K., Zervakis, G., Kosvyra, A., Chytas, A., Xydis, S., ... & Soudris, D. (2019, March). Co-design Implications of Cost-effective On-demand Acceleration for Cloud Healthcare Analytics: The AEGLE approach. In *2019 Design, Automation & Test in Europe Conference & Exhibition (DATE)* (pp. 622-625). IEEE

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