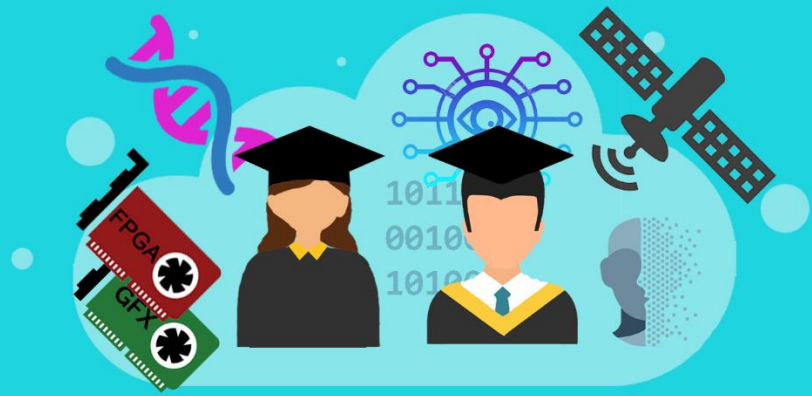


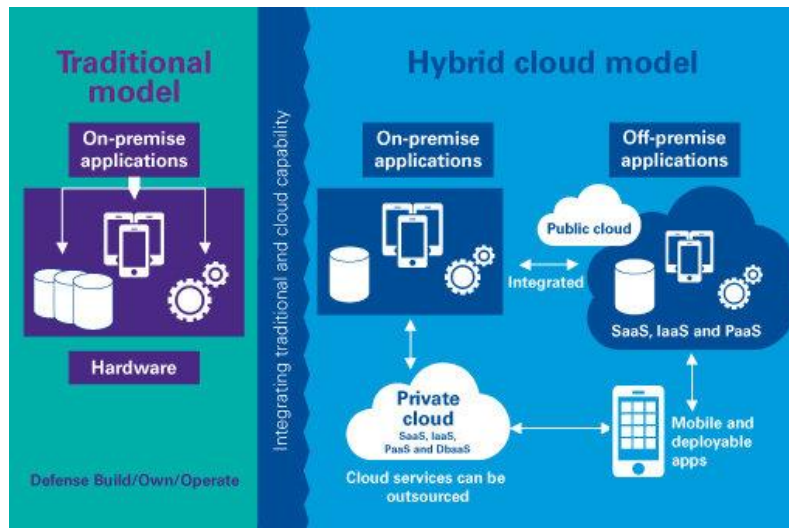
Diploma Thesis

Microprocessors and
Digital Systems
Laboratory



Resource management techniques for hybrid cloud environments

Nowadays, there is an ever-increasing number of workloads pushed and executed on the Cloud. Towards this direction, enterprises and companies are changing the way they are developing and deploying their applications, by gradually transforming them following a “cloud-native” approach, where each part of the application is packaged in its own container. These parts are then dynamically orchestrated on the available pool of resources, so each part is actively scheduled and managed to optimize resource utilization.



However, organizations with a need for higher security may maintain much of their on-premises infrastructure and use a cloud instance to host less-critical resources, for instance, while enterprises with many dynamic workloads and a need for high availability may opt for a private cloud with the ability to move to the public cloud during resource peaks. These requirements and limitations have led to the adoption of hybrid clouds, a cloud-computing environment that connects a mix of public cloud, private cloud and on-premises infrastructure.

In this thesis, we will investigate resource management and orchestration techniques for placing workloads on the available pool of resources, over hybrid cloud environments. The thesis will include in-depth occupation with state-of-the-art cloud technologies, such as Docker¹ containers and the Kubernetes² orchestrator and familiarization with modern distributed frameworks like Apache Spark³ and streaming frameworks, such as Apache Storm⁴ and Apache Kafka⁵.

¹ <https://www.docker.com/>

² <https://kubernetes.io/>

³ <https://spark.apache.org/>

⁴ <https://storm.apache.org/>

⁵ <https://kafka.apache.org/>

PREREQUISITES:

Good knowledge of BASH scripting and the Linux operating system.

USEFUL LINKS:

<https://www.redhat.com/en/topics/cloud-computing/what-is-hybrid-cloud>

<https://azure.microsoft.com/en-in/overview/what-is-hybrid-cloud-computing/>

<https://aws.amazon.com/hybrid/>

CONTACT INFORMATION:

Dimosthenis Masouros, Ph.D. student: (demo.masouros@microlab.ntua.gr)

Sotirios Xydis, Postdoctoral Researcher: (sxydis@microlab.ntua.gr)

Prof. Dimitrios Soudris: (dsoudris@microlab.ntua.gr)