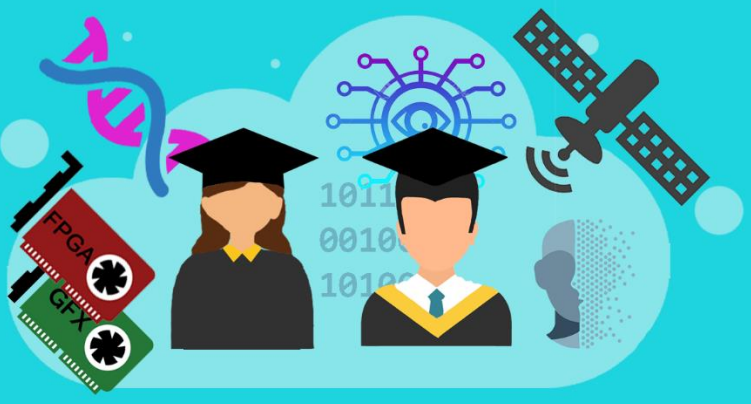
Diploma Thesis

Microproccessors and Digital Systems Laboratory



Adaptive resource allocation for clustered asymmetric many-core systems

Run-time resource management can be applied either in a centralized or a distributed manner. In traditional centralized approaches, a single core analyzes the performance of applications as well as the available system resources and takes appropriate actions. Even though the centralized approaches are clearer to implement at algorithmic level, they exhibit limited scalability due to bottlenecks appearing from processing and communication functions, especially in environments that require frequent configuration changes. On the other hand, distributed resource management has gained a lot of attention. Research works have shown that distributed systems can perform extremely well, unlock platform's resources and exploit any underlying topology for optimizing the performance of applications.

The goal of this thesis is to extend an existing for distributed resource management for asymmetric and heterogeneous systems. The extensions to be implemented are: (i) a more realistic application model running on heterogeneous architectures; (ii) support for different core types, which is an essential component of asymmetric systems; (iii) calculation of the inevitable interference injected into application behavior either by the hardware (e.g. cache misses, page faults); and (iv) the interference by the existence of other simultaneously executed applications.

PREREQUISITES:

Good knowledge of C/C++, computer architecture

READING MATERIAL:

1. A Hierarchical Distributed Run-time Resource Management Scheme for NoC-Based Many-Cores

2. SPA: Simple pool architecture for application resource allocation in many-core systems

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