

ICNP'2003 Panel
Looking into the Crystal Ball of Networking

What's Next in Networking?

Perspective from

NeXtworking'03

The First COST-IST(EU)-NSF(USA) Workshop on
EXCHANGES & TRENDS IN NETWORKING

TPC co-Chairs:

Ioannis Stavrakakis, University of Athens, Greece

Ibrahim Matta, Boston University

Michael Smirnov, Fraunhofer Institute, Germany

11th IEEE International Conference on Network Protocols (ICNP 2003)
November 4-7, 2003 in Atlanta, Georgia



The COST(EU)-NSF(USA) Workshop



on EXCHANGES & TRENDS IN NETWORKING

NeXtworking'03

Chania, Crete, Greece
June 23-25, 2003



ΕΘΝΙΚΟΝ & ΚΑΠΟΔΙΣΤΡΙΑΚΟΝ
ΠΑΝΕΠΙΣΤΗΜΙΟΝ ΑΘΗΝΩΝ
NATIONAL & KAPODISTRIAN
UNIVERSITY OF ATHENS

<http://www.di.uoa.gr/~istavrak/costnsf/Welcome.html>



HELLENIC REPUBLIC
MINISTRY OF
ECONOMY AND FINANCE

Exchanges

Trends



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Workshop Scope I : Exchanges

Provide the opportunity to the networking communities in Europe and USA to exchange understanding and achievements

Participants: 67 plus 15 students

USA	EU-{Greece}	Greece-{Crete}	Crete	other
24	30	8	3	2

Speakers: 48 (20 from USA and 28 from EU)



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Workshop Scope II: Trends

Discuss key, new and upcoming networking technologies and open issues by focusing on the driving fundamental principles

Talks and discussions focused on:

- ❑ Major research challenges
- ❑ Innovative approaches addressing **key problems**
- ❑ Fundamental work addressing fundamental (class of) problems
- ❑ Participants' own recent **work** as it relates to important **largely open problems** and thoughts for **follow up** and **applications in other domains**



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Format and Structure (content-wise)

Wireless	General (Ephremides)	Panel on Wireless/Sensor Networking	Workshop Report (Findings & Recommendations)
	Ad-hoc (Gerla)		
	Sensor (Akyildiz)		
Architectures	P2P (Crowcroft)	Panel on Modeling & Architectures	
	Overlays (Biersack)		
	Large-scale (Kurose)		
	Programming (Calvert)		
Modeling	Measurements (Diot)	Panel on EU (COST-IST) & US (NSF) processes	
	Tomography (Towsley)		
	Traffic (Roberts)		

Format and Structure (work-wise)

	BEFORE	DURING (all participate)	AFTER
TPC co-chairs	<p>Secure funding</p> <p>Define format, topics</p> <p>Invite session chairs and speakers</p> <p>Collect & publish abstracts / talks</p>	<p>Run the workshop</p> <p>Distribute questions</p> <p>Chair summary sessions</p>	<p>Reimburse participants</p> <p>Collect feedback</p> <p>Process Questionnaire</p> <p>Prepare a report</p> <p>Disseminate</p>
Session chairs	<p>Invite some speakers</p> <p>Coordinate talks</p> <p>Submit abstract / talk</p> <p>Submit session summaries</p>	<p>Run their session</p> <p>Present their views</p> <p>Prepare and present summary of their session</p>	<p>Submit summary of session highlights</p> <p>Revise slides / abstract</p> <p>Provide feedback</p> <p>Respond to Questionnaire</p>
Speakers	<p>Submit abstract / talk</p> <p>Coordinate with session chairs</p>	<p>Present their views</p>	<p>Revise slides / abstract</p> <p>Provide feedback</p> <p>Respond to Questionnaire</p>
Other Attendees	<p>Be invited</p>		<p>Provide feedback</p> <p>Respond to Questionnaire</p>

A Lot of work Before & After !!!

But also lots of fun



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Outcomes

- **EU/USA exchanges - a forum is established**
 - Bi-annual NeXtworking events
- **Stimulate EU/USA collaborations**
 - Collaborative efforts are being planned
- **Trends & self-assessment**
 - Consensus on research priorities
 - Understanding strengths, weaknesses, societal factors,...
- **Report to the Community - Dissemination**
 - Major challenges and priorities for the research community
 - Findings and recommendations for the funding agencies
 - Web, proceedings, panels like this one, ...



How do we assess ourselves?

- **More like scientists**
 - Not sufficiently involved in standards
 - Miss opportunity to reduce ossification
- **Funding priorities seem short-sighted**
 - Networking field perceived as mature
 - Need to correct this misconception
- **Are we creating faceted communities?**
 - Not enough effort to understand commonalities
 - We often reinvent the wheel
 - Fail to define and address grand challenges



What is happening to us?

- **We are growing**
 - More sophisticated applications
 - More inter-disciplinary across CS&E areas
- **Basic, long-term research de-emphasized**
 - Especially in Industry and EU
 - Promote long-term, application-driven research
- **Are we guilty?**
 - Do we need a big Internet collapse that we can not fix without fundamental research?!
 - Is IETF's "rough consensus and running code" too light?



Experiments vs theory vs applications

- All is needed
- Balance and good synergy is missing
- Theory on the defense
 - recent quote on DiffServ mailing list

“we don't have the math, so let's not bother [trying to model]”
 - Model and understand first before building



Research challenges

Sophisticated applications and new networking paradigms

- **Cross-layering**
 - Inter-disciplinary research
- **Programmability**
 - Reduce ossification, increase extensibility
- **Enabling technologies**
 - Security, trust, incentives, pricing, billing
- **Theory to model & understand**
 - Large-scale interactions, uncertainties, performance limits, “ities” (complexity, reliability, evolvability...)



More panelists for the NeXtworking'03 perspective who are here today:

- Ibrahim Matta
- Ken Calvert
- Jorg Liebeherr
- Constantine Dovrolis
- David Yau
- Moshe Sidi
- Israel Cidon

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