

# Anastassios Nanos

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**RESEARCH INTERESTS** Hypervisor technologies, Systems Software, Unikernel Frameworks, Lightweight workload deployment, I/O Virtualization, Communication Architectures for Clusters, Scalable Storage Architectures based on Clusters.

**PROGRAMMING** *Languages:* C, python, bash, C++, C#, PHP, perl, JS, Java  
*Linux Kernel Background:* Device Drivers (Block-Network), DMA API, Virtual Memory Management, x86 and ARMv7/8, SoC bootstrap  
*Unikernels:* rumpkernels, LKL, OSv  
*Virtualization:* Xen (extensive experience with MM, scheduling, device/drivers integration), KVM (MM, virtio)  
*Embedded systems:* Exynos (5422, 7420), Zynq-7000/Ultrascale+, KU3, LanaiXP, ARM XScale, custom FPGA boards  
*Interconnects:* 10GbE, Infiniband, Myrinet/GM (advanced) – Myrinet/MX, Open-MX (advanced)  
*DataBase Management Systems:* MySQL, PostgreSQL, MongoDB

**TECHNICAL & LANGUAGE SKILLS** *Operating Systems:* Linux, Unix, Free/Net/OpenBSD, MS Windows  
*Systems Administration:* DNS (bind), WWW (apache, nginx), Mail (sendmail & postfix, dovecot), DBMS (MySQL/Postgres, MongoDB) Auth and Directory services (openLDAP & Heimdal Kerberos), VoIP (Asterisk), Networking (CISCO IOS, iptables, openVPN), Monitoring (collectd, graphite, munin & mrtg). Familiar with setup and deployment of Cloud Computing platforms (OpenStack).  
*Typesetting:* L<sup>A</sup>T<sub>E</sub>X, MS Word  
*Languages:* English (Fluent), French (Moderate), Greek (mother tongue)

**WORK EXPERIENCE**

- ◇ **Researcher / Systems Engineer**, (Feb 2015 – present)  
Conducting research in emerging, power-efficient micro-server architectures on scalable network and storage I/O, and energy-driven resource management in cloud architectures. This work consists mostly of architecting and implementing low-level hypervisor and OS mechanisms in the context of EU-funded projects (EUROSERVER, SHARCS, ACTICLOUD, SUPERFLUIDITY). I have been affiliated with various companies and organizations such as OnApp Ltd., CSLab at NTUA, Up2Metric SA etc.
- ◇ **Postdoctoral research fellow**, CSLAB, ECE, NTUA (May 2014 – Jan 2015)  
Worked on I/O Virtualization, systems software for high-performance I/O in virtualized environments, communication architectures for clusters, and scalable storage architectures based on clusters.
- ◇ **Co-founder & Systems Engineer**, Mist.io Inc. (July 2013 – Jan 2015)  
Design, develop, deploy and maintain the company's product. Mist.io is about cloud server management, monitoring and automation across multiple cloud providers from any web device. Mostly develop in python, javascript and bash.
- ◇ **Intern**, Maxeler Technologies Ltd. (Sept 2011 – Mar 2012)  
Worked on porting the company's custom FPGA boards to virtualized environments. As my task was completed quickly, I joined the hardware group working on the company's new product line (MPC-X), doing performance evaluation at first as well as kernel developing for the board's interface driver and the networking stack (Infiniband).

- ◇ **Systems Engineer**, Unweb.me Ltd. (Jan 2011 – Dec 2013)  
Served as a systems engineer, deploying, administering and maintaining the company's infrastructure both on bare-metal servers (co-located) as well as cloud servers (mostly Amazon EC2).
- ◇ **Junior Researcher**, CSLAB, ECE, NTUA (April 2007 – Dec 2013)  
For the purpose of my PhD thesis, I worked on scalable block-level storage systems, communication architectures for clusters, custom 10gigE interconnection frameworks and I/O Virtualization.
- ◇ **Senior Unix/Linux Administrator**, CSLAB, ECE, NTUA (April 2007 – Dec 2013)  
Maintain, administer and support the lab (10-20 grad students, faculty members and visiting staff) providing services such as: DNS, WWW, Mail, VoiP and DBMS. From Sept 2011, my role is mostly advising the systems administration team.
- ◇ **Senior Unix/Linux Administrator**, Computer Center, ECE, NTUA (Oct 2005 – Sept 2010)  
Setup the entire lab (25-30 workstations, 5 servers), migrated from Solaris/SunOS 4.3 to Debian GNU/Linux, and maintained the lab which featured a fully autonomous setup, able to provide the necessary software for students to work on ECE school's projects.
- ◇ **Unix Support**, PC Systems S.A. (May 2004 – Sept 2004)  
Served as backend support for the company's clients mostly Solaris and some Linux-based setups.
- ◇ **Linux/Windows Administrator, Technical Support**, Small accounting business (Sept 2001 – 2006)  
Maintained all workstations (5) based on Windows 95/98/XP, migrated the server from Novel Netware to Windows server and finally Linux. Provided support for the integration of commercial software suites specific to the business (accounting) as well as general purpose software (network file sharing, scanning/printing etc.).
- ◇ **Freelance web developer** (2002 – 2005)  
Built small sites (static/dynamic) using HTML, PHP and MySQL.

- EDUCATION
- ◇ **Ph.D. in Computer Engineering**, CSLAB, ECE, NTUA, Greece. December 2013. Thesis title: *Efficient I/O Device Sharing in Virtualized Environments*
  - ◇ **Diploma in Electrical and Computer Engineering**, ECE, NTUA, Greece. September 2006.  
Thesis title: *Design and implementation of a mechanism transferring data from storage devices to Myrinet networks bypassing the memory hierarchy.*

- PUBLICATIONS
- A. Nanos, S. Gerangelos, I. Alifieraki, and N. Koziris, **V4V.Sockets: low-overhead intra-node communication in Xen**, Proceedings of the 5th International Workshop on Cloud Data and Platforms (CloudDP '15), held in conjunction with EuroSys 2015, Bordeaux, France, April 21-34 2015. DOI: 10.1145/2744210.2744215
  - I. Mytilinis, D. Tsumakos, V. Kantere, A. Nanos and N. Koziris **I/O Performance Modeling for Big Data Applications over Cloud Infrastructures** Proceedings of the 2015 IEEE International Conference on Cloud Engineering (IC2E 2015), 9-13 March, Tempe, AZ, USA.
  - A. Nanos and N. Koziris **Xen2MX: High-performance communication in Virtualized Environments**, Journal of Systems and Software (2014), <http://dx.doi.org/10.1016/j.jss.2014.04.036>
  - A. Nanos and N. Koziris **Xen2MX: Towards High-performance communication in the Cloud**, Proceedings of the 7th Workshop on Virtualization in High-Performance Cloud computing (VHPC 2012), held in conjunction with Euro-par 2012, Rhodes Island, Greece, August 27-31 2012
  - A. Nanos, N. Nikoleris, S. Psomadakis, E. Kozyri and N. Koziris **A Smart HPC interconnect for clusters of Virtual Machines**, in Proceedings of the 6th Workshop on Virtualization in High-Performance Cloud computing (VHPC 2011), held in conjunction with Euro-par 2011, Bordeaux, France.
  - D. Aragiorgis, A. Nanos, and N. Koziris **Coexisting Scheduling Policies boosting I/O Virtual Machines**, in Proceedings of the 6th Workshop on Virtualization in High-Performance Cloud computing (VHPC 2011), held in conjunction with Euro-par 2011, Bordeaux, France.
  - A. Nanos, G. Goumas and N. Koziris **Exploring I/O Virtualization Data paths for MPI Applications in a Cluster of VMs: A Networking Perspective**, in Proceedings of the 5th Workshop on Virtualization in High-Performance Cloud computing (VHPC 2010), held in conjunction with Euro-Par 2010, Ischia - Naples, Italy.

A. Nanos and N. Koziris, **MyriXen: Message Passing in Xen Virtual Machines over Myrinet and Ethernet**, in Proceedings of the Workshop on *Virtualization in High-Performance Cloud computing* (VHPC 2009), held in conjunction with Euro-Par 2009, Delft, Netherlands.

E. Koukis, A. Nanos and N. Koziris, **GMBlock: Optimizing Data Movement in a Block-level Storage Sharing System over Myrinet**, Cluster Computing, Vol. 13, No. 4, pp. 349-372, 2010. DOI: 10.1007/s10586-009-0106-y

E. Koukis, A. Nanos and N. Koziris, **Synchronized Send Operations for Efficient Streaming Block I/O over Myrinet**, in Proceedings of the Workshop on **Communication Architecture for Clusters** (CAC 2008), held in conjunction with the 22nd **International Parallel and Distributed Processing Symposium** (IPDPS 2008), Miami, FL, USA.

POSTERS /  
TALKS

**System-level Support for Heterogeneous Architectures**, Poster in ARM Research Summit, Sep. 11-13th 2017, Cambridge, UK

**Unikernel Support for NFV-like Applications on Xen ARM 64bit**, Design Session, Xen Summit 2017, Budapest, July 12th, 2017.

**Hypervisor support for emerging scale-out/scale-up architectures**, Lightning Talk, VHPC 17, ISC-HPC 2017, Frankfurt, Jun 22nd, 2017.

**High-performance I/O in Virtualized environments**, Invited Talk, CARV group, FORTH-ICS, Heraklion Crete, Greece, Nov. 1st, 2013.

**I/O in Virtualized environments**, Invited Talk, WBI seminar, Humboldt University of Berlin, Berlin, Germany, Jun. 12th, 2013.

**Experimenting with I/O data paths in Virtualized Environments**, ASPLOS 2012 Doctoral Workshop, short presentation, London, UK, Mar 3-7, 2012.

**Towards an HPC I/O framework for clusters of Virtual Machines**, Poster in ACACES 2011, HiPEAC summer School, Fiuggi, Italy, July 10-16, 2011.

**Deploying MPI applications in a cluster of Xen VMs: A Networking Perspective**, Poster, ACACES 2010, HiPEAC summer School, Terrassa (near Barcelona), Spain, July 11-17, 2010.

**High Performance I/O in Virtualized Environments: A Networking Perspective**, Eurosys 2010 Doctoral Workshop, short presentation, Paris, France, April 14, 2010.

**Message Passing in Xen VMs**, Poster, Cluster 2009, New Orleans, Louisiana, September 2, 2009.

TEACHING AND  
SUPERVISING  
EXPERIENCE

◇ **Teaching Assistance**

Operating Systems, ECE, NTUA (2008 – 2009) & (2009 – 2010) & (2010 – 2011)

Operating Systems Lab, ECE, NTUA (2009 – 2010)

Programming Techniques, ECE, NTUA (Mar 2007 – July 2007)

◇ **Co-supervision of Diploma Thesis**

*V4Vsockets: Efficient low-overhead intra-node communication in Virtual Machines*, CSLAB, ECE, NTUA (2013–2014)

*Evaluating and optimizing intra-node communication of co-existing virtual machines*, CSLAB, ECE, NTUA (2012–2013)

*HPC Interconnects in Virtualized Environments*, CSLAB, ECE, NTUA (2010–2011)

*Coexisting Scheduling Policies boosting I/O Virtual Machines*, CSLAB, ECE, NTUA (2010–2011)

*RAID-EC: Exploiting Erasure Codes in distributed storage systems*, CSLAB, ECE, NTUA (2009–2010)

*Integration of High-performance Interconnect semantics in Virtualized Environments*, CSLAB, ECE, NTUA (2009–2010)

*Design and implementation of an RDMA mechanism over programmable 10GbE Interfaces*, CSLAB, ECE, NTUA (2008–2009)

*I/O Tracing on Parallel Filesystems using a network of Virtual Machines*, CSLAB, ECE, NTUA (2007–2008)

OTHER ACTIVITIES	<p><i>Program co-chair</i> Workshop on Virtualization for High-Performance Cloud Computing (VHPC) 2012 – 2017, Workshop on Dependable Parallel, Distributed and Network-Centric Systems (DPDNS) 2015, Workshop on Middleware on HPC and Big Data systems (MHPC) 2013</p> <p><i>TPC Member</i> Workshop on Virtualization for High-Performance Cloud Computing (VHPC) 2010 – 2017, Workshop on Dependable Parallel, Distributed and Network-Centric Systems (DPDNS) 2015-2016, IEEE 4th Symposium on Network Cloud Computing and Applications 2015</p> <p><i>External Referee</i> Shadow PC of the European Conference on Computer Systems (EuroSys) 2015-2017 Workshop on Communication Architecture for Clusters (CAC) 2008, 2009, 2010 International Conference on Parallel Processing (ICPP) 2008 International Forum on Next-Generation Multicore/Manycore Technologies (IFMT) 2008</p>
DISTINCTIONS & AWARDS	<p>EU “IRAKLITOS II” PhD thesis Scholarship, 2010-2013 Greek State Scholarships Foundation, 2007-2010 Hellenic Mathematical Society, Awards for distinction in the nation-wide mathematical Contest (“THALIS 1998”, “EYKLEIDIS 1998”, “THALIS 1999”)</p>
MEMBER	<ul style="list-style-type: none"><li>◇ <b>Technical Chamber of Greece</b></li><li>◇ <b>IEEE Computer Society student member</b></li><li>◇ <b>HiPEAC Network of Excellence</b></li></ul>
REFERENCES	Available upon request.