Graduation Thesis Topics for AY2009

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Network Performance in Virtualized Systems

- System-level virtualization (Xen, VMware...) has various advantages:
  - independent and isolated computing environments (VMs)
  - multiple (and different) OS on each VM
- But these benefits come with performance overhead and network performance is one of most typical cases
- We are analyzing the network performance of Xen,
- trying to identify its performance bottle neck
- and hope to propose optimization techniques.

Performance Analysis and Modeling of VMs

- Again, we work on virtualized systems (Xen, in particular)
- We can different applications on (possibly different) OS on each VM
- A workload on a VM can affect the performance of another VM (performance interference).
- We instrument these performance overhead and interference and try to model these factors.

Workload Analysis of Emerging Applications

- To design HW and SW separately does not make sense (do you know the sub-title of your architecture textbook ?)
- We need hardware that help software to run faster (or more power efficiently)
- We need software that can utilize state-of-the-art hardware
- We study the interaction between HW and SW in the emerging workload, such as Java, Database, embedded applications.

Virtual Machine for Sensor Network Nodes

- Sensor Network: a large number of sensor nodes distributed in a field and communicate each other autonomously.
- Each node consists of a microcontroller, memory, wireless network interface, and sensors.
- Requirements: Large number of nodes (low cost per node), low power consumption (for longer lifetime), self-organization (find neighbor nodes and configure network, etc).
- Possible topics: designing virtual machine for sensor node reprogramming, protocol for network self-organization.

Collaborator: Dr.Bleakley (UCD, Ireland)

We need students who ...

- are interested in the topics explained earlier.
- come to the lab and spend substantial time of your day in the lab (you do this because you are interested, not because you are forced).
- come to the meeting and other activities of the lab. Please note that if you miss the group meeting too many times without notice and justifiable reasons, you will be dismissed from the lab.

See the Outside World

- Collaboration with other schools:
  - UCD (Ireland), USF Lakeland (USA), UPT (Romania), NTU (Singapore)
- Exchange program by Univ of Aizu
  - Rose-Hullman (USA) and NTU (Singapore)
- Presentations at Conference and Workshop
  - VPACT08 (Austin, TX) and ICCET 2009 (Singapore)

If you have any questions, please contact Dr. Hitoshi Oi at `hitoshi@u-aizu.ac.jp` or talk to any students in the lab (241-E).