HiPEAC Collaborating Projects

Nacho Navarro, UPC, Spain

Outline

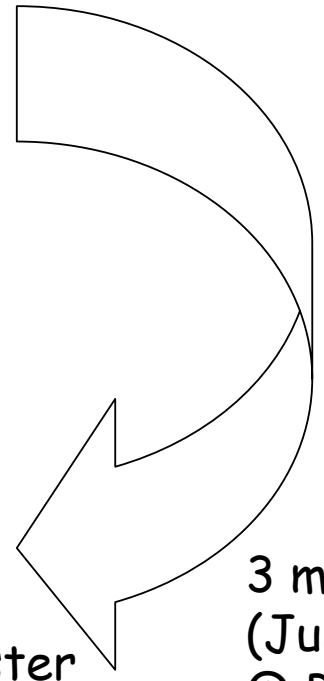
- NSF-IST collaboration framework
- European partner: HiPEAC NOE
- Princeton – Patras
- Rutgers – UPC / FORTH
- Experiences and Remarks

Collaboration Framework

- First call, June 2004
- Two HiPEAC collaborations were approved
- University of Patras – Princeton University
  - Margaret Martonosi, Princeton University, USA
  - Stefanos Kaxiras, Univ. of Patras, Greece
- U. Politecnica Catalunya / FORTH – Rutgers University
  - Liviu Iftode, Rutgers University, USA
  - Angelos Bilas, Univ. of Crete and FORTH, Greece
  - Nacho Navarro, UPC, Spain

Princeton/Patras Persons

Prof. Margaret Martonosi
Princeton University
NDP Project



Gilberto Contreras
3rd year grad. student
Princeton University
NDP Project
M.Martonosi advisor

Prof. Stefanos Kaxiras
Univ. of Patras
HiPEAC member
Scalable Architectures Cluster
SiSCAPE project U.of P.

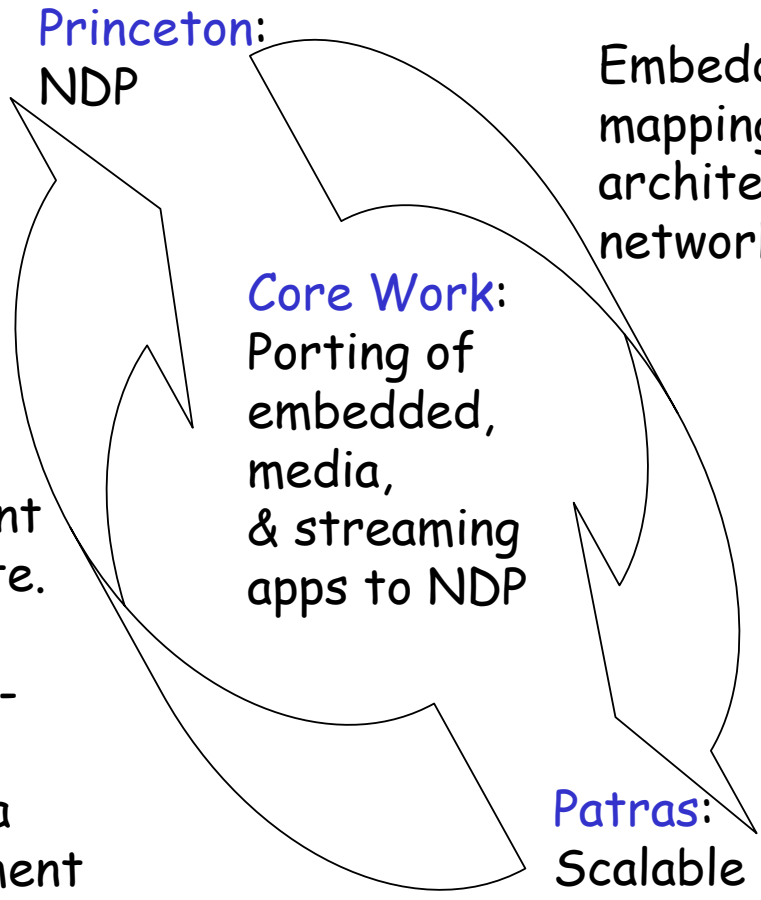
3 months
(Jun-Aug)
@ Patras

Princeton/Patras Projects

Princeton:
NDP: Network Driven Processor
CMP architecture where an intelligent Network orchestrates execution (scheduling of threads, communication, thread-mapping, etc).
Network provides generality, high-performance.

Patras:
Scalable Architectures & SiSCAPE:
CMP architectures where the role of the network is less important if at all.
Communication via shared memory.
Targeted towards embedded, low-power, low-cost, specific (not G.P.) applications.
Lack of super ICN: low-power, low-cost, easier to make (reliability …)

Collaborative Contributions



Princeton/Patras Experiences

- Student exchange is great to advance collaborative efforts (also supported by past experience between Martonosi / Kaxiras)
- Significant contributions in both ways
- Students get involved in other local activities besides main collaboration effort
  - Seeds for future collaborations
  - Joint papers in a larger context
- Reinforces relationship between primary researchers

Rutgers/UPC/FORTH Topics

- Rutgers:
  - Indoor-outdoor cooperative computing
  - Spatial Programming with bounded timers
  - Smart Messages (self-routing, consistency)
  - Intelligent Distributed Transportation Systems (TrafficView)
- UPC/FORTH:
  - Embedded High Performance Computer Architecture and Compilers
  - Runtime customization for embedded systems
  - Energy analysis at system/application level
  - Dynamic runtime for wireless sensor networks
  - Storage and High Performance communications

Rutgers/UPC/FORTH colab.

- Distributed computing for networks of embedded systems
  - Efficient execution using Smart Messages
- Add energy dimension to Spatial Programming model
- Expand work on Vehicular embedded systems
- Scalability issues (communication, storage, I/O, security) for mixed environments (appliances, cars, miniature devices)
- Bilateral visitor exchanges each year; write joint papers
  - One student from UPC to Rutgers during this August; from Rutgers to UPC/FORTH in Spring/Summer 2006

Rutgers/UPC/FORTH exp.

- Great ideas, but in this case, no previous collaboration
  - Meetings and discussions, but hard to decide on the specifics of the collaboration
  - Difficult to involve students at EU side (due to no funding)
  - Something that would not had happen without this USA/EU collaboration ?
- NSF:
  - Some funding
  - Match the objectives of ITR grant; results are needed
- IST:
  - No specific funding, we depend on NSF partner, only during students exchange
  - NOE goal is to establish links for future projects

Experiences and Remarks

- The most important (and probably the only viable) thing is to work on topics of common interest
- Collaboration is something from which we can learn a lot, and for this reason there is merit into making the effort
  - But it is also a matter of bridging expectations from partners
  - Students research horizons are expanded
  - Good opportunity to agree on state of the art compatible infrastructure, for example
- Although faculty had been already in contact
  - this formal support from USA/EU institutions is very useful to set the bases for common projects