

Workshop on “Advances in Networking”

Venue: *IIIT, Bhubaneswar, OCAC Building, Acharya Vihar Sq., Bhubaneswar 751013*
Date: *22nd December 2008 (9.00 Am to 5.00 pm)*
Organized by: *Bhubaneswar Institute of Technology & IIIT, Bhubaneswar*
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Speakers & Topics:

1. Prof. L.N. Bhuyan,
Topic: Network Processors: A Solution to the Next Generation Networking Challenges
2. Prof. Gopal Krishna Nayak
Topic: Building High level Network based Services
3. Prof. Prasant Mohapatra
Topic: Wireless Networks: Fundamentals to the State of the Art
4. Dr. Sukanta Mohapatra
Topic: Next Generation Network - Evolution, Planning and Management
5. Dr. Shivajit Mohapatra
Topic: Where-Fi: A Dynamic Energy-Efficient Multimedia Distribution Framework for MANETs

Note: Please see below For Abstract of talks, Bio of Speakers and hotels at Bhubaneswar

Abstract:

Network Processors: A Solution to the Next Generation Networking Challenges

Network processors (NPs) are programmable on-chip devices that can provide high-throughput packet processing using multithreaded shared memory multiprocessor architectures. They are flexible like general-purpose processors, but provide high performance like ASICs. At the same time, they can be employed at the link layer thus avoiding the high protocol stack overhead in operating systems. This talk will present possible future deployment of NPs in many applications like building firewalls, home computing, multimedia transcoding, and wireless and sensor networks.

This talk will also present the analysis, design and implementation of a content aware switch in our laboratory based on an IXP2400 network processor (NP). Content aware switches can examine web requests and distribute them to the web servers based on application level information. We explore various design tradeoffs, develop an NP-Splice protocol, and implement various tasks in the processors. Measurement results based on an IXP 2400 NP demonstrate that our NP-based switch can reduce the http processing latency by an average of 83.3% for a 1K byte web page, compared to a Linux-based switch. The amount of reduction increases with larger file sizes. It is also shown that the packet throughput can be improved by up to 5.7 times across a range of files.

Abstract:

Building High level Network based Services

It is common to implement infrastructure Network and infrastructure services. However, value of a network is realized when we build high level services on the basic infrastructure. This talk will focus on issues and techniques of building High level network services using a few case studies.

Abstract:

Wireless Networks: Fundamentals to the State of the Art

The talk will start with an overview of wireless networks, their applications, and how the issues in wireless networks differ from that of wired networks. A broad classification of the wireless networks will be discussed that will set the stage for the three major parts of the talk: Wireless Local Area Networks (WLANs), Mobile Ad Hoc Networks (MANETs), and Mesh Networks. We will overview the basic issues of WLANs, a description of the IEEE 802.11 protocol, its extensions, and other related issues. The lower layer issues that form the commonality of the three categories will be discussed. In the context of MANETs, we will describe the architecture, operations, and the challenges to meet the effectiveness of these networks. Considering the interests and activities in the areas of Mesh Networks, it may be useful to grasp an in-depth view of these networks in terms of their organization, applications, protocols, and unsolved problems. We will explore the issues associated with each of the protocol stack in a top-down manner. We will also discuss the experiences and lessons learnt from various test-bed and experimental implementations. The talk will conclude with an overview of the open issues and challenges in the wireless networks.

Abstract:

Next Generation Network - Evolution, Planning and Management

Content digitization, network packetization, and service convergence have been key technical factors in the evolution of emerging next generation networks. Meanwhile, economies of scale, rapid and flexible service delivery, reduction of capital and operating cost, changes in telecom policy and deregulation, and ever increasing competition are driving their deployment. Major telecom carriers and service providers worldwide have been migrating their current networks towards, or deploying new next generation networks to meet the market and competitive demands. These next generation IP-centric converged networks aim to provide a multitude of services over a single integrated network infrastructure, rather than multiple segmented and overlay networks as have existed for decades in past. But complex migration issues mean that existing legacy networks will co-exist along

with the next generation network for the foreseeable future. The deployment of these next generation networks have brought unique challenges for network planners and managers – as they need to grow them to meet uncertain market demand of new, evolving and unknown bandwidth-hungry services. This talk will focus on next generation network and its evolution and challenge that we face in planning and managing the network with optimal CAPEX and OPEX investment. The talk will discuss eTOM model approach and a solution framework to meet the next generation network planning and management challenges.

Abstract:

Where-Fi: A Dynamic Energy-Efficient Multimedia Distribution Framework for MANETs

Next generation mobile ad-hoc applications will revolve around users' need for sharing content/presence information with collocated devices. However, keeping such information fresh requires frequent meta-data exchanges, which could result in significant energy overheads. To address this issue, we propose distributed algorithms for energy efficient dissemination of presence and content usage information between nodes in mobile ad-hoc networks. First, we introduce a content dissemination protocol (called CPMP) for effectively distributing frequent small meta-data updates between co-located devices using multicast. We then develop two distributed algorithms that use the CPMP protocol to achieve "phase locked" wake up cycles for all the participating nodes in the network. The first algorithm is designed for fully connected networks and then extended in the second to handle hidden terminals. The "phased locked" schedules are then exploited to adaptively transition the network interface to a deep sleep state for energy savings. We present two novel applications (called "Zeitgeist" & "MeCast") developed using our protocol that present compelling "social experiences" for users. We have implemented a prototype system (called "Where-Fi") on several Motorola Linux-based cell phone models. Our experimental results show that for all network topologies our algorithms were able to achieve "phase locking" between nodes even in the presence of hidden terminals. Moreover, we achieved battery lifetime extensions of as much as 28% for fully connected networks and about 20% for partially connected networks. I will also present an extension to the Where-Fi framework to handle nodes exhibiting Byzantine behaviours.

Prof. L.N. Bhuyan

Professor and Chairman, Department of Computer Science, University of California, Riverside, USA

Dr. Laxmi Narayan Bhuyan is a professor of Computer Science and Engineering at the University of California, Riverside since January 2001. Prior to that, he was a professor of Computer Science at Texas A&M University (1989-2000) and Program Director of the Computer System Architecture Program at the National Science Foundation (1998-2000). He has also worked as a consultant to Intel and HP labs.

Dr. Bhuyan received his Ph.D. degree in Computer Engineering from Wayne State University in 1982. His current research interests are in the areas of network computing, multiprocessor architectures, router and web server architectures, parallel and distributed processing, and performance evaluation. He has published more than 150 papers in these areas in IEEE Transactions on Computers (TC), IEEE Transactions on Parallel and Distributed Systems (TPDS), Journal of Parallel and Distributed Computing (JPDC), and many refereed conference proceedings. Dr. Bhuyan currently serves as the Editor-in-Chief of the IEEE Transactions on Parallel and Distributed Systems (TPDS). He is a past Editor of the IEEE TC, JPDC, and Parallel Computing Journal. He was the founding Program Committee Chairman of the HPCA in 1995, Program Chair of the IPDPS in 1996, General Chair of ADCOM-2001, and General Chair of HPCA-9 (2003). He was elected Chair of the IEEE Computer Society Technical Committee on Computer Architecture (1995-1998).

Dr. Bhuyan is a Fellow of the IEEE, the ACM, the AAAS (American Association for the Advancement of Science), and the WIF (World Innovation Foundation). He has also been named as an ISI Highly Cited Researcher in Computer Science. He has received other awards such as Halliburton Professorship at Texas A&M University, and Senior Fellow of the Texas Engineering Experiment Station. He was also awarded the IEEE CS Outstanding Contribution Award in 1997.

Prof. Gopal Krishna Nayak

Dr. Gopal Krishna Nayak is the Director of IIIT, Bhubaneswar. He has taken charge of building this Institute from ground up to a great Institute. He was a founding professor at Xavier Institute of Management, Bhubaneswar. He had assumed the responsibility of the Dean, Admission Coordinator, Area Coordinator, Computer Services Coordinator. He was responsible for building the Campus network at XIMB. This network is known for its spread in reach and depth of services offered, Dr. Nayak is a bachelor in Electrical Engineering from IIT, Kharagpur, an MBA from IIM Bangalore and a Ph. D. from IIT, Kharagpur. He is an avid software developer. He has developed PAMIS: project accounting software, which was adopted by Govt of Orissa and AIS, which is used by many prominent institutes.

Prof. Prasant Mohapatra

Professor and Chairman, Department of Computer Science, University of California, Davis, USA

Dr. Prasant Mohapatra is currently a Professor in the Department of Computer Science at the University of California, Davis. In the past, he was on the faculty at Iowa State University and Michigan State University. He has also held Visiting Scientist positions at Intel Corporation, Panasonic Technologies, Institute of Infocomm Research (I2R), Singapore, and National ICT Australia (NICTA). Dr. Mohapatra received his Ph.D. in Computer Engineering from the Pennsylvania State University in 1993. He was/is on the editorial board of the IEEE Transactions on computers, ACM WINET, and Ad Hoc Networks. He has been on the program/organizational committees of several international conferences. He was the Program Vice-Chair of INFOCOM 2004, and the Program Co-Chair of the First IEEE International Conference on Sensor and Ad Hoc Communications and Networks (SECON 2004), Program Chair of QSHINE International Conference (2006), and a Guest Editor for IEEE Network, IEEE Communications, IEEE Transactions on Mobile Computing and the IEEE Computer.

Dr. Mohapatra's research interests are in the areas of wireless networks, sensor networks, Internet protocols and QoS. Dr. Mohapatra's research has been funded through grants from the National Science Foundation, Intel Corporation, Siemens, Panasonic Technologies, Hewlett Packard, and EMC Corporation. On the administrative side, Dr. Mohapatra served as the CTO of Polyphasic Corporation from 2001-2003, and has been serving the Chair of Graduate Group in Computer Science at UC Davis since 2003.

Dr. Sukanta Mohapatra

Dr. Sukant K. Mohapatra has a Ph.D degree in Computer Science with specialization in Telecommunication Engineering from Stevens Institute of Technology, New Jersey, USA. He has worked several years at Bell Laboratories, leading in the areas of data communication, optical networking and network management. Currently as a director at Virtual Photonics, NJ, he leads the network engineering; optimization and planning of next generation and IMS based networks. Dr. Mohapatra has also taught graduate program at Rutgers University, New Jersey. His research interest includes: Optical Networking, IP-MPLS Network, Next Generation and IMS based Network, Network Security, and Management of Converged Networks. He has numerous publications in various journals, conferences and seminars in the area of his expertise. He has chaired and organized various international conferences and has been invited as speaker in various conferences, seminars, and institutes around the globe.

Dr. Mohapatra is a senior member of Institute of Electrical and Electronics Engineers (IEEE). He is recipient of many awards and recognitions during his professional career including prestigious DMTS Award at Bell Laboratories for significant contribution in the areas of his expertise. Dr. Mohapatra was cited in International Who's Who of Information Technology in 1998, for his seminal contribution in the area of telecommunications. Dr. Mohapatra is the founder and founding chairman of National Institute of Science and Technology (NIST – www.nist.edu), Berhampur, Orissa. NIST was established in 1996 with complete support and visionary guidance of Dr. Mohapatra to promote quality education and innovation in science and technology in his home state of Orissa.

Dr. Shivajit Mohapatra

Shivajit Mohapatra is a Senior Researcher and Project Leader at the Pervasive Platforms and Architectures Lab at Motorola Research. His research focus is in the area of distributed and mobile middleware systems. He currently designs mobile middleware systems that enable energy efficient next-generation distributed and social applications on mobile systems. He is also interested in the areas of game theory, Incentive models and security for mobile environments. His professional service has included serving as program (co-) chair for CoPE 2009 and has served in the committees for ACM Multimedia, ACM WoWMoM, and ACM MMCN. He is also a recent inductee into the Marquis Who's Who in America. Shivajit holds a B.Tech from BITS, Pilani and an M.S. and Ph.D. from University of California, Irvine, all in Computer Science.

Accommodation:

1. Hotel Ginger: Tel. No. (0674) 6663333, reservations.bhubaneshwar@gingerhotels.com
2. Hotel Swosti: Tel. No. (0674) 2534678,2535771/72, swosti@swostiindia.com,
3. Pantha Nivas: Tel. No. (0674) 2432515 /1289
4. The Crown: Tel. No. (0674) 2555500, 2550001, reservation@thecrown.in
5. Hotel Richi Regency: Tel No. (0674) 2534619/39
6. Hotel Presidency: Tel No. (0674) 2559566
7. Hotel Suryansh: (0674) 2302700
8. Hotel Mayfair: Tel No. (o674) 2360101, lagoon@mayfairhotels.com
9. Hotel Swosti Plaza, Tel: (674) 2300028/069/008, reservations@swosti.com
10. Megha Resort: Tel No. (0674) 2302233
11. Hotel Keshari: Tel No. (0674) 2535093, 3291402/03
12. Royal Midtown: Tel. No. (0674) 2536138 /141
13. Hotel Hindustan International, Tel: (0674) 2531465/76/86/92, gmbbsr@hindusthan.com