# Service-Oriented Reconfigurable MPSoC

Contact: Chao Wang University of Science and Technology of China saintwc@mail.ustc.edu.cn

## Motivation

1. Solve the Programming Wall Problem, especially for Reconfigurable MPSoC on FPGAs. Construct efficient middleware for programming into circuits.

2. Improve task level parallelization, targeting automatic OoO task execution.

## Novelties and Contributions:

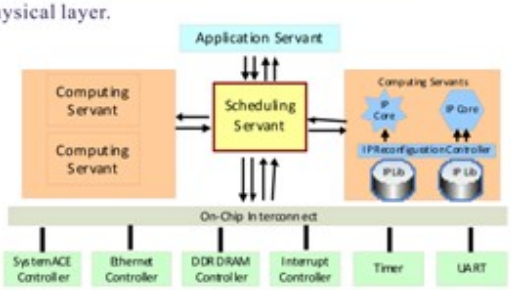
1. SOA Concepts are involved to regard each task as abstract instruction, as well as to treat IP core as dedicated function unit.

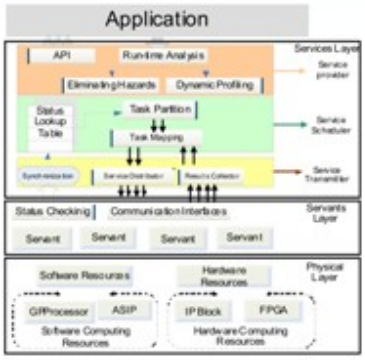
2. Automatic detects inter-task data dependencies and proposes task scheduling method for Out-of-Order parallelization.

3. Exploits an efficient adaptive task partition and mapping method under hardware reconfiguration

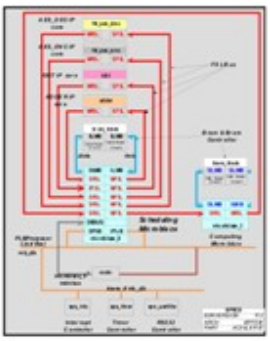
## Concept and Implementation

SOA model running on scheduling servant is abstracted into three layers: Service layer, Servants layer and Physical layer.




## Prototype with Results



**Results:**

1. Constructed on Xilinx Virtex-5 FPGA, with EAPR based reconfigurable design flow. Microblaze, JPEG, AES, DES, IDCT are integrated with FSL channels.

2. Unified programming model with consistent APIs, kept unchanged after reconfiguration.

3. Scoreboarding and Tomasulo have been applied from instruction level to task level for OoO execution. Scheduling costs of hardware Tomasulo <100 cycles.

**Reference**

[1]. C. Wang, J. Zhang, X. Zhou, X. Feng, et al. SOMP: Service-Oriented Multi Processors. in Proceedings of the 2011 IEEE International Conference on Services Computing. 2011: IEEE Computer Society.709-716

中国科学技术大学

Embedded System Lab,
School of Computer Science
Suzhou Institute of Advanced Study
University of Science and Technology of China